ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

CHƯƠNG TRÌNH ĐÀO TẠO KHÓA 2023 – NGÀNH KHOA HỌC MÁY TÍNH
TRÌNH ĐỘ ĐẠI HỌC

(Kèm theo Quyết định số 1158/QĐ-ĐHQT ngày 30 tháng 8 năm 2023
của Hiệu trưởng trường Đại học Quốc tế)

TRÌNH ĐỘ ĐẠI HỌC

1. Thông tin chung

- Tên ngành đào tạo: Khoa học Máy tính
  + Tiếng Việt: Khoa học Máy tính
  + Tiếng Anh: Computer Science
- Mã ngành đào tạo: 7480101
- Trình độ đào tạo: Bậc Đại học, trình độ cử nhân
- Loại hình đào tạo: Chính quy
- Thời gian đào tạo: 4 năm
- Tên văn bằng sau khi tốt nghiệp:
  + Tiếng Việt: Cử nhân Khoa học Máy tính
  + Tiếng Anh: Bachelor of Science in Computer Science
- Nơi đào tạo: Trường Đại Học Quốc Tế - Đại Học Quốc Gia TP.HCM

2. Thông tin tuyển sinh và kế hoạch đào tạo

a. Đối tượng tuyển sinh

Đối tượng tuyển sinh căn cứ theo quy chế tuyển sinh đại học của Bộ Giáo dục và Đào tạo và Đề án tuyển sinh hàng năm của Đại học Quốc gia TP.HCM và Đề án tuyển sinh của trường Đại học Quốc tế.

b. Hình thức tuyển sinh

Trường Đại học Quốc tế thực hiện tuyển sinh theo Quy chế tuyển sinh Đại học ban hành hàng năm bởi Bộ Giáo dục và Đào tạo, căn cứ theo Đề án tuyển sinh hàng năm của Đại học Quốc gia TP.HCM và Đề án tuyển sinh của trường Đại học Quốc tế.

c. Tổ hợp môn xét tuyển

d. Dự kiến chỉ tiêu tuyển sinh, quy mô đào tạo

3. Mục tiêu đào tạo

a. Mục tiêu chung: đào tạo cử nhân Khoa học máy tính đạt được (i) nền tảng kiến thức cơ bản vững chắc về khoa học máy tính, (ii) kiến thức chuyên ngành sâu và rộng về khoa học máy tính và hệ thống thông tin, (iii) kiến thức về hội nhập, khởi nghiệp, (iv) các kỹ năng mềm cần thiết, (v) đạo đức nghề nghiệp và ý thức trách nhiệm đối với bản thân và xã hội, (vi) khả năng tự học hoặc tham gia các khóa bồi dưỡng để nắm bắt các công nghệ mới, và (vii) đủ năng lực học tiếp sau đại học trong và ngoài nước.

Bảng 1. Sự phù hợp của mục tiêu đào tạo với Tầm nhìn, sứ mạng và Mục tiêu giáo dục của Luật giáo dục đại học.

Mục tiêu đào tạo của CTĐT	Tầm nhìn	Sứ mạng (tô đậm những nội hàm mà mục tiêu thể hiện hoặc gắn kết)	Luật giáo dục (tô đậm những nội hàm mà mục tiêu thể hiện hoặc gắn kết)
- Sinh viên tốt nghiệp chương trình Cử nhân Kỹ thuật CNTT sẽ có: 1. Kiến thức và lý luận về ngành (i) kiến thức cơ bản vững chắc về máy tính, hệ thống máy tính, mạng máy tính và ứng dụng CNTT, bao gồm các khía cạnh lý thuyết và ứng dụng (ii) kiến thức chuyên ngành sâu, rộng về máy tính, hệ thống máy tính, mạng máy tính và ứng dụng công nghệ thông tin. Có kỹ năng phân tích và giải quyết vấn đề; thiết kế, phát triển và tích hợp hệ thống thông tin cho các ứng dụng kỹ thuật liên quan đến máy tính, hệ thống mạng máy tính và các ứng dụng và hệ thống dựa trên mạng máy tính. Khả năng giải quyết các vấn đề kỹ thuật, xã hội, chính	Nhằm mục đích trở thành trường được quốc gia và quốc tế công nhận về phương pháp giảng dạy tiên tiến, nghiên cứu hiện đại và đổi mới. ● Phương pháp giảng dạy tiên tiến: ✓ Để cung cấp cho sinh viên các lý thuyết cơ bản và nâng cao và liên kết chúng với ứng dụng kỹ thuật. ✓ Tương tác với học sinh cả trong và ngoài lớp học. ✓ Để hỗ trợ sinh viên với việc giảng dạy kết hợp. ✓ Để truyền cảm hứng cho sinh viên tham gia nghiên cứu và giải quyết các vấn đề kỹ thuật. ● Nghiên cứu hiện đại: ✓ Xây dựng các phòng thí nghiệm hiện đại phục vụ cho các lĩnh vực nghiên cứu của	Phù hợp với sứ mệnh của IU – ĐHQG TP.HCM, SEE hướng đến: ● Giúp học sinh tận dụng tốt nhất các cơ hội học tập và chuẩn bị cho học sinh những kiến thức cần thiết để có thể thích ứng với sự thay đổi nhanh chóng của công nghệ ● Tiến hành nghiên cứu chất lượng cao mang lại lợi ích cho sinh viên, học giả và cộng đồng ● Chuyển giao công nghệ để giải quyết các vấn đề của cộng đồng và tạo ra sự hợp tác mạnh mẽ với Ngành.	● Cung cấp giáo dục sau đại học và đại học chất lượng cao trong đa ngành. Tất cả các chương trình giáo dục đều được kiểm định/đánh giá theo tiêu chuẩn khu vực và quốc tế. ● Cung cấp các nghiên cứu xuất sắc bao gồm nghiên cứu cơ bản và ứng dụng đáp ứng nhu cầu của ngành, địa phương, xã hội và tiêu chuẩn quốc tế. ● Giữ vai trò tiên phong tại Việt Nam bằng cách thực hành quản lý xuất sắc, truyền cảm hứng và hỗ trợ các thành viên khác của ĐHQGHN trong việc thúc đẩy sự phát triển của Đại học Quốc gia TP.HCM nói chung.

trị và kinh tế liên ngành. 2. Kỹ năng và phẩm chất cá nhân và nghề nghiệp (iii) kiến thức về hội nhập và khởi nghiệp. Có ý thức bảo vệ môi trường, thiết kế và vận hành hệ thống thân thiện với môi trường. 3. Kỹ năng làm việc nhóm và giao tiếp (iv) các kỹ năng mềm cần thiết và giải quyết vấn đề. Có khả năng làm việc theo nhóm, kỹ năng lãnh đạo và quản lý. Có khả năng giao tiếp và làm việc chuyên nghiệp bằng tiếng Anh (ở mức độ thành thạo). (v) Có ý thức rõ ràng về chuyên môn, đạo đức nghề nghiệp và tinh thần trách nhiệm đối với bản thân và xã hội. Có phẩm chất chính trị tốt, sống và làm việc tuân thủ pháp luật của nhà nước Việt Nam.	trường và khuyến khích sinh viên tham gia. ✓ Để chuẩn bị chương trình giảng dạy học thuật liên quan đến nghiên cứu. ● Đổi mới: ✓ Hướng dẫn học sinh hiểu về bối cảnh xã hội, kinh tế và kỹ thuật. ✓ Hướng học sinh nhìn nhận vấn đề hiện tại và tương lai. ✓ Rèn cho học sinh tư duy sáng tạo và phản biện. ✓ Rèn luyện cho học sinh làm việc theo nhóm đối với các bài toán tích hợp.		

4. Năng lực hành nghề (vi) khả năng tự học và nghiên cứu hoặc tham gia các khóa bồi dưỡng để nắm bắt công nghệ mới, (vii) có đủ năng lực học tiếp trong và ngoài nước.			

b. Mục tiêu cụ thể (Program Objectives - POs)

Sinh viên tốt nghiệp phải có phẩm chất đạo đức, chính trị và sức khỏe tốt; có kiến thức cơ bản và chuyên sâu về Khoa học máy tính; có khả năng nghiên cứu, phân tích và thiết kế các hệ thống máy tính để giải quyết các vấn đề thực tế; có khả năng làm việc hiệu quả và sáng tạo trong quá trình làm việc; có khả năng tiếp tục học suốt đời để phát triển nghề nghiệp.

4. Chuẩn đầu ra của chương trình đào tạo (Program Learning Outcomes –PLOs)

Kết quả của sinh viên dẫn đến mục tiêu Giáo dục của Chương trình một cách hợp lý. Việc đạt được các mục tiêu giáo dục của chương trình được hỗ trợ bởi các hành động của chương trình, được ánh xạ tới kết quả đầu ra của học sinh như trong Bảng:

Mục tiêu giáo dục của chương trình	**1**	**2**	**3**	**4**	**5**	**6**	**7**
PLO1	5	5	3	5	3	5	5
PLO **2**	5	3	3	3	3	3	5
PLO **3**			4	5	4	3	2
PLO **4**			3	5	5		

5. Ma trận giữa mục tiêu đào tạo và chuẩn đầu ra

Bảng 2. Mối quan hệ giữa CĐR của CTĐT và mục tiêu đào tạo

Mục tiêu giáo dục của chương trình	PLOs	**Kiến thức và sự hiểu biết**	**Phân tích kỹ thuật**	**Thiết kế kỹ thuật**	**Thực hành kỹ thuật và phát triển sản phẩm**	**Kỹ năng chuyển nhượng**
Kiến thức	PLO 1	X	X	X	X	

Kỹ năng	PLO 2				X	X
Tự chủ và trách nhiệm	PLO 3				X	X
	PLO 4					X

6. Quy trình đào tạo, điều kiện tốt nghiệp

Căn cứ Quyết định số 1342/QĐ-ĐHQG ngày 30 tháng 9 năm 2022 của Giám đốc Đại học Quốc gia Thành phố Hồ Chí Minh về việc ban hành Quy chế đào tạo trình độ đại học.

Căn cứ Quyết định số 719/QĐ-ĐHQT ngày 06 tháng 12 năm 2021 của Hiệu trưởng trường Đại học Quốc tế về việc ban hành Quy chế đào tạo trình độ đại học theo hệ thống tín chỉ tại trường Đại học Quốc tế.

7. Thang điểm (theo thang điểm chính thức của trường)

Trường quy định thang điểm đánh giá kết quả học tập của người học (Quy chế đào tạo trình độ đại học theo hệ thống tín chỉ tại trường Đại học Quốc tế)

Bảng 3: Thang điểm

Xếp loại	**Thang điểm 100**	**Thang điểm 10**	**Thang điểm 4**	**Thang điểm chữ**
Đạt				
Xuất sắc	90≤ ĐTBTL ≤ 100	9,0 ≤ ĐTBTL ≤ 10	4,0	A^+
Giỏi	80≤ ĐTBTL < 90	8,0 ≤ ĐTBTL < 9,0	3,5	A
Khá	70≤ ĐTBTL < 80	7,0≤ ĐTBTL < 8,0	3,0	B^+
Trung bình khá	60≤ ĐTBTL < 70	6,0≤ ĐTBTL < 7,0	2,5	B
Trung bình	50≤ ĐTBTL < 60	5,0≤ ĐTBTL < 6,0	2,0	C

Không đạt				
Yếu	40 ≤ ĐTBTL < 50	4,0≤ ĐTBTL < 5,0	1,5	D+
Kém	30 ≤ ĐTBTL < 40	3,0≤ ĐTBTL < 4,0	1,0	D
	ĐTBTL < 30	ĐTBTL < 3,0	0,0	F

8. Khối lượng kiến thức toàn khoá

Tổng số tín chỉ: 130 tín chỉ, trong đó phân bổ kiến thức như Bảng 4 (không bao gồm giáo dục thể chất và giáo dục quốc phòng):

Bảng 4. Cấu trúc chương trình đào tạo

TT	**Các khối kiến thức(3)**	**Khối lượng**	
		Số tín chỉ	**%**
I	Khối kiến thức giáo dục đại cương	45	35%
II	Khối kiến thức cơ sở ngành	31	24%
III	Kiến thức chuyên ngành	20	15%
IV	Kiến thức tự chọn	15	12%
V	Kiến thức bổ trợ	3	2%
VI	Thực tập, khóa luận/luận văn tốt nghiệp	16	12%
	Tổng cộng	**130**	**100%**

9. Nội dung chương trình đào tạo

Bảng 5. Các môn học thuộc CTĐT

Stt	Tên MH	Mã MH	Tên môn học (MH)		Loại MH (bắt buộc/ tự chọn)	Tín chỉ			Phòng TN (**)
			Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm	

I		**Kiến thức giáo dục đại cương**							
1.1	***Các môn lý luận chính trị***								
1	Triết học Mác-Lênin	PE015IU	Triết học Mác-Lênin	Philosophy Marx - Lenin	Bắt buộc	3	3	0	
2	Kinh tế chính trị Mác-Lênin	PE016IU	Kinh tế chính trị Mác-Lênin	Marxist – Leninist Political Economy	Bắt buộc	2	2	0	
3	Chủ nghĩa xã hội khoa học	PE017IU	Chủ nghĩa xã hội khoa học	Scientific Socialism	Bắt buộc	2	2	0	
4	Lịch sử Đảng Cộng Sản Việt Nam	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	
5	Tư tưởng Hồ Chí Minh	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	
		Tổng cộng				**11**	**11**	**0**	
1.2	***Khoa học tự nhiên – Xã hội***								
6	Toán 1	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	
7	Toán 2	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	

8	Xác suất, thống kê và quá trình ngẫu nhiên	MA026IU	Xác suất, thống kê và quá trình ngẫu nhiên	Probability, Statistic & Random Process	Bắt buộc	3	3	0	
9	Vật lý 1	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	
10	Vật lý 3	PH015IU	Vật lý 3	Physics 3	Bắt buộc	3	3	0	
11	Thực hành Vật lý 3	PH016IU	Thực hành Vật lý 3	Physics 3 Laboratory	Bắt buộc	1	0	1	
12	Đại số tuyến tính	IT154IU	Linear Algebra	Đại số tuyến tính	Bắt buộc	3	3	0	
13	Toán rời rạc	IT153IU	Toán rời rạc	Discrete Mathematics	Bắt buộc	3	3	0	
14	Pháp luật đại cương	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
	Tổng cộng					**26**	**25**	**1**	
1.3	***Ngoại ngữ***								
15	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Academic English 1 (listening skill)	Bắt buộc	2	2	0	
16	Tiếng Anh chuy	EN007IU	Tiếng Anh chuyên	Academic English 1	Bắt buộc	2	2	0	

	ên ngành 1 (kỹ năng viết)		ngành 1 (kỹ năng viết)	(writing skill)					
17	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Academic English 2 (speaking skill)	Bắt buộc	2	2	0	
18	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Academic English 2 (writing skill)	Bắt buộc	2	2	0	
	Tổng cộng					**8**	**8**	**0**	
1.4	***Giáo dục thể chất***								
19	Giáo dục thể chất 1	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	0	3	
20	Giáo dục thể chất 2	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	0	3	
	Tổng cộng					**6**	**0**	**6**	
II	**Kiến thức cơ sở ngành**								
21	Nhập môn Tin học	IT064IU	Nhập môn Tin học	Introduction to Computing	Bắt buộc	3	3	0	
22	Lập trình	IT116IU	Lập trình C/C++	C/C++ Programming	Bắt buộc	4	3	1	

	C/C++								
23	Lập trình hướng đối tượng	IT069IU	Lập trình hướng đối tượng	Object-Oriented Programming	Bắt buộc	4	3	1	
24	Cấu trúc dữ liệu và giải thuật	IT013IU	Cấu trúc dữ liệu và giải thuật	Algorithms and Data Structures	Bắt buộc	4	3	1	
25	Nguyên lý Quản trị Cơ sở dữ liệu	IT079IU	Nguyên lý Quản trị Cơ sở dữ liệu	Principles of Database Management	Bắt buộc	4	3	1	
26	Kiến trúc máy tính	IT089IU	Kiến trúc máy tính	Computer Architecture	Bắt buộc	4	3	1	Môn học học trước IT067IU (3,0) Digital Logic Design
27	Mạng máy tính	IT091IU	Mạng máy tính	Computer Networks	Bắt buộc	4	3	1	
28	Phân tích và thiết kế hướng đối tượng	IT090IU	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis and Design	Bắt buộc	4	3	1	
	Tổng cộng					**31**	**24**	**7**	

III	**Kiến thức chuyên ngành**								
29	Công nghệ Phần mềm	IT076IU	Công nghệ Phần mềm	Software Engineering	Bắt buộc	4	3	1	
30	Phát triển ứng dụng Web	IT093IU	Phát triển ứng dụng Web	Web Application Development	Bắt buộc	4	3	1	
31	Nguyên lý của Ngôn ngữ lập trình	IT092IU	Nguyên lý của Ngôn ngữ lập trình	Principles of Programming Languages	Bắt buộc	4	3	1	
32	Hệ điều hành	IT017IU	Hệ điều hành	Operating Systems	Bắt buộc	4	3	1	
33	Trí thông minh nhân tạo	IT159IU	Trí thông minh nhân tạo	Artificial Intelligence	Bắt buộc	4	3	1	
	Tổng cộng					**20**	**15**	**5**	
IV	**Kiến thức tự chọn *(sinh viên chọn tối thiểu 15 tín chỉ trong nhóm môn học sau)***								
34	Khai thác dữ liệu	IT160IU	Data Mining	Khai thác dữ liệu	Tự chọn	4	3	1	
35	Xử lý ảnh Kỹ thuật số	IT130IU	Digital Image Processing	Xử lý ảnh Kỹ thuật số	Tự chọn	4	3	1	

36	Kiến trúc phần mềm	IT114IU	Software Architecture	Kiến trúc phần mềm	Tự chọn	4	3	1	
37	Lập trình mạng	IT096IU	Net-centric Programming	Lập trình mạng	Tự chọn	4	3	1	
38	Quản lý hệ thống thông tin	IT094IU	Information System Management	Quản lý hệ thống thông tin	Tự chọn	4	3	1	
39	Quản lý dự án CNTT	IT056IU	IT Project Management	Quản lý dự án CNTT	Tự chọn	4	3	1	
40	Đồ hoạ Máy tính	IT024IU	Computer Graphics	Đồ hoạ Máy tính	Tự chọn	4	3	1	
41	Học sâu	IT157IU	Deep Learning	Học sâu	Tự chọn	4	3	1	
42	Internet Vạn vật	IT134IU	Internet of Things	Internet Vạn vật	Tự chọn	4	3	1	
43	Phát triển ứng dụng di động	IT133IU	Mobile Application Development	Phát triển ứng dụng di động	Tự chọn	4	3	1	
44	Tương tác người và máy	IT044IU	Human Computer Interaction	Tương tác người và máy	Tự chọn	4	3	1	

45	Điện toán đám mây	IT164IU	Cloud computing	Điện toán đám mây	Tự chọn	4	3	1	
46	Công nghệ và Triển khai bảo mật	IT165IU	Security Technology and Implementation	Công nghệ và Triển khai bảo mật	Tự chọn	4	3	1	
47	Kiểm tra chất lượng phần mềm	IT166IU	Software Quality Verification and Validation	Kiểm tra chất lượng phần mềm	Tự chọn	4	3	1	
48	Phát triển ứng dụng game	IT167IU	Game Application Development	Phát triển ứng dụng game	Tự chọn	4	3	1	
49	Chuỗi khối	IT150IU	Blockchain	Chuỗi khối	Tự chọn	4	3	1	
50	Phát triển và vận hành liên tục	IT156IU	Development & Operation (DevOps)	Phát triển và vận hành liên tục	Tự chọn	4	3	1	
51	Trực quan hóa dữ liệu	IT138IU	Data Science and Visualization	Trực quan hóa dữ liệu	Tự chọn	4	3	1	
52	Tư Duy Phản Biện	PE008IU	Critical Thinking	Tư Duy Phản Biện	Tự chọn	3	3	0	

53	Tự chọn tự do		Free Elective	Tự chọn tự do		3	3	0	
	Tổng cộng					**15**	**12**	**3**	
V	**Kiến thức bổ trợ**								
54	Khởi nghiệp	IT120IU	Khởi nghiệp	Entrepreneurship	Bắt buộc	3	3	0	
	Tổng cộng					**3**	**3**	**0**	
	Nghiên cứu, thực tập và luận văn tốt nghiệp								
55	Thực tập công nghiệp	IT082IU	Thực tập công nghiệp	Internship	Bắt buộc	3	0	3	
56	Thực tập tốt nghiệp	IT083IU	Thực tập tốt nghiệp	Special Study of the Field	Bắt buộc	3	0	3	
	Tổng cộng					**6**	**0**	**6**	
	Tốt nghiệp								
	Sinh viên có GPA >= 70: chọn môn Thesis								
57	Luận văn tốt nghiệp	IT058IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	
	Tổng cộng					**10**	**0**	**10**	
	Sinh viên có GPA < 70: chọn môn Thực tập tốt nghiệp 2 và 2 môn tự chọn (sinh viên chọn 2 môn tự chọn ít nhất 7 tín chỉ)								
58	Thực tập tốt nghiệp 2	IT168IU	Thực tập tốt nghiệp 2	Special Study of the Field 2	Bắt buộc	3	3	0	
59	Khai thác	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	

	dữ liệu								
60	Xử lý ảnh Kỹ thuật số	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
61	Kiến trúc phần mềm	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
62	Lập trình mạng	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	
63	Quản lý hệ thống thông tin	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	
64	Quản lý dự án CNTT	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	
65	Đồ hoạ Máy tính	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	
66	Học sâu	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
67	Internet Vạn vật	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	
68	Phát triển ứng dụng	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	

	di động								
69	Tương tác người và máy	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
70	Điện toán đám mây	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	
71	Công nghệ và Triển khai bảo mật	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	
72	Kiểm tra chất lượng phần mềm	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	
73	Phát triển ứng dụng game	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	
74	Chuỗi khối	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
75	Phát triển và vận hành liên tục	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
76	Trực quan	IT138IU	Trực quan hóa dữ liệu	Data Science and	Tự chọn	4	3	1	

	hóa dữ liệu			Visualization					
	Tổng cộng					**10**	**9**	**1**	
	TỔNG SỐ TÍN CHỈ (không bao gồm thể dục, giáo dục quốc phòng)					**130**	**98**	**32**	

10. Dự kiến kế hoạch giảng dạy *(phân bổ các môn học theo từng học kỳ)*

10.1. Trình độ AE1

Bảng 6. Kế hoạch giảng dạy đối với người học đạt trình độ AE1

Học kỳ	**Mã MH**	**Tên MH**		**Loại MH (bắt buộc/tự chọn)**	**Tín chỉ**			**Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)**
		Tiếng việt	**Tiếng Anh**		**Tổng cộng**	**Lý thuyết**	**Thực hành /Thí nghiệm**	
I (tổng số 17 tín chỉ)	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	IT064IU	Nhập môn Tin học	Introduction to Computing	Bắt buộc	3	3	0	Không
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	Không
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	Không

	IT116IU	Lập trình C/C++	C/C++ Programming	Bắt buộc	4	3	1	Không
	Tổng				**17**	**16**	**1**	
II (tổng số 19 tín chỉ)	PH015IU	Vật lý 3	Physics 3	Bắt buộc	3	3	0	Môn học trước PH013IU Physics 1 và học song hành môn PH016IU Physics 3 Laboratory
	PH016IU	Thực hành Vật lý 3	Physics 3 Laboratory	Bắt buộc	1	0	1	Học song hành môn PH015IU Physics 3
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	IT069IU	Lập trình hướng đối tượng	Object-Oriented Programming	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1)

								Fundamentals of Programming
	IT153IU	Toán rời rạc	Discrete Mathematics	Bắt buộc	3	3	0	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming; IT154IU (3,0) Linear Algebra hoặc MA023IU (4,0) Calculus 3
	IT091IU	Mạng máy tính	Computer Networks	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	Tổng				**19**	**16**	**3**	
III (tổng số 20	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Môn học học trước MA001IU (4,0) Calculus 1

tín chỉ)	IT154IU	Đại số tuyến tính	Linear Algebra	Bắt buộc	3	3	0	Môn học học trước MA003IU (4,0) Calculus 2
	IT013IU	Cấu trúc dữ liệu và giải thuật	Algorithms and Data Structures	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT079IU	Nguyên lý Quản trị Cơ sở dữ liệu	Principles of Database Management	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	PE015IU	Triết học Mác-Lênin	Philosophy Marx - Lenin	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Marxist – Leninist Political Economy	Bắt buộc	2	2	0	Không
	Tổng				**20**	**18**	**2**	
IV (tổng số 19 tín chỉ, trong đó sinh	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	0	3	Không
	IT089IU	Kiến trúc máy tính	Computer Architecture	Bắt buộc	4	3	1	Môn học học trước IT067IU (3,0) Digital Logic Design

viên chọn 1 môn tự chọn 4 tín chỉ)	IT090IU	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis and Design	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT093IU	Phát triển ứng dụng Web	Web Application Development	Bắt buộc	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management và IT069IU (3,1) Object-Oriented Programming
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-

								Oriented Programming
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	

	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	PE008IU	Tư Duy Phản Biện	Critical Thinking	Tự chọn	3	3	0	
	Tổng				**19**	**12**	**7**	
V (tổng số 20 tín chỉ, trong đó sinh viên chọn 2 môn tự chọn 8 tín chỉ)	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	0	3	Không
	MA026IU	Xác suất, thống kê và quá trình ngẫu nhiên	Probability, Statistic & Random Process	Bắt buộc	3	3	0	Môn học trước MA001IU Calculus 1 and MA003IU Calculus 2
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific Socialism	Bắt buộc	2	2	0	Môn học trước PE016IU (2,0) Marxist – Leninist Political Economy
	IT092IU	Nguyên lý của Ngôn ngữ lập trình	Principles of Programming Languages	Bắt buộc	4	3	1	
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming

	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	Tổng				**20**	**14**	**6**	
VI (tổng số 19 tín chỉ, trong đó sinh viên chọn 1 môn tự chọn tự do 3 tín chỉ)	IT076IU	Công nghệ Phần mềm	Software Engineering	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT159IU	Trí thông minh nhân tạo	Artificial Intelligence	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming và IT153IU (3,0) Discrete Mathematics
	PE021IU	Pháp luật đại cương	General law	Bắt buộc	3	3	0	Không
	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Môn học trước PE017IU (2,0) Scientific Socialism

		Tự chọn tự do	Free elective	Tự chọn	3	3	0	Không
	IT120IU	Khởi nghiệp	Entrepreneurship	Bắt buộc	3	3	0	Không
	Tổng				**19**	**17**	**2**	
VII-học kỳ hè (tổng số 3 tín chỉ)	IT082IU	Thực tập công nghiệp	Internship	Bắt buộc	3	0	3	
	Tổng				**3**	**0**	**3**	**3**
VIII (tổng số 13 tín chỉ)	IT017IU	Hệ điều hành	Operating Systems	Bắt buộc	4	3	1	Môn học học trước IT089IU (3,1) Computer Architecture và IT013IU (3,1) Algorithms and Data Structure
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	Môn học trước PE018IU (2,0) History of Vietnamese Communist Party
	IT083IU	Thực tập tốt nghiệp	Special Study of the Field	Bắt buộc	3	0	3	Không
	Tổng				**9**	**5**	**4**	
	Sinh viên có GPA >= 70: chọn môn Thesis							

IX (tổng số 10 or 11 tín chỉ)	IT058IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	
	Tổng cộng				**10**	**0**	**10**	
	Sinh viên có GPA < 70: chọn môn Thực tập tốt nghiệp 2 và 2 môn tự chọn (sinh viên chọn 2 môn tự chọn ít nhất 7 tín chỉ)							
	IT168IU	Thực tập tốt nghiệp 2	Special Study of the Field 2	Bắt buộc	3	0	3	Môn học trước IT083IU Special Study of the Field (3,0)
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	

	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	

	Tổng cộng	**10**	**9**	**1**	
	Tổng	**136**	**98**	**38**	

10.2. Trình độ IE2

Bảng 7. Kế hoạch giảng dạy đối với người học đạt trình độ IE2

Học kỳ	**Mã MH**	**Tên MH**		**Loại MH (bắt buộc/tự chọn)**	**Tín chỉ**			**Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)**
		Tiếng việt	**Tiếng Anh**		**Tổng cộng**	**Lý thuyết**	**Thực hành/Thí nghiệm**	
I (tổng số 17 tín chỉ)	EN TP02	Tiếng Anh Tăng Cường 2	Intensive English 2	Bắt buộc	17	17	0	Không
	Tổng				**17**	**17**	**0**	
II (tổng số 17 tín chỉ)	MA 001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	IT064IU	Nhập môn Tin học	Introduction to Computing	Bắt buộc	3	3	0	Không
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	Không
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	Không

	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	Không
	IT116IU	Lập trình C/C++	C/C++ Programming	Bắt buộc	4	3	1	Không
	Tổng				**17**	**16**	**1**	
III (tổng số 19 tín chỉ)	PH015IU	Vật lý 3	Physics 3	Bắt buộc	3	3	0	Môn học trước PH013IU Physics 1 và học song hành môn PH016IU Physics 3 Laboratory
	PH016IU	Thực hành Vật lý 3	Physics 3 Laboratory	Bắt buộc	1	0	1	Học song hành môn PH015IU Physics 3
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	Không
	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	Không

	IT069IU	Lập trình hướng đối tượng	Object-Oriented Programming	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	IT153IU	Toán rời rạc	Discrete Mathematics	Bắt buộc	3	3	0	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming; IT154IU (3,0) Linear Algebra hoặc MA023IU (4,0) Calculus 3
	IT091IU	Mạng máy tính	Computer Networks	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	Tổng				**19**	**16**	**3**	
IV (tổng số 20 tín chỉ)	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Môn học học trước MA001IU (4,0) Calculus 1
	IT154IU	Đại số tuyến tính	Linear Algebra	Bắt buộc	3	3	0	Không
	IT013IU	Cấu trúc dữ liệu và giải thuật	Algorithms and Data	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

			Structures					
	IT079IU	Nguyên lý Quản trị Cơ sở dữ liệu	Principles of Database Management	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	PE015IU	Triết học Mác-Lênin	Philosophy Marx-Lenin	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Marxist – Leninist Political Economy	Bắt buộc	2	2	0	Không
	Tổng				**20**	**18**	**2**	
V (tổng số 19 tín chỉ, trong đó sinh viên chọn 1 môn tự chọ	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	0	3	Không
	IT089IU	Kiến trúc máy tính	Computer Architecture	Bắt buộc	4	3	1	Không
	IT090IU	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

n 4 tín chỉ)			and Design					
	IT093IU	Phát triển ứng dụng Web	Web Application Development	Bắt buộc	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management và IT069IU (3,1) Object-Oriented Programming
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT133IU	Phát triển ứng	Mobile Appli	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-

		dụng di động	cation Development					Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	PE008IU	Tư Duy Phản Biện	Critical Thinking	Tự chọn	3	3	0	
	Tổng				**19**	**12**	**7**	
VI (tổng số 20 tín chỉ, trong đó sinh viên chọn 2 môn tự chọn 8	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	0	3	Không
	MA026IU	Xác suất, thống kê và quá trình ngẫu nhiên	Probability, Statistic & Random Process	Bắt buộc	3	3	0	Môn học trước MA001IUCalculus 1 and MA003IU Calculus 2
	PE017IU	Chủ nghĩa xã hội	Scientific Socialism	Bắt buộc	2	2	0	Môn học trước PE016IU (2,0) Marxist –

tín chỉ)		khoa học						Leninist Political Economy
	IT092IU	Nguyên lý của Ngôn ngữ lập trình	Principles of Programming Languages	Bắt buộc	4	3	1	
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	Tổng				**20**	**14**	**6**	
VIII (tổng số 19	IT076IU	Công nghệ Phần mềm	Software Engineering	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

tín chỉ, trong đó sinh viên chọn 1 môn tự chọn tự do 3 tín chỉ)	IT159IU	Trí thông minh nhân tạo	Artificial Intelligence	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming và IT153IU (3,0) Discrete Mathematics
	PE021IU	Pháp luật đại cương	General law	Bắt buộc	3	3	0	Không
	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Môn học trước PE017IU (2,0) Scientific Socialism
		Tự chọn tự do	Free elective	Tự chọn	3	3	0	Không
	IT120IU	Khởi nghiệp	Entrepreneurship	Bắt buộc	3	3	0	Không
	Tổng				**19**	**17**	**2**	
IX (tổng số 13 tín chỉ)	IT017IU	Hệ điều hành	Operating Systems	Bắt buộc	4	3	1	Môn học học trước IT089IU (3,1) Computer Architecture và IT013IU (3,1) Algorithms and Data Structure
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's	Bắt buộc	2	2	0	Môn học trước PE018IU (2,0) History of Vietnamese Communist Party

			Thoughts					
	IT083IU	Thực tập tốt nghiệp	Special Study of the Field	Bắt buộc	3	0	3	Không
	Tổng				**9**	**5**	**4**	
X- học kỳ hè (tổng số 3 tín chỉ)	IT082IU	Thực tập công nghiệp	Internship	Bắt buộc	3	0	3	Không
	Tổng				**3**	**0**	**3**	
XI (tổng số 10 or 11 tín chỉ)	**Sinh viên có GPA >= 70: chọn môn Thesis**							
	IT058IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Môn học trước IT083IU Special Study of the Field (3,0)
	Tổng cộng				**10**	**0**	**10**	
	Sinh viên có GPA < 70: chọn môn Thực tập tốt nghiệp 2 và 2 môn tự chọn (sinh viên chọn 2 môn tự chọn ít nhất 7 tín chỉ)							
	IT168IU	Thực tập tốt nghiệp 2	Special Study of the Field 2	Bắt buộc	3	0	3	Môn học trước IT083IU Special Study of the Field (3,0)
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image	Tự chọn	4	3	1	

			Processing					
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks

	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Devel	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

			opment					
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	Tổng cộng				**10**	**9**	**1**	
	Tổng				**153**	**115**	**38**	

10.3. Trình độ IE1

Bảng 8. Kế hoạch giảng dạy đối với người học đạt trình độ IE1

Học kỳ	**Mã MH**	**Tên MH**		**Loại MH (bắt buộc/ tự chọn)**	**Tín chỉ**			**Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)**
		Tiếng việt	**Tiếng Anh**		**Tổng cộng**	**Lý thuyết**	**Thực hành/Thí nghiệm**	
I (tổng số 17 tín chỉ)	ENTP01	Tiếng Anh Tăng Cường 1	Intensive English 1	Bắt buộc	17	17	0	Không
	ENTP02	Tiếng Anh Tăng	Intensive English 2	Bắt buộc	17	17	0	Môn học trước Tiếng Anh Tăng Cường 1

		Cường 2						
	Tổng				**34**	**34**	**0**	
II (tổng số 17 tín chỉ)	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	IT064IU	Nhập môn Tin học	Introduction to Computing	Bắt buộc	3	3	0	Không
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	Không
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	Không
	IT116IU	Lập trình C/C++	C/C++ Programming	Bắt buộc	4	3	1	Không
	Tổng				**17**	**16**	**1**	
III (tổng số 19 tín chỉ)	PH015IU	Vật lý 3	Physics 3	Bắt buộc	3	3	0	Môn học trước PH013IU Physics 1 và học song hành môn PH016IU Physics 3 Laboratory

	PH016IU	Thực hành Vật lý 3	Physics 3 Laboratory	Bắt buộc	1	0	1	Học song hành môn PH015IU Physics 3
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	IT069IU	Lập trình hướng đối tượng	Object-Oriented Programming	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	IT153IU	Toán rời rạc	Discrete Mathematics	Bắt buộc	3	3	0	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming; IT154IU (3,0) Linear Algebra hoặc MA023IU (4,0) Calculus 3

	IT091IU	Mạng máy tính	Computer Networks	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	Tổng				**19**	**16**	**3**	
IV (tổng số 20 tín chỉ)	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Môn học học trước MA001IU (4,0) Calculus 1
	IT154IU	Đại số tuyến tính	Linear Algebra	Bắt buộc	3	3	0	Không
	IT013IU	Cấu trúc dữ liệu và giải thuật	Algorithms and Data Structures	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT079IU	Nguyên lý Quản trị Cơ sở dữ liệu	Principles of Database Management	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	PE015IU	Triết học Mác-Lênin	Philosophy Marx - Lenin	Bắt buộc	3	3	0	Không

	PE016IU	Kinh tế chính trị Mác-Lênin	Marxist – Leninist Political Economy	Bắt buộc	2	2	0	Không
	Tổng				**20**	**18**	**2**	
V (tổng số 19 tín chỉ, trong đó sinh viên chọn 1 môn tự chọn 4 tín chỉ)	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	0	3	Không
	IT089IU	Kiến trúc máy tính	Computer Architecture	Bắt buộc	4	3	1	Không
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	Tự chọn	4	3	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU

								(3,1) Computer Networks
	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	PE008IU	Tư Duy Phản Biện	Critical Thinking	Tự chọn	3	3	0	
	IT090IU	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis and Design	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT093IU	Phát triển ứng dụng Web	Web Application Development	Bắt buộc	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management và IT069IU (3,1) Object-Oriented Programming
	Tổng				**19**	**12**	**7**	
VI	PT002IU	Giáo dục thể chất 2	Physical	Bắt buộc	3	0	3	Không

(tổng số 20 tín chỉ, trong đó sinh viên chọn 2 môn tự chọn 8 tín chỉ)			Training 2					
	MA026IU	Xác suất, thống kê và quá trình ngẫu nhiên	Probability, Statistic & Random Process	Bắt buộc	3	3	0	Môn học trước MA001IUCalculus 1 and MA003IU Calculus 2
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific Socialism	Bắt buộc	2	2	0	Môn học trước PE016IU (2,0) Marxist – Leninist Political Economy
	IT092IU	Nguyên lý của Ngôn ngữ lập trình	Principles of Programming Languages	Bắt buộc	4	3	1	
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric	Tự chọn	4	3	1	Môn học học trước IT091IU

			Programming					(3,1) Computer Networks
	Tổng				**20**	**14**	**6**	
VII (tổng số 19 tín chỉ, trong đó sinh viên chọn 1 môn tự chọn tự do 3 tín chỉ)	IT076IU	Công nghệ Phần mềm	Software Engineering	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT159IU	Trí thông minh nhân tạo	Artificial Intelligence	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming và IT153IU (3,0) Discrete Mathematics
	PE021IU	Pháp luật đại cương	General law	Bắt buộc	3	3	0	Không
	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Môn học trước PE017IU (2,0) Scientific Socialism
		Tự chọn tự do	Free elective	Tự chọn	3	3	0	Không
	IT120IU	Khởi nghiệp	Entrepreneurship	Bắt buộc	3	3	0	Không
	Tổng				**19**	**17**	**2**	
VIII (tổng số 13	IT017IU	Hệ điều hành	Operating Systems		4	3	1	Môn học học trước IT089IU (3,1) Computer Architecture và IT013IU (3,1) Algorithms and

tín chỉ)								Data Structure
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts		2	2	0	Môn học trước PE018IU (2,0) History of Vietnamese Communist Party
	IT083IU	Thực tập tốt nghiệp	Special Study of the Field		3	0	3	Không
	Tổng				**9**	**5**	**4**	
IX- học kỳ hè (tổng số 3 tín chỉ)	IT082IU	Thực tập công nghiệp	Internship	Bắt buộc	3	0	3	Không
	Tổng				**3**	**0**	**3**	
X (tổng số 10 or 11 tín chỉ)	**Sinh viên có GPA >= 70: chọn môn Thesis**							
	IT058IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Môn học trước IT083IU Special Study of the Field (3,0)
	Tổng cộng				**10**	**0**	**10**	
	Sinh viên có GPA < 70: chọn môn Thực tập tốt nghiệp 2 và 2 môn tự chọn (sinh viên chọn 2 môn tự chọn ít nhất 7 tín chỉ)							
	Thực tập tốt nghiệp 2	IT168IU	Special Study of the Field 2	Bắt buộc	3	0	3	Môn học trước IT083IU Special Study of the Field (3,0)
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-

								Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks

	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	

	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	Tổng				**10**	**9**	**1**	
	Tổng				**187**	**149**	**38**	

10.4. Trình độ IE0

Bảng 9. Kế hoạch giảng dạy đối với người học đạt trình độ IE0

Học kỳ	**Mã MH**	**Tên MH**		**Loại MH (bắt buộc/ tự chọn)**	**Tín chỉ**			**Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)**
		Tiếng việt	**Tiếng Anh**		**Tổng cộng**	**Lý thuyết**	**Thực hành/Thí nghiệm**	
I (tổng số 17 tín chỉ)	EN TP00	Tiếng Anh Tăng Cường 0	Intensive English 0	Bắt buộc	17	17	0	Không
	EN TP01	Tiếng Anh Tăng Cường 1	Intensive English 1	Bắt buộc	17	17	0	Môn học trước Tiếng Anh Tăng Cường 1

	Tổng				**34**	**34**	**0**	
II (tổng số 17 tín chỉ)	EN TP02	Tiếng Anh Tăng Cường 2	Intensive English 2	Bắt buộc	17	17	0	Môn học trước Tiếng Anh Tăng Cường 1
	Tổng				**17**	**17**	**0**	
III (tổng số 17 tín chỉ)	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	IT064IU	Nhập môn Tin học	Introduction to Computing	Bắt buộc	3	3	0	Không
	EN008IU	Tiếng Anh chuyên ngành 1 (kỹ năng nghe)	Listening AE1	Bắt buộc	2	2	0	Không
	PH013IU	Vật lý 1	Physics 1	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh chuyên ngành 1 (kỹ năng viết)	Writing AE1	Bắt buộc	2	2	0	Không
	IT116IU	Lập trình C/C++	C/C++ Programming	Bắt buộc	4	3	1	Không
	Tổng				**17**	**16**	**1**	

IV (tổng số 19 tín chỉ)	PH015IU	Vật lý 3	Physics 3	Bắt buộc	3	3	0	Môn học trước PH013IU Physics 1 và học song hành môn PH016IU Physics 3 Laboratory
	PH016IU	Thực hành Vật lý 3	Physics 3 Laboratory	Bắt buộc	1	0	1	Học song hành môn PH015IU Physics 3
	EN012IU	Tiếng Anh chuyên ngành 2 (kỹ năng nói)	Speaking AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	EN011IU	Tiếng Anh chuyên ngành 2 (kỹ năng viết)	Writing AE2	Bắt buộc	2	2	0	Môn học trước EN008IU Listening AE1 và EN007IU Writing AE1
	IT069IU	Lập trình hướng đối tượng	Object-Oriented Programming	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming

	IT153IU	Toán rời rạc	Discrete Mathematics	Bắt buộc	3	3	0	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming; IT154IU (3,0) Linear Algebra hoặc MA023IU (4,0) Calculus 3
	IT091IU	Mạng máy tính	Computer Networks	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	Tổng				**19**	**16**	**3**	
V (tổng số 20 tín chỉ)	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Môn học học trước MA001IU (4,0) Calculus 1
	IT154IU	Đại số tuyến tính	Linear Algebra	Bắt buộc	3	3	0	Không
	IT013IU	Cấu trúc dữ liệu và giải thuật	Algorithms and Data	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-

			Structures					Oriented Programming
	IT079IU	Nguyên lý Quản trị Cơ sở dữ liệu	Principles of Database Management	Bắt buộc	4	3	1	Môn học học trước IT116IU (3,1) C/C++ Programming hoặc IT149IU (3,1) Fundamentals of Programming
	PE015IU	Triết học Mác-Lênin	Philosophy Marx - Lenin	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Marxist – Leninist Political Economy	Bắt buộc	2	2	0	Không
	Tổng				**20**	**18**	**2**	
VI (tổng số 19 tín chỉ, trong đó	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3	0	3	Không
	IT089IU	Kiến trúc máy tính	Computer	Bắt buộc	4	3	1	Không

sinh viên chọn 1 môn tự chọn 4 tín chỉ)			Architecture					
	IT090IU	Phân tích và thiết kế hướng đối tượng	Object-Oriented Analysis and Design	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT093IU	Phát triển ứng dụng Web	Web Application Development	Bắt buộc	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management và IT069IU (3,1) Object-Oriented Programming
	IT094IU	Quản lý hệ thống thông tin	Information System Management	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming

	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán đám mây	Cloud computing	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT165IU	Công nghệ và Triển	Security Tec	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1)

		khai bảo mật	hnology and Implementation					Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (De	Tự chọn	4	3	1	

			vOps)					
	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	PE008IU	Tư Duy Phản Biện	Critical Thinking	Tự chọn	3	3	0	
	Tổng				**19**	**12**	**7**	
VII (tổng số 20 tín chỉ, trong đó sinh viên chọn 2 viên chọn 2 môn tự chọn 8 tín chỉ)	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3	0	3	Không
	MA026IU	Xác suất, thống kê và quá trình ngẫu nhiên	Probability, Statistic & Random Process	Bắt buộc	3	3	0	Môn học trước MA001IUCalculus 1 and MA003IU Calculus 2
	PE017IU	Chủ nghĩa xã hội khoa học	Scientific Socialism	Bắt buộc	2	2	0	Môn học trước PE016IU (2,0) Marxist – Leninist Political Economy
	IT092IU	Nguyên lý của Ngôn	Principles of	Bắt buộc	4	3	1	

		ngữ lập trình	Programming Languages					
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	Tổng				**20**	**14**	**6**	
VIII - (tổn	IT076IU	Công nghệ Phần mềm	Software Engi	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-

g số 19 tín chỉ, trong đó sinh viên chọn 1 môn tự chọn tự do 3 tín chỉ)			neering					Oriented Programming
	IT159IU	Trí thông minh nhân tạo	Artificial Intelligence	Bắt buộc	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming và IT153IU (3,0) Discrete Mathematics
	PE021IU	Pháp luật đại cương	General law	Bắt buộc	3	3	0	Không
	PE018IU	Lịch sử Đảng Cộng Sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Môn học trước PE017IU (2,0) Scientific Socialism
		Tự chọn tự do	Free elective		3	3	0	Không
	IT120IU	Khởi nghiệp	Entrepreneurship	Bắt buộc	3	3	0	Không
	Tổng				**19**	**17**	**2**	
IX- (tổng số 3	IT082IU	Thực tập công nghiệp	Internship	Bắt buộc	3	0	3	Không

tín chỉ)								
	Tổng				**3**	**0**	**3**	
X (tổng số 13 tín chỉ)	IT017IU	Hệ điều hành	Operating Systems		4	3	1	Môn học học trước IT089IU (3,1) Computer Architecture và IT013IU (3,1) Algorithms and Data Structure
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts		2	2	0	Môn học trước PE018IU (2,0) History of Vietnamese Communist Party
	IT083IU	Thực tập tốt nghiệp	Special Study of the Field		3	0	3	Không
	Tổng				**13**	**8**	**5**	
XI (tổng số 10 or 11 tín chỉ)	**Sinh viên có GPA >= 70: chọn môn Thesis**							
	IT058IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Môn học trước IT083IU Special Study of the Field (3,0)
	Tổng cộng				**10**	**0**	**10**	

	Sinh viên có GPA < 70: chọn môn Thực tập tốt nghiệp 2 và 2 môn tự chọn (sinh viên chọn 2 môn tự chọn ít nhất 7 tín chỉ)							
	IT168IU	Thực tập tốt nghiệp 2	Special Study of the Field 2	Bắt buộc	3	0	3	Môn học trước IT083IU Special Study of the Field (3,0)
	IT160IU	Khai thác dữ liệu	Data Mining	Tự chọn	4	3	1	Môn học trước IT069IU (3,1) Object-Oriented Programming
	IT130IU	Xử lý ảnh Kỹ thuật số	Digital Image Processing	Tự chọn	4	3	1	
	IT114IU	Kiến trúc phần mềm	Software Architecture	Tự chọn	4	3	1	
	IT096IU	Lập trình mạng	Net-centric Programming	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT094IU	Quản lý hệ thống thông tin	Information System Manage	Tự chọn	4	3	1	Môn học học trước IT079IU (3,1) Principles of Database Management

			ment					
	IT056IU	Quản lý dự án CNTT	IT Project Management	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT024IU	Đồ hoạ Máy tính	Computer Graphics	Tự chọn	4	3	1	
	IT157IU	Học sâu	Deep Learning	Tự chọn	4	3	1	
	IT134IU	Internet Vạn vật	Internet of Things	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT133IU	Phát triển ứng dụng di động	Mobile Application Development	Tự chọn	4	3	1	Môn học học trước IT090IU (3,1) Object-Oriented Analysis and Design
	IT044IU	Tương tác người và máy	Human Computer Interaction	Tự chọn	4	3	1	
	IT164IU	Điện toán	Cloud com	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1)

		đám mây	puting					Computer Networks
	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	Tự chọn	4	3	1	Môn học học trước IT091IU (3,1) Computer Networks
	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT167IU	Phát triển ứng dụng game	Game Application Development	Tự chọn	4	3	1	Môn học học trước IT069IU (3,1) Object-Oriented Programming
	IT150IU	Chuỗi khối	Blockchain	Tự chọn	4	3	1	
	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	Tự chọn	4	3	1	

	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	Tự chọn	4	3	1	
	Tổng				**10**	**9**	**1**	
	Tổng				**204**	**166**	**38**	

11 Ma trận các môn học và chuẩn đầu ra (kỹ năng)

Mức độ đóng góp của các môn học vào chuẩn đầu ra của CTĐT ngành Khoa học Máy tính được trình bày như Bảng 10.

Bảng 10. Đóng góp của các môn học vào CĐR của CTĐT

Học kỳ	**Tên môn học**	**Chuẩn đầu ra của CTĐT**					
		PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**
I	Calculus 1	✓✓					
	Introduction to Computing	✓			✓	✓	
	Listening AE1			✓✓✓			
	Physics 1	✓					
	Writing AE1			✓✓✓			
	C/C++ Programming	✓	✓✓✓				
II	Physics 3	✓					
	Physics 3 Laboratory	✓					
	Speaking AE2			✓✓✓			
	Writing AE2			✓✓✓			
	Object-Oriented Programming	✓✓	✓✓✓				✓
	Discrete Mathematics	✓	✓				✓

	Computer Networks	✓✓	✓✓✓			✓	
III	Calculus 2	✓✓					
	Linear Algebra	✓	✓		✓		
	Algorithms and Data Structures	✓✓	✓✓✓				✓
	Principles of Database Management	✓✓✓	✓✓✓			✓✓	
	Philosophy Marx - Lenin				✓✓		
	Marxist – Leninist Political Economy				✓✓		
V (sinh viên chọn 1 môn tự chọn 4 tín chỉ)	Computer Architecture	✓	✓				✓
	Object-Oriented Analysis and Design	✓	✓			✓	
	Web Application Development	✓	✓			✓	✓
	Information System Management (môn tự chọn)		✓		✓		
	IT Project Management (môn tự chọn)		✓	✓		✓	✓
	Computer Graphics (môn tự chọn)	✓	✓			✓	✓
	Deep Learning (môn tự chọn)	✓	✓				✓
	Internet of Things (môn tự chọn)		✓✓✓			✓✓	✓
	Mobile Application Development (môn tự chọn)	✓✓	✓✓✓				✓
	Human Computer Interaction (môn tự chọn)	✓	✓	✓✓			

	Cloud computing (môn tự chọn)	✓	✓✓				✓
	Security Technology and Implementation (môn tự chọn)	✓✓	✓	✓	✓		
	Software Quality Verification and Validation (môn tự chọn)	✓✓	✓✓				✓
	Game Application Development (môn tự chọn)	✓	✓✓				✓
	Blockchain (môn tự chọn)	✓	✓✓				✓
	Development & Operation (DevOps) (môn tự chọn)	✓	✓✓				✓
	Data Science and Visualization (môn tự chọn)	✓	✓✓	✓			
	Critical Thinking (môn tự chọn)			✓✓	✓		
VI (sinh viên chọn 2 viên chọn 2 môn tự chọn 8 tín chỉ)	Probability, Statistic & Random Process	✓✓					
	Scientific Socialism				✓✓		
	Principles of Programming Languages	✓	✓				
	Data Mining (môn tự chọn)	✓				✓	✓
	Digital Image Processing (môn tự chọn)	✓				✓	✓
	Software Architecture (môn tự chọn)	✓	✓				✓
	Net-centric Programming (môn tự chọn)	✓	✓✓✓				✓
VI	Internship		✓		✓	✓	✓

VII (sinh viên chọn 1 môn tự chọn tự do)	Software Engineering			✓✓		✓✓✓	✓✓✓
	Artificial Intelligence	✓	✓				✓
	General law				✓✓	✓	
	History of Vietnamese Communist Party				✓✓		
	Free elective						
	Entrepreneurship			✓	✓	✓	
VIII	Operating Systems	✓	✓				
	Ho Chi Minh's Thoughts				✓✓		
	Special Study of the Field		✓	✓			✓
IX	Thesis	✓	✓	✓			✓
	Special Study of the Field 2	✓✓✓	✓✓✓				✓
	Data Mining (môn tự chọn)	✓				✓	✓
	Digital Image Processing (môn tự chọn)	✓				✓	✓
	Software Architecture (môn tự chọn)	✓	✓				✓
	Net-centric Programming (môn tự chọn)	✓	✓✓✓				✓
	Information System Management (môn tự chọn)		✓		✓		
	IT Project Management (môn tự chọn)		✓	✓		✓	✓
	Computer Graphics (môn tự chọn)	✓	✓			✓	✓
	Deep Learning (môn tự chọn)	✓	✓				✓

	Internet of Things (môn tự chọn)		✓✓✓			✓✓	✓
	Mobile Application Development (môn tự chọn)	✓✓	✓✓✓				✓
	Human Computer Interaction (môn tự chọn)	✓	✓	✓✓			
	Cloud computing (môn tự chọn)	✓	✓✓				✓
	Security Technology and Implementation (môn tự chọn)	✓✓	✓	✓	✓		
	Software Quality Verification and Validation (môn tự chọn)	✓✓	✓✓				✓
	Game Application Development (môn tự chọn)	✓	✓✓				✓
	Blockchain (môn tự chọn)	✓	✓✓				✓
	Development & Operation (DevOps) (môn tự chọn)	✓	✓✓				✓
	Data Science and Visualization (môn tự chọn)	✓	✓✓	✓			

12 Mô tả vắn tắt nội dung và khối lượng các môn học

12.1. PE015IU - Triết học Mác-Lênin (Philosophy Marx - Lenin)

Số tín chỉ : 3 (3LT + 0TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học trang bị cho sinh viên những kiến thức cơ bản về triết học Mác-Lênin.

12.2. PE016IU - Kinh tế chính trị Mác-Lênin (Marxist – Leninist Political Economy)

Số tín chỉ : 2 (2LT + 0TH)
Môn học song hành: Triết học Mác-Lênin
Mô tả môn học:
Nội dung chương trình gồm 6 chương: Trong đó chương 1 bàn về đối tượng, phương pháp nghiên cứu và chức năng của Kinh tế chính trị Mác-Lênin. Từ chương 2 đến chương 6 trình bày nội dung cốt lõi của Kinh tế chính trị Mác-Lênin theo mục tiêu của môn học. Cụ thể các vấn đề như: Hàng hóa, thị trường và vai trò của các chủ thể trong nền kinh tế thị trường; Sản xuất giá trị thặng dư trong nền kinh tế thị trường; Cạnh tranh và độc quyền trong nền kinh tế thị trường; Kinh tế thị trường định hướng xã hội chủ nghĩa và các quan hệ lợi ích kinh tế ở Việt Nam; Công nghiệp hóa, hiện đại hóa và hội nhập kinh tế quốc tế ở Việt Nam.

12.3. PE017IU - Chủ nghĩa xã hội khoa học (Scientific Socialism)

Số tín chỉ : 2 (2LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Triết học Mác-Lênin, Kinh tế chính trị Mác-Lênin
Mô tả môn học:
Môn học trang bị cho sinh viên những kiến thức cơ bản về chủ nghĩa xã hội khoa học.

12.4. PE018IU - Lịch sử Đảng Cộng Sản Việt Nam (History of Vietnamese Communist Party)

Số tín chỉ : 2 (2LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Triết học Mác-Lênin, Kinh tế chính trị Mác-Lênin, Chủ nghĩa xã hội khoa học.
Mô tả môn học:
Môn học trang bị cho sinh viên những kiến thức cơ bản về lịch sử Đảng Cộng Sản Việt Nam.

12.5. PE019IU - Tư tưởng Hồ Chí Minh (Ho Chi Minh's Thoughts)

Số tín chỉ : 2 (2LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Triết học Mác-Lênin, Kinh tế chính trị Mác-Lênin, Chủ nghĩa xã hội khoa học.
Mô tả môn học:
Môn học trang bị cho sinh viên những kiến thức cơ bản về: đối tượng, phương pháp nghiên cứu và ý nghĩa học tập môn tư tưởng Hồ Chí Minh; về cơ sở, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh; về độc lập dân tộc và đoàn kết quốc tế; về văn hóa, đạo đức, con người.

12.6. MA001IU - Toán 1 (Calculus 1)

Số tín chỉ : 4 (4LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Không
Mô tả môn học:

Nội dung chính: Hàm số, Giới hạn, Tính liên tục, Đạo hàm, Đạo hàm cho các hàm cơ bản, Qui tắc tính đạo hàm, Ứng dụng của đạo hàm, Quy tắc L'hospital, Tối ưu, Phương pháp Newton, Tích phân, Tích phân xác định, Các định lý cơ bản của giải tích, kỹ thuật tính tích phân.

12.7. MA003IU- Toán 2 (Calculus 2)

Số tín chỉ : 4 (4LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Toán 1
Mô tả môn học:
Dãy và chuỗi; Kiểm tra sự hội tụ; Chuỗi mủ; Chuỗi Taylor và Maclaurin; Hệ tọa độ Cartesian; Đường thẳng, Mặt và Mặt phẳng; Đạo hàm và tích phân của hàm Véctơ; Chiều dài đường cong; Mặt phẳng tham số; Mặt tiếp xúc; Véctơ Gradient; Cực trị; Nhân tử Lagrange; Tích phân bội: tích phân hai lớp, tích phân ba lớp, những kỹ thuật tính tích phân; Trường Véctơ, tích phân đường, tích phân mặt.
Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Toán 1, Toán 2
Mô tả môn học:
Phương trình vi phân cấp một, phương trình vi phân cấp hai, hệ số không xác định, phương sai của tham số, phương trình vi phân tuyến tính cấp cao, nghiệm chuỗi của phương trình vi phân tuyến tính cấp hai với hệ số không là hằng, hệ phương trình tuyến tính cấp một, cơ bản về phương trình đạo hàm riêng và phương pháp tách biến, phương pháp số.

12.8. MA026IU - Xác suất, thống kê và quá trình ngẫu nhiên (Probability, Statistic & Random Process)

Số tín chỉ : 3 (3LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Toán 1, Toán 2
Mô tả môn học:
Môn học trình bày lý thuyết xác suất theo quan điểm độ đo. Nội dung chính bao gồm kiến thức về các biến cố (độc lập, có điều kiện,…), các biến ngẫu nhiên, phân phối, kỳ vọng, phương sai và các định lý giới hạn quan trọng trong xác suất (định lý giới hạn trung tâm, luật số lớn, …).

12.9. PH013IU - Vật lý 1 (Physics 1)

Số tín chỉ : 2 (2LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Không
Mô tả môn học:
Khảo sát động học, động lực học, năng lượng học của chuyển động của chất điểm và của vật rắn. Khảo sát động lực học lưu chất, tính chất của khí lí tưởng, và các nguyên lí nhiệt động lực học.

12.10. PH015IU & PH016IU - Vật lý 3 (Physics 3 + Physics 3 Laboratory)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Vật lý 1

Mô tả môn học:
Môn học cung cấp cho sinh viên những kiến thức cơ bản về điện và từ.

12.11. IT154IU - Đại số tuyến tính (Linear algebra)

Mã MH: IT154IU

Số tín chỉ: 3 (3,0)

Điều kiện tiên quyết/Môn học trước: Toán 1
Mô tả môn học:

Đại số tuyến tính cung cấp một khuôn khổ toán học để tổ chức thông tin và sau đó sử dụng thông tin đó để giải quyết các vấn đề, đặc biệt là các vấn đề phân tích dữ liệu. Đại số tuyến tính rất cần thiết để hiểu và tạo ra các thuật toán học máy, đặc biệt là mạng thần kinh và các mô hình học sâu.

Khóa học này sẽ cung cấp cho sinh viên kiến thức đại số tuyến tính cần thiết cho học máy và mô hình mạng thần kinh. Học sinh sẽ tìm hiểu tổng quan về ma trận cơ bản và đại số vector như được áp dụng cho các hệ thống tuyến tính. Sau đó, họ sẽ học cách thao tác ma trận để có được kiến thức hữu ích từ dữ liệu, định lượng mức độ học tập và tối ưu hóa tốc độ học tập trong không gian vector và chuyển đổi tuyến tính để khám phá dữ liệu. Các bài học và bài tập thực hành sẽ trang bị cho sinh viên nền tảng toán học cần thiết để xây dựng và đào tạo các mạng thần kinh đơn giản trong các ứng dụng khai thác dữ liệu.

12.12. IT153IU – Toán rời rạc (Discrete Mathematics)

Số tín chỉ: 3 (3LT + 0TH)
Điều kiện tiên quyết/Môn học trước: C/C++ Programming hoặc Fundamentals of Programming; Linear Algebra hoặc Calculus 3
Mô tả môn học:
Môn học giúp sinh viên phát triển khả năng tư duy, suy nghĩ và diễn giải dựa trên toán học, logic, ứng dụng khả năng này để phân tích, xử lý và giải quyết các đối tượng rời rạc trong thực tế. Đây là khóa học hướng ứng dụng dựa trên việc nghiên cứu các sự kiện xảy ra là nhỏ hay rời rạc phân đoạn trong khoa học, kinh tế, công nghiệp…. Sinh viên sẽ được giới thiệu các công cụ toán học về toán rời rạc như: lý thuyết tổ hợp; lý thuyết quan hệ (quan hệ tương đương, quan hệ sắp xếp); bài toán đếm (giới thiệu về bài toán và phần mở rộng về hệ thức truy hồi); bài toán tồn tại; bài toán liệt kê; lý thuyết đại số Boole; lý thuyết đồ thị và cây. Các ứng dụng thực tế sẽ được giới thiệu trong suốt khóa học.

12.13. PE021IU – Pháp Luật Đại cương

Số tín chỉ : 3 (3LT + 0TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:

Môn học sẽ giới thiệu cho sinh viên hệ thống pháp luật Việt Nam. Đặc biệt, sinh viên sẽ hiểu được quyền và nghĩa vụ của mình trong Hiến pháp, luật Hình sự, luật hành chính, luật dân sự, luật lao động và luật doanh nghiệp của Việt Nam. Từ đó, sinh viên sẽ nâng cao nhận thức về trách nhiệm đảm bảo công lý, trong đó có việc chấm dứt tham nhũng trong xã hội.

12.14. EN007IU & EN008IU - Tiếng anh chuyên ngành 1 (Academic English 1)

Số tín chỉ : 4 (4LT + 0TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học nhằm nâng cao kỹ năng viết trình độ tiền nâng cao (pre-advanced). Chương trình tập trung vào việc xây dựng bài luận dựa trên các kỹ năng viết như: làm dàn bài, viết câu luận đề, kết nối và sắp xếp trình tự các đoạn, dung từ và cụm từ nối để tạo sự mạch lạc cho bài văn. Các thể loại bao gồm: miêu tả người, đồ vật, qui trình, trình bày ý kiến, so sánh và đối chiếu, nguyên nhân – kết quả, vấn đề - giải pháp, nghị luận. Những kỹ năng nghe tiếng Anh học thuật, ghi chú, và thảo luận sẽ giúp sinh viên làm quen với những khó khăn trong việc học tiếng Anh ở đại học. Sinh viên sẽ học các kỹ năng cần thiết cho sinh viên đại học quốc tế, bao gồm: nghe bài giảng chủ động, ghi chú hiệu quả, tham gia thảo luận tự tin. Cùng với các kỹ năng nghe, sinh viên cũng sẽ trau giồi thêm vốn từ vựng học thuật.

12.15. EN011IU & EN012IU - Tiếng anh chuyên ngành 2 (Academic English 2)

Số tín chỉ : 4 (4LT + 0TH)
Điều kiện tiên quyết/Môn học trước: Tiếng anh chuyên ngành 1
Mô tả môn học:
Khóa học nhằm cung cấp một cách tổng quát cấu trúc của một bài viết báo cáo nghiên cứu, từng bước giúp sinh viên hoàn tất một bài viết cụ thể trong lĩnh vực của mình. Nội dung của khóa học bao gồm: các thành phần của bài báo cáo, kỹ năng chọn và giới hạn đề tài, viết câu luận đề, làm dàn bài, tìm và dẫn chứng tài liệu, ghi chú, viết mở bài, nội dung chính và kết luận, viết và sửa chữa bản nháp. Sinh viên sẽ thực hành trên các đề tài liên quan đến môn học của mình. Môn học cung cấp cho sinh viên các chiến lược thiết thực sử dụng trong việc thuyết trình. Ngòai ra sinh viên được giúp đỡ hình thành kỹ năng lắng nghe, nhận xét và nêu ý kiến phản hồi đối với các bài thuyết trình khác trong lớp.

12.16. IT064IU - Nhập môn Tin học (Introduction to computing)

Số tín chỉ: 3 (3 LT+0TH)
Điều kiện tiên quyết/Môn học trước: Không
Mô tả môn học:
Môn học giới thiệu những khái niệm cơ bản, những mô hình và xu hướng trong ngành công nghiệp Công nghệ thông tin. Ngoài ra, sinh viên được giới thiệu về các chuyên ngành, về cơ cấu các môn học trong mỗi chuyên ngành, ý nghĩa của các môn học, các nghề nghiệp liên quan đến mỗi chuyên ngành, định hướng nghề nghiệp cho sinh viên.

12.17. IT116IU - Lập trình C/C++ (C/C++ Programming)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Không
Mô tả môn học:
Môn học giúp phát triển những giải thuật và giới thiệu những nguyên tắc trong lập trình dùng C và C++. Các chủ đề bao gồm: giới thiệu máy tính và điện toán, phát triển chương trình, cú pháp ngôn ngữ lập trình C/C++ và các phương pháp số căn bản cho kỹ sư. Môi trường Unix và một số tiện ích cũng được giới thiệu trong môn học này.

12.18. IT069IU - Lập trình hướng đối tượng (Object Oriented Programming)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình C/C++ hoặc Lập trình cơ bản
Mô tả môn học:
Lập trình và các cấu trúc dữ liệu cơ bản dùng ngôn ngữ Java. Các cấu trúc điều khiển cơ bản như vòng lặp, mảng, đệ qui và con trỏ. Thiết kế hướng đối tương: lớp, thừa kế, overload và đa hình. Cấu trúc dữ liệu trừu tượng: danh sách, danh sách liên kết, chồng và hàng. Giới thiệu về phân tích giải thuật, dùng ký hiệu O, các phương pháp tìm kiếm và sắp xếp.

12.19. IT013IU - Cấu trúc dữ liệu và giải thuật (Algorithms and Data Strutures)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng
Mô tả môn học:
Tìm hiểu những đặc điểm quan trọng của cấu trúc dữ liệu và giải thuật. Cách sử dụng những cấu trúc này để hỗ trợ thiết kế giải thuật. Giới thiệu về các kỹ thuật tìm kiếm, sắp xếp và băm.

12.20. IT079IU - Nguyên lý Quản trị Cơ sở dữ liệu (Principle of Database Management).

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình C/C++ hoặc Lập trình cơ bản
Mô tả môn học:
Môn học nhằm cung cấp cho người học kiến thức tổng quan về: kiến trúc Cơ sở dữ liệu (CSDL), phương pháp quản trị CSDL; các mô hình dữ liệu phân cấp, mô hình dữ liệu mạng và mô hình dữ liệu quan hệ; phương pháp thiết kế mô hình thực thể kết hợp và mô hình cơ sở dữ liệu quan hệ; các phụ thuộc hàm cho dữ liệu và cách chuẩn hóa dữ liệu, các ràng buộc toàn vẹn dữ liệu và bảo mật dữ liệu; các cơ chế quản lý giao tác cho hệ quản trị CSDL đa người dùng; ngoài ra môn học còn giới thiệu một số hệ quản trị CSDL thông dụng như SQL Server và một số hệ quản trị CSDL thương mại khác.

12.21. IT089IU - Cấu trúc máy tính (Computer Architecture)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Thiết kế logic số

Mô tả môn học:
Lịch sử và các nguyên lý của cấu trúc máy tính, cấu tạo máy tính, hợp ngữ và mã máy tính, số học của máy tính, thiết kế ALU, hiệu năng của máy tính, đường dẫn dữ liệu và điều khiển, pipelining, cấu trúc phân tầng của bộ nhớ, thiết bị xuất nhập, và các bộ xử lý di động cũng như đa lõi.

12.22. IT091IU - Mạng Máy Tính (Computer Networks)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình C/C++, Lập trình hướng đối tượng
Mô tả môn học:
Giới thiệu về mạng, cấu trúc OSI, chuyển mạch gói, mạng nội bộ, Ethernet, mạng không dây, và các giao thức mạng.

12.23. IT090IU- Phân tích và thiết kế hướng đối tượng (Object Oriented Analysis and Design)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng
Mô tả môn học:
Mô hình hóa hệ thống. Các khái niệm về phân tích và thiết kế hệ thống. Chu kỳ phát triển sản phẩm. Quy trình hợp nhất và những công đoạn thực hiện như: lấy yêu cầu, phân tích, thiết kế, hiện thực và kiểm thử. Nội dung nâng cao bao gồm cơ sở dữ liệu hướng đối tượng, mẫu thiết kế, lập trình Extreme.

12.24. IT076IU - Công nghệ phần mềm (Software Engineering)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng
Mô tả môn học:
Môn học giới thiệu quy trình công nghệ phần mềm. Khảo sát hoạt động doanh nghiệp. Thảo luận với khách hàng về yêu cầu. Chọn công nghệ thiết kế. Phân tích hệ thống theo hướng đối tượng. Thiết kế và lập trình dự án.

12.24. IT093IU - Phát triển ứng dụng Web (Web Application Development)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng, Nguyên lý Quản Trị Cơ sở dữ liệu
Mô tả môn học:
Sử dụng các kiến thức và kỹ năng để phát triển ứng dụng Web dựa trên các tiện ích, công nghệ và môi trường phát triển của Java như HTML, Java Server Page, Java Bean, MVC Model. Ngoài ra còn mở rộng thêm các kiến thức liên quan đến kiến trúc của Java như Ajax và Struts. Môn học này làm nền tảng để sinh viên thực hiện các đề án môn học cũng như luận văn tốt nghiệp theo hướng Web.

12.25. IT092IU - Nguyên lý Ngôn ngữ lập trình (Principle of Programming Languages)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học nhằm làm cho người học quen thuộc với một số khái niệm cơ bản của các ngôn ngữ lập trình, từ đó nâng cao khả năng tiếp thu các ngôn ngữ lập trình khác. Các kiểu ngôn ngữ lập trình khác nhau (chẳng hạn như ngôn ngữ lập trình luận lý, ngôn ngữ lập trình chức năng, ngôn ngữ lập trình thủ tục, ngôn ngữ lập trình hướng đối tượng) cũng được so sánh và các phương pháp cài đặt cũng được tìm hiểu và thảo luận.

12.26. IT017IU - Hệ điều hành (Operating System)

Số tín chỉ: 4 (3 LT+1TH)
Điều kiện tiên quyết/Môn học trước: Cấu trúc dữ liệu và giải thuật, Kiến trúc máy tính, Lập trình C/C++
Mô tả môn học:
Môn học trang bị cho sinh viên khả năng định nghĩa và giải thích các nguyên lý của hệ điều hành. Hiểu về kiến trúc của một hệ điều hành. Khả năng lập trình để giao tiếp với các chức năng và dịch vụ hệ thống.

12.27. IT159IU - Trí thông minh nhân tạo (Artificial Intelligent)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Toán rời rạc hoặc Đại số tuyến tính, Lập trình hướng đối tượng
Mô tả môn học:
Môn học nhằm cung cấp một cách tiếp cận kỹ thuật vào các khái niệm cơ bản trong lĩnh vực trí tuệ nhân tạo. Nội dung cụ thể bao gồm: lịch sử trí tuệ nhân tạo, các tác tử, các phương pháp tìm kiếm (tìm kiếm trên không gian trạng thái, tìm kiếm có thông tin và tìm kiếm không có thông tin, tìm kiếm thỏa mãn ràng buộc hoặc tìm kiếm cho trò chơi), biểu diễn tri thức (biểu diễn tri thức cụ thể bằng logic, hệ thống lập luận bằng logic), hoạch định, và ngôn ngữ Lisp. Môn học này thích hợp cho sinh viên nào muốn có một kiến thức cơ bản vững chắc về trí tuệ nhân tạo hoặc chuẩn bị cho những phát triển sâu hơn trong lĩnh vực Trí tuệ nhân tạo.

12.28. IT160IU – Khai thác Dữ liệu (Data Mining, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng
Mô tả môn học:
Môn học này giới thiệu cho sinh viên các nguyên lý, thuật toán khai phá dữ liệu, yêu cầu của một quá trình khai phá dữ liệu. Học sinh sẽ nghiên cứu các khái niệm và thuật toán khai thác dữ liệu để giải quyết các vấn đề khám phá tri thức. Học sinh có thể phát triển các kỹ năng sử dụng phần mềm khai thác dữ liệu gần đây để giải quyết các vấn đề thực tế và tích lũy kinh nghiệm thực hiện nghiên cứu và học tập độc lập.

12.29. IT130IU – Xử lý ảnh Kỹ thuật số (Digital Image Processing, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)

Điều kiện tiên quyết/Môn học trước: không.

Mô tả môn học:

Môn học này giới thiệu cho sinh viên các nguyên lý, thuật toán khai phá dữ liệu, yêu cầu của một quá trình khai phá dữ liệu. Học sinh sẽ nghiên cứu các khái niệm và thuật toán khai thác dữ liệu để giải quyết các vấn đề khám phá tri thức. Học sinh có thể phát triển các kỹ năng sử dụng phần mềm khai thác dữ liệu gần đây để giải quyết các vấn đề thực tế và tích lũy kinh nghiệm thực hiện nghiên cứu và học tập độc lập.

12.30. IT114IU – Kiến trúc phần mềm (Software Architecture, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)

Điều kiện tiên quyết/Môn học trước: không.

Mô tả môn học:

Cung cấp cho sinh viên sự hiểu biết thấu đáo về các phương pháp và kỹ thuật khác nhau trong phân tích, thiết kế và triển khai hệ thống thông tin bằng cách sử dụng UML.

12.31. IT096IU - Lập trình mạng (Net-Centric Programming, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)

Điều kiện tiên quyết/Môn học trước: Mạng máy tính

Mô tả môn học:

Môn học cung cấp các kiến thức cơ sở và nâng cao về các kỹ thuật lập trình mạng TCP/IP và UDP. Giúp sinh viên có khả năng xây dựng định dạng dữ liệu để thiết kế các giao thức truyền dữ liệu trên mạng. Hướng dẫn sinh viên lập trình được các ứng dụng có kết nối mạng Client/Server độc lập sử dụng ở mức socket và một số giao thức mạng cấp ứng dụng phổ biến như HTTP, FTP, DNS, Email… Môn học cũng cung cấp cho sinh viên các kỹ năng phát triển phần mềm trên các công cụ và môi trường trực quan như PyCharm, Visual Studio…

12.32. IT094IU - Quản lý Hệ thống thông tin (Information System Management, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)

Điều kiện tiên quyết/Môn học trước: Nguyên lý Quản trị Cơ sở dữ liệu

Mô tả môn học:

Môn học hướng tới việc mô tả cách mà một hệ thống thông tin được sử dụng bởi các doanh nghiệp và sự ảnh hưởng của nó đến hoạt động của doanh nghiệp. Cùng với việc trình bày và tìm hiểu về công nghệ trong hệ thống thông tin, các vấn đề cơ bản là làm cách nào để các công nghệ được dùng giải quyết các vấn đề của doanh nghiệp và các cơ hội khai thác chúng. Nội dung cụ thể gồm các vấn đề liên quan đến tổ chức, quản lý,

mạng doanh nghiệp; hạ tầng công nghệ thông tin doanh nghiệp; các hệ thống hỗ trợ quản lý và tổ chức cho doanh nghiệp số; xây dựng và quản lý hệ thống thông tin.

12.33. IT056IU - Quản trị Dự án Phần mềm (Software Project Management, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình hướng đối tượng
Mô tả môn học:
Soạn đề cương kế hoạch dự án. Phỏng vấn và chuẩn bị yêu cầu khách hàng. Ước tính chi phí, thời gian, nhân lực để hoàn tất dự án. Quản lý công đoạn thiết kế và lập trìng hệ thống. Kiểm soát chất lượng: thử nghiệm phần mềm, kiểm soát yêu cầu khách hàng.

12.34. IT024IU - Đồ hoạ máy tính (Computer Graphics, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: Lập trình C/C++**,** Lập trình hướng đối tượng
Mô tả môn học:
Triển khai các giải thuật và ngôn ngữ cho việc tương tác trong đồ hoạ máy tính. Các khái niệm về hệ trục toạ độ trong không gian 2 chiều, 3 chiều, không gian véc tơ đường cong, bề mặt được sinh ra từ việc thiết kế, bố trí xây dựng các đối tượng đồ hoạ. Ngoài ra còn phát triển các mô hình kết hợp camera để tạo ảnh và xử lý ảnh.

12.35. IT157IU – Học sâu (Deep Learning, môn tự chọn)

Số tín chỉ : 4 (3LT + 1TH)
Điều kiện tiên quyết/Môn học trước: khônG
Mô tả môn học:
Khóa học này giúp sinh viên hiểu được các khả năng, kỹ thức và hậu quả của việc học sâu và chuẩn bị cho sinh viên tham gia phát triển công nghệ AI hàng đầu.

12.36. IT134IU - Internet vạn vật (Internet of Things, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: Mạng máy tính
Mô tả môn học:
Môn học giải thích về kiến trúc, thành phần của mạng Internet vạn vật. Sinh viên sẽ được học về các kỹ thuật truyền thông khác nhau, từ tầm gần đến tầm xa như là Bluetooth, Zigbee, Wifi, LoRa, NB-IoT,... Ngoài ra, các kỹ thuật lưu trữ, tổ chức và phân tích dữ liệu còn được học trong môn học này. Sau đó, sinh viên sẽ được học các khái niệm, nguyên lý cơ bản và cấu tạo cơ bản của các hệ thống IoT cho các ứng dụng công nghiệp như y tế, sản xuất, nông nghiệp, v.v...

12.37. IT133IU - Phát triển ứng dụng di động (Mobile Application Development, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: Phân tích và thiết kế hướng đối tượng
Mô tả môn học:

Khóa học này được thiết kế nhằm giới thiệu và làm quen với sinh viên về lập trình trên môi trường di động: Nền tảng Android sẽ được sử dụng trong suốt khóa học. Khóa học bắt đầu với phần giới thiệu về các thành phần, khái niệm, cấu trúc cơ bản của ứng dụng Android sau đó tiếp tục với các thành phần giao diện người dùng phổ biến, lưu trữ liên tục, cơ sở dữ liệu cho thiết bị di động, v.v. Giới thiệu về hầu hết các công cụ và công cụ phổ biến kỹ thuật viết ứng dụng Android cũng được kèm theo bằng tay về kinh nghiệm dưới dạng dự án lập trình bài tập trong phòng thí nghiệm.

12.38. IT044IU - Tương tác người và máy (Human Computer Interaction, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học cung cấp cho sv các nguyên lý cơ bản trong tương tác giữa người và máy.

12.39. IT164IU – Điện toán đám mây (Cloud computing, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: Computer Network
Mô tả môn học:
Môn học tập trung vào kỹ thuật lập trình song song cho tính toán trên đám mây và hệ thống phân tán lớn. Các chủ đề được đề cập bao gồm tổng quan về điện toán đám mây, hệ thống đám mây, tính toán song song trên đám mây, hệ lưu trữ phân tán, ảo hóa, an toàn trên đám mây, và hệ điều hành đa nhân. Sinh viên sẽ được học các giải pháp hiện đại cho tính toán đám mây phát triển bởi Google, Amazon, Microsoft, Yahoo, VNWare và tương tự. Sinh viên sẽ được áp dụng các kiến thức vào các bài tập và đồ án thực hiện trên Amazon Web Services.

12.40. IT165IU – Công nghệ và Triển khai bảo mật (Security Technology and Implementation, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: Computer Network
Mô tả môn học:
Môn học giới thiệu cho sinh viên nguyên lý của an toàn thông tin, hệ thống mật mã hóa (mã hóa đối xứng và mã hóa công cộng), quản lý rủi ro, an toàn cho kiến trúc và thiết kế, an toàn trong vận hành kinh doanh liên tục, kiểm soát truy cập, bảo vệ màng TCP/IP, tưởng lửa, mạng ảo, IPSec, an toàn trong phát triển phần mềm.

12.41. IT0IU – Kiểm tra chất lượng phần mềm (Software Quality Verification and Validation, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học giới thiệu về kiểm tra, kiểm định và kiểm thử phần mềm. Các chiến thuật và kỹ

thuật cho kiểm thử phần mềm, và lên kế hoạch kiểm thử phần mềm cũng được giới thiệu.

12.42. IT167IU – Phát triển ứng dụng game (Game Application Development, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: Object-Oriented Programming
Mô tả môn học:
Môn học giới thiệu các định lý và kinh nghiệm thực hành quá trình thiết kế trò chơi và trải nghiệm trò chơi. Sinh viên sẽ được làm quen với phương pháp, khái niệm và các tài liệu được dùng trong thiết kế trò chơi. Chiến thuật thiết kế theo hướng qui trình và tập trung vào các mảng như tạo nhanh phiên bản mẫu, kiểm thử trò chơi, vòng lập thiết kế sử dụng cách tiếp cận tập trung vào người chơi.

12.43. IT150IU – Chuỗi khối (Blockchain, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Môn học này giới thiệu cho sinh viên nền tảng của công nghệ chuỗi khối và các ứng dụng của nó. Học sinh sẽ nghiên cứu các khái niệm và nguyên tắc blockchain hoạt động như thế nào. Khóa học này bao gồm các chủ đề liên quan đến không gian chuỗi khối. Khóa học bắt đầu với những điều cơ bản về chuỗi khối, mật mã, hiểu biết cơ bản về bitcoin. Sau đó, các ứng dụng của công nghệ blockchain được giới thiệu trong các lĩnh vực tài chính, y tế, chuỗi cung ứng, v.v. Một bức tranh hoàn chỉnh về hệ sinh thái xung quanh công nghệ blockchain và các xu hướng phát triển cũng được thảo luận.

12.44. IT156IU – Phát triển và vận hành liên tục (Development & Operation, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Khóa học này là phần giới thiệu về DevOps nhằm giúp sinh viên hiểu các nguyên tắc và thực tiễn của nó. Các khái niệm và thuật ngữ chính sẽ được đề cập bằng các nghiên cứu điển hình, ví dụ và bài tập thực tế trong đời thực. Các công cụ phổ biến và phổ biến để đạt được mô hình DevOps cũng sẽ được giới thiệu.

12.45. IT138IU – Trực quan hóa dữ liệu (Data Science and Visualization, môn tự chọn)

Số tín chỉ: 4 (3LT+1TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Mục tiêu của khóa học này là giới thiệu cho sinh viên các nguyên tắc, phương pháp và kỹ thuật chính để phân tích dữ liệu trực quan một cách hiệu quả. Khóa học bắt đầu với mục tiêu và nguyên tắc chính của trực quan hóa dữ liệu. Khóa học tiếp tục với các khía cạnh khác nhau của trực quan hóa bao gồm các kỹ thuật và phương pháp trình bày các loại dữ

liệu khác nhau cũng như thảo luận và phân tích trực quan hóa. Xuyên suốt khóa học, học viên sẽ được làm quen với nhiều hệ thống trực quan và công cụ trực quan thông qua các bài tập thực hành.

12.46. PE008IU – Tư duy Phản biện (Critical Thinking, môn tự chọn)

Số tín chỉ: 3 (3LT+0TH)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học:
Tư duy phê phán nghiên cứu một quá trình không thể thiếu đối với tất cả những người có học thức - quá trình chúng ta phát triển và ủng hộ niềm tin của mình cũng như đánh giá sức mạnh của những lập luận của người khác trong các tình huống thực tế. Nó bao gồm thực hành về lý luận quy nạp và suy diễn, trình bày các lập luận dưới dạng nói và viết và phân tích việc sử dụng ngôn ngữ để tác động đến suy nghĩ. Khóa học cũng áp dụng quy trình suy luận vào các lĩnh vực khác như kinh doanh, khoa học, luật, khoa học xã hội, đạo đức và nghệ thuật.

12.47. IT120IU - Khởi nghiệp (Entrepreneurship, môn tự chọn)

Số tín chỉ: 3 (3LT)
Điều kiện tiên quyết/Môn học trước: không
Mô tả môn học: Môn học cung cấp kiến thức về khởi tạo doanh nghiệp, tư duy sáng tạo để đưa ra sản phẩm, dịch vụ mới có liên quan đến công nghệ. Vai trò của doanh nghiệp trẻ trong nền kinh tế và cách quản lý doanh nghiệp để khơi nguồn ý tưởng sáng tạo trong nhóm làm việc. Xây dựng và biến ý tưởng kinh doanh thành hiện thực.

12.48. IT082IU - Thực tập Công nghiệp (Internship)

Số tín chỉ: 3 (0 LT+3TH)
Điều kiện tiên quyết/Môn học trước: sinh viên năm 3 trở lên
Mô tả môn học:
Môn học nhằm tạo điều kiện cho sinh viên có cơ hội tiếp xúc với môi trường thực tế, nhằm để giải quyết những vấn đề thực tiễn trong sản xuất, cuộc sống hàng ngày. Nội dung chủ yếu bao gồm: xây dựng và quản trị hệ thống thông tin bằng web hoặc ứng dụng; tin học hóa các công tác văn phòng, công việc hang ngày; thiết kế, cài đặt vận hành mạng máy tính cho các doanh nghiệp, tổ chức. Tìm hiểu và ứng dụng các công nghệ mới.

12.49. IT083IU- Thực tập tốt nghiệp (Special Study of the Field)

Số tín chỉ: 3 (0 LT+3TH)
Điều kiện tiên quyết/Môn học trước: đủ số tín chỉ theo quy định
Mô tả môn học:
Môn học nhằm hướng dẫn sinh viên đến việc tìm hiểu phương pháp giải quyết một vấn đề tổng hợp thực tế. Nội dung hướng dẫn chủ yếu bao gồm: phương pháp tiếp cận vấn đề, các bước trong quá trình tìm hiểu vấn đề, các phương pháp tìm hiểu những giải pháp, các bước hoạch định, đề xuất giải pháp cho vấn đề.

12.50. IT058IU - Luận văn tốt nghiệp (Thesis)

Số tín chỉ: 10 (0LT+10TH)
Điều kiện tiên quyết/Môn học trước: Thực tập tốt nghiệp
Mô tả môn học:
Đây là các đề tài có tính thực tiễn hoặc có tính khoa học cao, được thiết kế để bảo đảm sinh viên nắm và vận dụng được những kiến thức đã học trong chương trình. Sinh viên sẽ làm việc theo nhóm để thu thập yêu cầu, thiết kế, cài đặt và cung cấp giải pháp cho các vấn đề thực tế. Sinh viên có thể sử dụng mô hình thích hợp, phải tự quản lý chính đề án đố, theo các kỹ thuật quản lý đề án đã học. Kết quả của luận văn có thể là sản phẩm theo yêu cầu và các tài liệu liên quan.

12.51. IT168IU - Thực tập tốt nghiệp (Special Study of the Field 2, sinh viên lựa chọn nếu có GPA>= 70)

Số tín chỉ: 3 (0LT+3TH)
Điều kiện tiên quyết/Môn học trước: Thực tập tốt nghiệp
Mô tả môn học:
Khóa học nâng cao này được xây dựng dựa trên các khái niệm đã học trong khóa học "Nghiên cứu đặc biệt về lĩnh vực này" và hướng dẫn sinh viên thực hiện các nghiên cứu nâng cao hơn. Khóa học được thiết kế để phát triển kỹ năng nghiên cứu, phân tích và trình bày của sinh viên

TRƯỞNG KHOA	**KT. HIỆU TRƯỞNG** **PHÓ HIỆU TRƯỞNG**
Nguyễn Văn Sinh	**Đinh Đức Anh Vũ**

ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

PHỤ LỤC 1

NỘI DUNG ĐIỀU CHỈNH CHƯƠNG TRÌNH ĐÀO TẠO
NGÀNH KHOA HỌC MÁY TÍNH KHÓA 2023 SO VỚI KHÓA 2022

(Kèm theo Quyết định số: 1158 /QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

1. **Các môn học loại bỏ khỏi chương trình đào tạo:**
   - Bỏ 10 môn bắt buộc như sau:

STT	Mã môn	Tên môn	Số tín chỉ	Ghi chú
01	PE008IU	Critical Thinking	3	Học kỳ II năm 1
02	CH011IU	Chemistry for Engineers	3	Học kỳ I năm 1
03	CH012IU	Chemistry Laboratory	1	Học kỳ I năm 1
04	IT131IU	Theoretical Models in Computing	4	Học kỳ I năm 2
05	IT067IU	Digital Logic Design	3	Học kỳ I năm 2
06	IT099IU	Digital Logic Design Laboratory	1	Học kỳ I năm 2
07	PH012IU	Physics 4	2	Học kỳ I năm 2
08	PH014IU	Physics 2	2	Học kỳ I năm 1
09	MA023IU	Calculus 3	4	Học kỳ I năm 2
10	IT158IU	UI Design and Evaluation	4	Trong danh sách môn tự chọn

2. **Các môn học bổ sung vào chương trình đào tạo:**
   - Thêm 10 môn tự chọn như sau:

STT	Mã môn	Tên môn tiếng Việt	Tên môn	Số tín chỉ	Ghi chú
01			Free elective	3	Học kỳ II năm 3
02	IT044IU	Tương tác người và máy	Human Computer Interaction	4	Trong danh sách môn tự chọn
03	IT164IU	Điện toán đám mây	Cloud computing	4	Trong danh sách môn tự chọn

04	IT165IU	Công nghệ và Triển khai bảo mật	Security Technology and Implementation	4	Trong danh sách môn tự chọn
05	IT166IU	Kiểm tra chất lượng phần mềm	Software Quality Verification and Validation	4	Trong danh sách môn tự chọn
06	IT167IU	Phát triển ứng dụng game	Game Application Development	4	Trong danh sách môn tự chọn
07	IT150IU	Chuỗi khối	Blockchain	4	Trong danh sách môn tự chọn
08	IT156IU	Phát triển và vận hành liên tục	Development & Operation (DevOps)	4	Trong danh sách môn tự chọn
09	IT138IU	Trực quan hóa dữ liệu	Data Science and Visualization	4	Trong danh sách môn tự chọn
10	PE008IU	Tư Duy Phản Biện	Critical Thinking	3	Trong danh sách môn tự chọn

3. Các điều chỉnh khác: Không

4. Hướng xử lý cho các sinh viên khóa cũ khi chưa học các môn học bị loại bỏ khỏi chương trình đào tạo

Khoa sẽ rà soát số lượng sinh viên khóa cũ chưa hoàn thành các môn học bị loại bỏ để mở lớp. Đối với các môn học loại bỏ trong chương trình đào tạo, đã chuyển thành môn tự chọn trong chương trình đào tạo mới nên được tổ chức mở trong những năm tiếp theo cho đến hết sinh viên khóa cũ.

ĐẠI HỌC QUỐC GIA
THÀNH PHỐ HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC QUỐC TẾ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

PHỤ LỤC 2: ĐỀ CƯƠNG CHI TIẾT CÁC MÔN HỌC

(Kèm theo Quyết định số 1158/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

Course Name: Calculus 1

Course Code: MA001IU

Course designation	This course equips students with basic concepts of calculus: limits, continuity, differentiation, and integration. Applications of these concepts are extensively discussed.
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Lectures of Department of Mathematics
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lectures, assignments
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 120 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 60 (lectures) Private study including examination preparation, specified in hours[1]: 60
Credit points	4
Required and recommended prerequisites for joining the course	None

[1] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<table>
<tr><td>Course objectives</td><td>1. To provide students with the main ideas and techniques of calculus. These include limits, continuity, differentiation, and integration.
2. To introduce practical applications of these ideas and techniques, through practical examples taken from many areas of engineering, business, and life sciences.
3. To develop skills in mathematical modelling and problem solving, ability to think logically, and adapt these skilss creatively to new situations</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Have basic knowledge of limits and derivatives (Program outcomes: a)
CLO2. Have basic knowledge of definite/indefinite integrals
(Program outcomes: a)</td></tr>
<tr><td>Skill</td><td>CLO3. Can compute often used limits, can define and compute derivatives (Program outcomes: a, j)
CLO4. Can compute standard types of integrals. Use integrals in practical situations (Program outcomes: a, j)</td></tr>
<tr><td>Attitude</td><td>CLO5. Confident when dealing with derivatives and integrals. Comfortable with using derivatives and integrals in practical situations. (Program outcome: j, k)</td></tr>
</table></td></tr>
</table>

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (4 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Functions and Graphs, Inverse Functions, Exponen and Logarithmic Functions	1	I, T
Parametric Curves, Limit. One-sided Limits, Laws Limits.	1	I, T
Evaluating Limits. The Squeeze Theorem. Continuity. The Intermediate Value Theorem	1	T, U
Tangent Lines and Velocity Problems. Rates of Change, Derivative.	1	T, U
Higher-Order Derivatives, Rules of Differentiation. Rates of Change in the Natural and Social Sciences	1	T, U
Implicit Differentiation, Differentiation of Inverse Functions,	1	T, U
Logarithmic Differentiation, Linear Approximations. Differentials.	1	T, U
Related Rates, Maxima and Minima. Critical Point, The Mean Value Theorem.	1	T, U
The First and Second Derivative Test, Concavity. Shapes of Curves, Curve Sketching	1	T, U
Indeterminate Forms and l'Hôpital's Rules, Maxima and Minima Problems, Newton's Method	1	T, U
Anti-derivatives and Indefinite Integrals, The Definite Integral	1	I, T
Properties of the Definite Integral. The Fundamental Theorem of Calculus, Integration by Substitution	1	I, T, U
Integration by Parts, Partial Fractions, Numerical Integration,	1	T, U
Improper Integrals, Areas between Curves Areas Enclosed by Parametric Curves	1	T, U
Volumes, Arc Length, Applications to Engineering, Economics and Science	1	T, U

Examination forms	Written examination
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	J. Stewart, *Calculus*, Thomson Learning, 7th edition, 2012.

Course Name: Introduction to Computing

Course Code: IT064

1. General information

Course designation	This course introduces students to a broad knowledge of the computer science and information technology fields. Topics covered will include basic computer concepts, components of computer hardware and operating systems software as well as data and telecommunications systems. Students can use the knowledge they've gained to strengthen their future-oriented job.
Semester(s) in which the course is taught	1,3
Person responsible for the course	Dr. Nguyen Trung Ky
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 135 hours. Contact hours: 45 hours (lecture). Private study including examination preparation, specified in hours: 90 hours.
Credit points	Number of credits: 3 Lecture: 3 Laboratory: 0
Required and recommended prerequisites for joining the course	None
Course objectives	This course is to provide fundamentals and basic concepts of computer science and engineering, basics of Computing such as basic concepts, models, trends in industry. Introduction to majors and curricula, career path of all majors in computing, career orientation, job requirements and career opportunities in industry are also included in this course.
Course learning outcomes	CLO1: Demonstrate an in-depth understanding of fundamental knowledge and history of computing, all career paths in computing and learning methodologies in university. CLO2: Describe basic hardware and software concepts and basic computing terminologies CLO3: Make a plan for his/her own future career and his/her works CLO4: Seek information from the Internet and manage his/her information. CLO5: Follow the discussions of instructors and classmates.

Competency level	Course learning outcome (CLO)

		Knowledge	CLO1, CLO2.
		Skill	CLO3, CLO4.
		Attitude	CLO5.

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
The Overall Picture	1	I
Data and Information	2	T, U
Hardware	2	T, U
Algorithm and Programming Language	2	T, U
Operating System	2	T, U
Networking	2	T, U
Information System and Application	2	T, U
Majors and Curriculum, Career Paths and Orientation Careers at a Hardware, Network and Software Company	1	I
Revision	1	

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Nell Dale and John Lewis, *"Computer science: Illuminated"*, 7th Edition, Jones & Bartlett Learning Publisher, ISBN-13 978-1284155617, 2019.
[2] J. Glenn Brookshear, *"Computer Science: An Overview"*, 12th Edition, Pearson Publisher, ISBN-13 978-0133760064, 2014.
[3] Peter Wentworth, Jeffrey Elkner, *"How to Think Like a Computer Scientist: Learning with Python 3 Documentation"*, 3rd Edition, Allen B. Downey and Chris Meyers, Green Tea Press Publisher, ISBN-13 978-0971677500, 2020.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6

1	X			X		
2	X			X		
3	X					
4	X					
5					X	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	The Overall Picture	1		Lecture, Discussion	[1]. Chapter 1
2	Binary Values and Number System	1, 2	Quiz.	Lecture, In-class quiz	[1]. Chapter 2
3	Data Representation	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 3
4	Gates and Circuits	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 4
5	Computing Components	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 5
6	Low-level Programming Languages and Pseudocode	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 6
7	**Midterm**				
8	Problem Solving and Algorithm, Abstract Data Types and Subprograms	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 7,8
9	Object-oriented Design and High-level Programming Languages	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 9
10	Operating System and File System and Directory	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 10, 11
11	Information System, Artificial Intelligence	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 12, 13
12	Simulation, Graphics, Gaming, and Other Programming Networks	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 14, 15
13	The World Wide Web Computer Security	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 16, 17
14	Majors and Curriculum, Career Paths and Orientation, Careers at Hardware, Network and Software Company	3, 4		Lecture, Discussion	

15	Revision			Review-test	
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO 1**	**CLO 2**	**CLO 3**	**CLO 4**	**CLO 5**
Quiz (10%)	25%	25%	33.3 %	33.3 %	25%
Midterm examination (30%)	25%	25%			25%
Projects/Presentations/ Report (20%)	25%	25%	33.3 %	33.3 %	25%
Final examination (40%)	25%	25%	33.3 %	33.3 %	25%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		

TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	experts are questioned thoroughly.	experts are subject to questioning.	Viewpoints of experts are taken as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications)	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are

		are identified clearly.	implications) are identified clearly.	oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and

	polished and confident.		appears tentative.	speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Listening AE1

Course Code: EN008IU

1. General information

Course designation	*The course is designed to prepare students for effective listening and note-taking skills, so that they can pursue the courses in their majors without considerable difficulty. The course is therefore lecture-based in that the teaching and learning procedure is built up on lectures on a variety of topics such as business, science, and humanities.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of Department of English
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (lecture, exercise): 30 Private study including examination preparation, specified in hours[2]: 60
Credit points	2
Required and recommended prerequisites for joining the course	Students must fulfil ONE of the following requirements to attend this course: • hold TOEFL iBT certificate with score ≥ 61 • hold IELTS certificate with score ≥ 5.5 • complete IE2 course

[2] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<table>
<tr><td>Course objectives</td><td>There are a number of objectives embedded in various teaching activities in Listening AE1 course:
Pre-listening activities: aim to activate students' current knowledge of the topic, and to provide them with lecture language and effective strategies in listening and note-taking to prepare themselves for the coming lecture. These activities include reading (this can be done before class meetings), discussing and reviewing what they have learned from the reading.
While-listening and post-listening activities: aim to enable students to put their newly activated knowledge and acquired strategies into work by taking notes on the lecture, using the outline given by the teacher or prepared by themselves. They are later on asked to assess their understanding based on their notes and discuss them with their classmates. Finally, as an optional activity, depending on time and students' needs, students are asked to summarize the lecture.
Follow-up activities: students are required to discuss the lecture topic and to prepare arguments for or against the topic in the debate. The purpose is to enhance students' comprehension of the lecture, and to allow them to put their acquired academic language into practice, and to experience the atmosphere of a university lecture class.</td></tr>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Remember different strategies and techniques in listening to academic lectures and taking notes.
CLO2. Improve their specialized knowledge of academic lectures</td></tr>
<tr><td>Skill</td><td>CLO3. Respond to academic lectures with appropriate strategies
CLO4. Communicate effectively with their classmates and professors.</td></tr>
<tr><td>Attitude</td><td>CLO5. Respond to academic lectures with confidence</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Content</td><td>

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (2 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Orientation & Introduction of strategies and techniques in note-taking</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 1: New Trends in Marketing Research</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 2: Business Ethics</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 3: Trends in Children’s Media Use</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 4: The Changing Music Industry</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 5: The Placebo Effect</td><td>2</td><td>T, U</td></tr>
<tr><td>Midterm Sample Test & Review</td><td>2</td><td>T, U</td></tr>
<tr><td>Chapter 6: Intelligent Machines</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 7: Sibling Relationships</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 8: Multiple Intelligences</td><td>3</td><td>T, U</td></tr>
<tr><td>Chapter 9: The Art of Graffiti</td><td>3</td><td>T, U</td></tr>
<tr><td>Final Sample Test & Review</td><td>2</td><td>T, U</td></tr>
</table>

</td></tr>
<tr><td>Examination forms</td><td>Paper and pen tests: Correct the mistakes, Fill in the blanks, Write short answers, Write a summary paragraph.</td></tr>
<tr><td>Study and examination requirements</td><td>

Attendance

Regular on-time attendance in this course is expected. It is compulsory that students attend atleast 80% of the course to be eligible for the final examination.

Missed tests

Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

Class behavior

Students are supposed to:

prepare thoroughly for each class in accordance with the syllabus and complete allassignments upon the instructor’s request

participate fully and constructively in all class activities (and discussions if any)

display appropriate courtesy to all involved in the class

provide constructive feedback to faculty members regarding their performance

</td></tr>
</table>

Reading list	[1] Frazie, L., & Leeming, S. (2013). *Lecture ready 3.* Oxford: Oxford University Press.References: [2] Frazie, L., & Leeming, S. (2013). *Lecture ready 1, 2.* Oxford: Oxford University Press.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						
2						
3						
4						

3. Planned learning activities and teaching methods

WEEK	P.	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 1	2	ORIENTATION		
WEEK 2	2	**<u>Chapter 1</u>** **New Trends in Marketing Research**	Recognizing topic introducing and lecture plan presenting expressions Organizing ideas by outlining	Expressing ideas duringa discussion
WEEK 3	2	**<u>Chapter 2</u>** **Business Ethics**	Recognizing transition expressions Using symbols and abbreviations	Asking for clarification and elaboration during a discussion
WEEK 4	2	REVIEW		
WEEK 5	2	**<u>Chapter 3</u>** **Trends in Children's Media Use**	Recognizing generalization and support expressions	Giving opinions andasking for opinions during a discussion
WEEK 6	2	**<u>Chapter 4</u>** **The Changing MusicIndustry**	Recognizing expressions for clarification or emphasis Organizing	Expressing interest and asking for elaboration

			notes byusing a split-page format	during a discussion
WEEK 7	2	**<u>Chapter 5</u>** **The Placebo Effect**	Recognizing cause and effect expressions Noting causes and effects	Agreeing and disagreeing during a discussion
WEEK 8	2	SAMPLE TEST CORRECTION WRAP-UP AND REVIEW		
MID-TERM EXAMINATION				
WEEK 9	2	**<u>Chapter 6</u>** **Intelligent Machines**	Recognizing expressions used to predict causes and effects Using arrows to show the relationship between causes and effects	Learning to compromiseand reach a consensus during a discussion
WEEK 10	2	REVIEW		
WEEK 11	2	**<u>Chapter 7</u>** **Sibling Relationships**	Recognizing expressions of comparison and contrast Noting comparison and contrast	Expanding on ideasduring a discussion
WEEK 12	2	**<u>Chapter 8</u>** **Multiple Intelligences**	Recognizing non-verbal signals indicating important information Representing information in list form	Keeping the discussionon topic
WEEK 13	2	REVIEW		

WEEK 14	2	**<u>Chapter 9</u>** **The Art of Graffiti**	Recognizing expressions of definition Reviewing and practicing all note taking strategies	Indicating to other when preparing to speak or pausing to collect thoughts
WEEK 15	2	WRAP-UP AND REVIEW		
FINAL EXAMINATION				

4.

5. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
On-going assessment (30%) (participation,individual work, group work, assignments, etc.)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass
Midterm exam (30%)	80% Pass		80% Pass		
Final exam (40%)	80% Pass		80% Pass		

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

6. Rubrics (optional)

Date revised: 15 August, 2022 *Ho Chi Minh City, 15 August 2022*

Course Name: Physics 1

Course Code: PH013IU

1. General information

Course designation	*This subject will provide an introduction to mechanics including: concepts and principles of kinetics, dynamics, energetics of motion of a particle and a rigid body.*
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Assoc. Prof. Phan Bảo Ngọc Dr. Phan Hiền Vũ
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, assignment.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 30 Private study including examination preparation, specified in hours[3]: 60
Credit points	2
Required and recommended prerequisites for joining the course	None
Course objectives	This course will provide students with: 1. The basic knowledge of general Mechanics Physics 2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques 3. Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment 4. Confidence and fluency in discussing physics in English.

[3] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. An ability to understand of bas knowledge of law of conservations a dynamics of rigid body.
CLO2. An ability to analysis and design problem in science and engineering</td></tr>
<tr><td>Skill</td><td>CLO3. An ability in applying knowledge physics</td></tr>
<tr><td>Attitude</td><td>CLO4. An ability to communicate effectively writing manner</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Chapter 1: Bases of Kinematics</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 2: The Law of Motion</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 3: Work and Mechanical Energy</td><td>3</td><td>I, T</td></tr>
<tr><td>Chapter 4: Linear Momentum and Collisions</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 5: Rotation of a Rigid Object About a Fixed Axis</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 6: Equilibrium and Elasticity</td><td>2</td><td>I, T</td></tr>
<tr><td>Chapter 7: Universal Gravitation</td><td>2</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	[1] Halliday D., Resnick R. and Walker, J. (2011) *Fundamentals of Physics*, 9th edition, John Willey and Sons, Inc. [2] Alonso M. and Finn E.J. (1992) *Physics,* Addison-Wesley Publishing Company. [3] Hecht, E. (2000) *Physics: Calculus,* 2nd edition, Brooks/Cole. [4] Faughn/Serway (2006) *Serway's College Physics*, Thomson Brooks/Cole.

1. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	PLO									
CLO	1	2	3	4	5	6	7	8	9	10
1	x									
2	x									
3										
4										

2. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1-2	Chapter 1: Bases of Kinematics	1	Quiz1	Lecture, Discussion, Inclass-Quiz	[1].0. [2].1.
3-4	Chapter 2: The Law of Motion	1	HW1	Lecture, Inclass, HW	[1].9.
5-6-7	Chapter 3: Work and Mechanical Energy	3	Quiz2	Lecture, Discussion, Inclass-Quiz	[2].2.
8-9	Chapter 4: Linear Momentum and Collisions	2	HW2, Quiz3	Lecture, Group work, HW	[1]. 2, 4 [2]. 2
10	Midterm				
11-12	Chapter 5: Rotation of a Rigid Object About a Fixed Axis	3	HW3	Lecture, Group work, HW	[2]. 4. [1]. 18.
13-14	Chapter 6: Equilibrium and Elasticity	3		Lecture, Group work	[3]. 10
15-16	Chapter 7: Universal Gravitation	3	HW4	Lecture, Discussion, HW	[2]. 8
17	Final exam				

3. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Attendance + Homework + in-class discussion (15%)				
Quizzes (Qz) / assignment (As) (15%)	Qz1, Qz3/ As.P1 50%Pass	Qz2, Qz4/ As.P2 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P3 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P4 50%Pass
Midterm exam (30%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass
Final exam (40%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment: …….		
Date: ……	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response

4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact,	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledge s different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and	Conclusion is logically tied to a range of information, including opposing	Conclusion is logically tied to information (because information is	Conclusion is inconsistently tied to some of the information discussed;

	reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	viewpoints; related outcomes (consequences and implications) are identified clearly.	chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandabl e, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandabilit y of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandabl e but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. **Date revised: January 12, 2022**

Course Name: Writing AE1

Course Code: EN007IU

1. General information

Course designation	*This course provides students with comprehensive instructions and practice in essay writing, including transforming ideas into different functions of writing such as process, cause-effect, comparison-contrast, and argumentative essays.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of Department of English
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (lecture, exercise): 30 Private study including examination preparation, specified in hours[4]: 60
Credit points	2
Required and recommended prerequisites for joining the course	Students must fulfil ONE of the following requirements to attend this course: • hold TOEFL iBT certificate with score ≥ 61 • hold IELTS certificate with score ≥ 5.5 • have completed IE2 course
Course objectives	Throughout the whole course, students are required to read university-level texts to develop the ability to read critically and to respond accurately, coherently and academically in writing. Through providing them with crucial writing skills such as brainstorming, paraphrasing, idea developing, revising, and editing, this course prepares the students for research paper writing in the next level of AE2 writing.

[4] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand and follow different steps in the writing process to produce a complete essay
CLO2. Employ different methods to improve their writing such as peer feedback and teacher comments</td></tr>
<tr><td>Skill</td><td>CLO3. Read critically, analyze and annotate an academic text
CLO4. Use different functions of writing to successfully communicate their purposes to the audience (describe a process, discuss the causes and effects, compare and contrast, make arguments, paraphrase and summarize)</td></tr>
<tr><td>Attitude</td><td>CLO5. Reason around ethical issues in writing academic essays and avoid committing plagiarism</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>The process of Academic Writing</td><td>1</td><td>I, T, U</td></tr>
<tr><td>Using Outside Sources</td><td>3</td><td>T, U</td></tr>
<tr><td>From Paragraph to Essay</td><td>4</td><td>T, U</td></tr>
<tr><td>Process Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Cause/Effect Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Comparison/ Contrast Essays</td><td>4</td><td>T, U</td></tr>
<tr><td>Argumentative Essays</td><td>6</td><td>T, U</td></tr>
<tr><td>Summarizing</td><td>2</td><td>U</td></tr>
<tr><td>Review & Correction</td><td>2</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Essay writing</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance
Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that</td></tr>
</table>

	the students attend at least 80% of the course to be eligible for the final examination. *Missed Tests* Students are not allowed to miss any of the tests (both Mid-term and Final). There are very few exceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re-take the examination. *Class Behaviors* Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Writing AE1 course with approximately 8-10 hours per week (both in class and self-study). Accordingly, students are supposed to follow the obligations below: - Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request. - Participate fully and constructively in all course activities and discussions (if any). - Display appropriate courtesy to all involved in the class. - Provide constructive feedback to faculty members regarding their performance. *Plagiarism* Students are warned not to copy from other books or from their peers for all assessment tasks. Committing plagiarism will result in 0 point for the task. Students who plagiarize twice will be prohibited from sitting the final examination. *Writing Center (Room 509)* Students are encouraged to visit the Writing Center to schedule an appointment for additional help with essay writing.
Reading list	[1] Oshima, A., & Hogue, A. (2017). *Longman Academic Writing Series, Level 4: Essays* (5th ed.).New Jersey, NJ: Pearson Longman. [2] Oshima, A., & Hogue, A. (2006). *Longman Academic Writing Series, Level 4: Essays* (4th ed.).New Jersey, NJ: Pearson Longman.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						
2						
3						
4						

3. Planned learning activities and teaching methods

Week	Coursebook		Homework
	Chapter	***Pages***	
1	**The process of Academic Writing** Step 1: Creating (Prewriting) Step 2: Planning (Outlining) Step 3: Writing	[2] pp. 265-279 [1] pp. 58-65	• Do revising & editing exercises • Read pp. [1] pp. 66-72
2	***Using Outside Sources (Cont'd)*** Strategies for writing a successful summary	[1] pp. 58 - 72	• Do paraphrasing exercises • Read [1] pp.74-100. Read, take notes and write the summary of ONE of the following articles: o The Challenge of Many Languages (p. 280) o Nice by Nature? (p. 281) o Marital Exchanges (pp. 283-4) o Why We Should Send a Manned Mission to Mars (pp.286-7) o Let's Not Go to Mars (pp. 288-9)

3 & 4	**Review/ Correction**: Lecturergives feedback to one or two students' writings in class. **From Paragraph to Essay** The introductory paragraph: • General statements & Introductory techniques • Thesis statements & Logical division of ideas Body paragraphs: • Topic sentences The concluding paragraph: • Restatement • Final thoughts Outlines of essays	[1] pp. 74 – 100	• Read pp. 101-15 • Do exercises on: o Writing thesis statements o Writing topic sentences fromthe thesis statement provided o Writing restatements
5	**Process Essays** Introduction Analyzing the models Thesis statements for process essays Transitional signals **Write together:** Writing from a diagram (p.115)	[1] pp. 101 - 115	• Write a short essay (150-200words) describing how hydroelectric power is generated (or a topic of the lecturer's choice)

6	**Process Essays (Cont'd) Review/ Correction**: Lecturer gives feedback to one or two students' writings in class. ***<u>In-class Assignment:</u>*** Write a process essay about one of these topics or a topic of the lecturer's choice: • How to cook a favorite food • How to do a favorite hobby • How to succeed in your major area or professional field • How to accomplish an academic task (register for classes, apply for a scholarship, pass an exam, etc.)	[1] pp. 101 - 115	• Read [1] pp. 116-132
7	**Cause/ Effect Essays** Introduction Analyzin	[1] pp. 116 - 132	• Practice 4, 5,6 /pp. 127-9 • Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been

	g the models Organiza tion Signal words and phrases **Write together:** Write the introduction, ONE bodyparagraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • The cause of obesity • The effects of involvement in sports on young children • The causes of stress in college students • The effects of regular reading on students' lives		used in class: o The cause of obesity o The effects of involvement insports on young children o The causes of stress in college students o The effects of regular readingon students' lives

8	**Cause/ Effect Essays (Cont'd) Review/ Correction:** Lecturer gives feedback to one or two students' writings in class. ***<u>In-class Writing:</u>*** Write the introduction, ONE bodyparagraph and the conclusion on one of the two topics left (except for the ones that has been worked on in class and assigned as homework) or a topic of the lecturer's choice: • The cause of obesity • The effects of involvement in sports on young children • The causes of stress in college students The effects of regular reading on students' lives		• Give peer-feedback using therubric provided
MID-TERM EXAMINATION			
9	**Comparison/ Contrast Essays** Introduction Analyzing the models Organization: • Points of	[1] pp. 133 - 151	• Practice 3, 4, 6, 7/pp.142-6 • Write the introduction, ONE body paragraph and the conclusion on one of the topics below or a topic of the lecturer's choice. The topic should be different from the one that has been used in class: o Compare and contrast the relationship between parents and children in two different

	comparison • Point-by-point organization • Block organization Comparison and Contrast signal words **Write together:** Write the introduction, ONE bodyparagraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • Compare and contrast the relationship between parents and children in two different cultures. • Compare and contrast theuniversity culture in two different countries. • Compare and contrast the culture of a small town and a big city.		cultures. ○ Compare and contrast the university culture in two different countries. ○ Compare and contrast the culture of a small town and abig city.

10	**Comparison/ Contrast Essays (Cont'd) Review/ Correction:** Lecturergives feedback to one or two students' writings in class. ***<u>In-class Assignment:</u>*** Write a compare and contrast essay on the topic left or a topic ofthe lecturer's choice: • Compare and contrast the relationship between parents and children in two different cultures • Compare and contrast theuniversity cultures in two different countries • Compare and contrast the cultures of a small town and a big city	[1] pp. 133 - 151	• Read [1] pp. 152-168
11 & 12	**Argumentative Essays** Introduction Analyzing the model	[1] pp. 152-168	• Write an argumentative essay (300 – 350 words) on ONE of the following topics or a topic

	Organization: Block vs. Point-by-point pattern The elements of an argumentativeessay: • An explanation of the issue • A clear thesis statement • A summary of the opposing arguments • Rebuttals to the opposing arguments • Your own arguments The introductory paragraph: Thesis Statement Statistics as support **Write together:** Write the introduction, ONE bodyparagraph and the conclusion on one of the topics below or a topic of the lecturer's choice: • Can same-sex parenting negatively influence a child's mentality? • Do famous artists have aninnate talent, or do they put in great effort to improve their skills? • Is homework helpful?		of the lecturer's choice: ○ Can same-sex parenting negatively influence a child's mentality? ○ Do famous artists have an innate talent, or do they put ingreat effort to improve their skills? ○ Is homework helpful?

13	**Argumentative Essays (Cont'd) Review/ Correction:** Lecturer gives feedback to one or two students' writings in class. **In-class Writing:** Write an argumentative essay onthe topic left or a topic of the lecturer's choice: • Can same-sex parenting negativel y influence achild's mentalit y? • Do famous artists have aninnate talent, or do they put in great effort to improve their skills? • Is homework helpful?		• Give peer-feedback using therubric provided
14	Review & Practice: Summarizing		Sample final test
15	**Review/Correction :** Lecturer gives feedback to one or two students' argumentative essays +sample final test in class. Lecturer has students check their own assignment scores.		
FINAL EXAMINATION			

Course Name: C/C++ Programming

Course Code: IT116IU

1. General information

Course designation	Learning the basics of programming
Semester(s) in which the course is taught	2
Person responsible for the course	MSc. Le Thanh Son
Language	English
Relation to curriculum	Compulsory (CS, NE, CE)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This course concentrates on learning the basics of programming languages which are the foundations for further studies in IT. The course enables students to get familiar with C programming language. The course covers all basic C data structures, control flows, simple data structures as well as other advanced topics which include pointers, bit operators, file processing, dynamic data types.
Course learning outcomes	CLO 1. Understand programming languages and applications, how applications work CLO 2. Understand basic data structure and control flow of C programming language CLO 3. Able to write applications using C

Competency level	**Course learning outcome (CLO)**
Knowledge	1
Skill	2, 3
Attitude	

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

	Topic	Weight	Level
	Introduction to Computer and Programming Language	1	I
	Introduction to C Programming Language	1	I, T
	C Basic Data Types	1	T, U
	Control Flow: Branching statements	1	T, U
	Control Flow: Iteration	1	T, U
	Functions	1	T, U
	Array	1	T, U
	Pointers	1	T, U
	String	1	T, U
	File Processing	1	T, U
	Dynamic Memory Allocation	1	T, U
	Struct, Union	1	T, U
	Bitwise Operation	1	T, U
	Linked list, Stack, Queue	1	T, U
	Binary tree	1	T, U
Examination forms	Short-answer questions, Programming exercises		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	1. Paul Deitel, C How to Program 8th, 2016		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6
1	x					
2		xxx				
3		xxx				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Computer and Programming Language	1	Quiz	Lecture	1
2	Introduction to C Programming Language	1	Quiz	Lecture	1

3	C Basic Data Types	1	Quiz	Lecture	1
4	Control Flow: Branching statements	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
5	Control Flow: Iteration	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	Functions	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
7	Array	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Pointers	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
Midterm					
9	String	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	File Processing	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Dynamic Memory Allocation	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
12	Struct, Union	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
13	Bitwise Operation	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
14	Linked list, Stack, Queue	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
15	Binary tree	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1

Final

4. **Assessment plan**

Assessment Type	CLO1	CLO2	CLO3
Quiz / Assigment (10%)	50%	10%	10%
Labs (20%)	10%	30%	30%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	10%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. **Rubrics (optional)**

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.

2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a	Shows an emerging awareness of present assumptions (sometimes labels assertions as

	contexts when presenting a position.		position. May be more aware of others' assumptions than one's own (or vice versa).	assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and	Organizational pattern (specific introduction and conclusion, sequenced material within	Organizational pattern (specific introduction and conclusion, sequenced material within	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and

	transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	the body, and transitions) is clearly and consistently observable within the presentation.	the body, and transitions) is intermittently observable within the presentation.	transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandabilit y of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the

	analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	supports the presentation or establishes the presenter's credibility/ authority on the topic.	supports the presentation or establishes the presenter's credibility/ authority on the topic.	presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Physics 3

Course Code: PH015IU

1. General information

Course designation	*This subject will provide a basic knowledge of electricity and magnetism.*
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Assoc. Prof. Phan Bảo Ngọc
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, assignment.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 135 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 45 Private study including examination preparation, specified in hours: 90
Credit points	3
Required and recommended prerequisites for joining the course	Physics 1
Course objectives	This course will provide students with: 1. The basic knowledge of electricity and magnetism such as electric charge, electric potential, magnetic fields, electromagnetic waves, etc. 2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques. 3. Understanding and skills needed to use physical laws governing real process and to solve them in the engineering environment. 4. Confidence and fluency in discussing physics in English.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. An ability to understand basic knowledge of electricity and magnetism such as electric charge, electric potential, magnetic fields, electromagnetic waves.
CLO2. Examine problem solving in engineering environment</td></tr>
<tr><td>Skill</td><td>CLO3. Understand and acquire skills needed to use physical laws governing real process and to solve them in the engineering environment</td></tr>
<tr><td>Attitude</td><td>CLO4. Develop confidence and fluency in discussing physics in English</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Chapter 1: Electric Fields</td><td>3</td><td>I, T, U</td></tr>
<tr><td>Chapter 2: Electric Potential and Capacitance</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 3: Current and Resistance. Direct Current Circuits</td><td>3</td><td>I, T, U</td></tr>
<tr><td>Chapter 4: Magnetism</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 5: Electromagnetic Induction</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 6: Electromagnetic Oscillations and Alternating Current</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Chapter 7: Maxwell’s Equation and Electromagnetic Waves</td><td>1</td><td>I, T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	[1] Halliday D., Resnick R. and Walker, J. (2011) *Fundamentals of Physics*, 9th edition, John Willey and Sons, Inc. [2] Alonso M. and Finn E.J. (1992) *Physics,* Addison-Wesley Publishing Company. [3] Hecht, E. (2000) *Physics: Calculus,* 2nd edition, Brooks/Cole. [4] Faughn/Serway (2006) *Serway's College Physics*, Thomson Brooks/Cole.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-10) is shown in the following table:

	PLO									
CLO	1	2	3	4	5	6	7	8	9	10
1	x									
2	x									
3										
4										

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-3	Chapter 1: Electric Fields	1, 2, 3, 4	Quiz 1/ Assignment Midterm exam	Lecture, Discussion	[1].0. [2].1.
4-5	Chapter 2: Electric Potential and Capacitance	1, 2, 3, 4	Quiz 2/ Assignment Midterm exam	Lecture, Discussion	[1].9.
6-7	Chapter 3: Current and Resistance. Direct Current Circuits	1, 2, 3, 4	Assignment Midterm exam	Lecture, Discussion	[2].2.
8	Chapter 4: Magnetism (Part 1)	1, 2, 3, 4	Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.
9-10	Midterm				
11-12	Chapter 4: Magnetism (Part 2)	1, 2, 3, 4	Quiz 3/ Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.
13-14	Chapter 5: Electromagnetic Induction	1, 2, 3, 4	Quiz 4/ Assignment Final exam	Lecture, Discussion	[3]. 10
15-16	Chapter 6: Electromagnetic Oscillations and Alternating Current	1, 2, 3, 4	Assignment Final exam	Lecture, Discussion	[2]. 4. [1]. 18.

Week	Topic	CLO	Assessments	Learning activities	Resources
17	Chapter 7: Maxwell's Equation and Electromagnetic Waves	1, 2, 3, 4	Final exam	Lecture	[3]. 10
18-19	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Attendance + Homework + in-class discussion (15%)				
Quizzes (Qz) / assignment (As) (15%)	Qz1, Qz3/ As.P1 50%Pass	Qz2, Qz4/ As.P2 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P3 50%Pass	Qz1, Qz2, Qz3, Qz4 / As.P4 50%Pass
Midterm exam (30%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass
Final exam (40%)	Q1, Q2, Q3 50%Pass	Q4, Q5 50%Pass	Q3, Q5 50%Pass	Q3, Q5 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1 Grading checklist

Grading checklist for Written Reports			
Student: …….. **Date: ……**		**HW/Assignment: …….** **Evaluator: ……**	
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	**10**		
Introduction demonstrates thorough knowledge of relevant background and prior work	**15**		
Analysis and discussion demonstrate good subject mastery	**30**		
Summary and conclusions appropriate and complete	**5**		
Organization (10%)			
Distinct introduction, body, conclusions	**5**		
Content clearly and logically organized, good transitions	**5**		

Presentation (20%)			
Correct spelling, grammar, and syntax	**10**		
Clear and easy to read	**10**		
Quality of Layout and Graphics (10%)	**10**		
TOTAL SCORE	**100**		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a	Information is taken from source(s) with enough interpretation/ evaluation to develop a	Information is taken from source(s) with some interpretation / evaluation, but not	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of

	comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: January 12, 2022

Course Name: Physics 3 Laboratory

Course Code: PH016IU

1. General information

Course designation	*This course provides students with basic knowledge of electricity and magnetism in laboratory, consists of: Ohm's law, LRC circuit, RC circuit, LR circuit, magnetic fields of coils….*
Semester(s) in which the course is taught	1, 2
Person responsible for the course	Msc. Lê Thị Quế Msc. Trịnh Thanh Thủy
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, assignment.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 60 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): lecture: 30 Private study including examination preparation, specified in hours: 30
Credit points	1
Required and recommended prerequisites for joining the course	Physics 3 (PH015IU)
Course objectives	This course will provide students with: 1. The basic concepts in electricity and magnetism. Have laboratory experiences. 2. Skills to solve problems in engineering environment by applying both theoretical and experimental techniques 3. Skill to present scientific report in writing, and better understand the relations between theory and experiment. 4. Confidence and fluency in discussing physics in English.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand the basic concepts in electricity and magnetism.</td></tr>
<tr><td>Skill</td><td>CLO2. Approach and solve problems in Electricity and magnetism experiments
CLO3. Write scientific report, have understanding the relations between theory and experiment</td></tr>
<tr><td>Attitude</td><td>CLO4. An ability to communicate effectively in writing English manner</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: experimental session (4 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Ohm’s law</td><td>1</td><td>T, U</td></tr>
<tr><td>Resistances in Circuits</td><td>1</td><td>T, U</td></tr>
<tr><td>LRC Circuits</td><td>1</td><td>T, U</td></tr>
<tr><td>Kirchhoff’s laws</td><td>1</td><td>T, U</td></tr>
<tr><td>RC circuit</td><td>1</td><td>T, U</td></tr>
<tr><td>LR circuit</td><td>1</td><td>T, U</td></tr>
<tr><td>Magnetic fields of coils</td><td>1</td><td>T, U</td></tr>
<tr><td>The e/m experiment</td><td>1</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions, taking experiment, write report</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Halliday D., Resnick R. and Walker, J. (2011) Fundamentals of Physics, 9th edition, John Willey and Sons, Inc.
[2] Labguide</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	PLO									
CLO	1	2	3	4	5	6	7	8	9	10
1	x									
2	x									
3										
4										

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Ohm's law	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
2	Resistances in Circuits	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
3	LRC Circuits	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
4	Kirchhoff's laws	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
5	RC circuit	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
6	LR circuit	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
7	Magnetic fields of coils	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
8	The e/m experiment	1, 2	Prelab answer, Lab report	Taking experiment	[1]. [2].
9	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Prelab (20%)	Prelab1-8 60%Pass			Prelab1-8 60%Pass
Lab report (30%)	Labreport 1-8 50%Pass	Labreport 1-8 50%Pass	Labreport 1-8 50%Pass	Labreport 1-8 50%Pass
Attendance (20%)				
Final exam (30%)	Part I.1 50%Pass	Part I.2 50%Pass	Part II.1,2 50%Pass	Part II.3 50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports

Student: …….. **Date: ……**		**HW/Assignment: …….** **Evaluator: ……**	
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	**10**		
Introduction demonstrates thorough knowledge of relevant background and prior work	**15**		
Analysis and discussion demonstrate good subject mastery	**30**		
Summary and conclusions appropriate and complete	**5**		
Organization (10%)			
Distinct introduction, body, conclusions	**5**		
Content clearly and logically organized, good transitions	**5**		
Presentation (20%)			
Correct spelling, grammar, and syntax	**10**		
Clear and easy to read	**10**		
Quality of Layout and Graphics (10%)	**10**		
TOTAL SCORE	**100**		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not

	consistently observable and is skillful and makes the content of the presentation cohesive.	consistently observable within the presentation.	observable within the presentation.	observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the

	supports the presentation or establishes the presenter's credibility/ authority on the topic.	establishes the presenter's credibility/ authority on the topic.	establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

6. Date revised: January 12, 202

Course Name: Speaking AE2

Course Code: EN012IU

1. General information

Course designation	*Giving presentations today becomes a vital skill for students to succeed not only in university but also at work in the future. Speaking AE2, therefore, provides students with the knowledge and skills needed to deliver effective presentations (informative and persuasive presentations).*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of Department of English
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, mini presentations
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (lecture, exercise): 30 Private study including examination preparation, specified in hours[5]: 60
Credit points	2
Required and recommended prerequisites for joining the course	Students must complete AE1 courses
Course objectives	Speaking AE2 aims at introducing an training students many aspects of giving a presentation: building up confidence, preparing and planning, using the appropriate language, applying effective visual aids, applying delivery techniques, dealing with questions and responding, performing body language, and so on.

[5] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Understand many aspects of giving a presentation: building up confidence, preparing and planning, using the appropriate language, applying effective visual aids, applying delivery techniques, dealing with questions and responding, performing body language</td></tr>
<tr><td>Skill</td><td>CLO2. Prepare and deliver effective, formal, structured presentations that are appropriate to the specific environment and audience.</td></tr>
<tr><td>Attitude</td><td>CLO3. Deliver both informative and persuasive speech with confidence</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Orientation & Introduction
Needs analysis</td><td>2</td><td>I, T, U</td></tr>
<tr><td>Building up confidence</td><td>2</td><td>T, U</td></tr>
<tr><td>The first few minutes</td><td>2</td><td>T, U</td></tr>
<tr><td>Organizing what you want to say</td><td>2</td><td>T, U</td></tr>
<tr><td>Summarizing and concluding</td><td>2</td><td>T, U</td></tr>
<tr><td>Using equipment</td><td>2</td><td>T, U</td></tr>
<tr><td>Delivery techniques: Putting it all together</td><td>2</td><td>T, U</td></tr>
<tr><td>Group presentations for the instructor’s evaluation and advice</td><td>2</td><td>U</td></tr>
<tr><td>Introduction to persuasive speeches</td><td>2</td><td>T, U</td></tr>
<tr><td>Methods of persuasion</td><td>2</td><td>T, U</td></tr>
<tr><td>Maintaining interest</td><td>2</td><td>T, U</td></tr>
<tr><td>Dealing with problems and questions</td><td>2</td><td>T, U</td></tr>
<tr><td>Body language</td><td>2</td><td>T, U</td></tr>
<tr><td>Individual presentations for the instructor’s evaluation and advice</td><td>4</td><td>U</td></tr>
</table></td></tr>
</table>

Examination forms	Oral Presentations
Study and examination requirements	*Attendance* Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination. *Missed Tests* Students are not allowed to miss any of the tests (both Mid-term and Final). There are very few exceptions. Only with extremely reasonable excuses (e.g. certified paper from doctors), students may re-take the examination. *Class Behaviors* Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Speaking AE2 course with approximately 8-10 hours per week (both in class and self-study). Accordingly, students are supposed to follow the obligations below: • Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request. • Participate fully and constructively in all course activities and discussions (if any). • Display appropriate courtesy to all involved in the class. • Provide constructive feedback to faculty members regarding their performance. *Plagiarism* Students are warned not to copy from other books or from their peers for all assessment tasks. Committing plagiarism will result in 0 point for the task. Students who plagiarize twice will be prohibited from sitting the final examination.
Reading list	[1] Lowe, S, & Pile, L. (2010). *Presenting.* Singapore: Cengage Learning [2] Comfort, J. (1997). *Effective presentations*. Oxford: Oxford University Press [3] Lucas, S. (2014). *The art of public speaking* (12th edition). New York: McGraw-Hill Education. [4] Harrington, D., & Lebeau, C. (2009). *Speaking of speech*. Macmillan

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						
2						
3						
4						

3. Planned learning activities and teaching methods

WEEK	Content	MATERIAL(S) COVERED	ACTIVITIES
WEEK 1	· **Orientation & Introduction** · **Needs analysis**	[1] *Presenting*, p. 5	Students will: • receive an introduction to effectivepresentation • think about their strength and weaknesses in presenting in English • identify and prioritize their immediate and future needs forpresenting • share tips on improving weaknesses
WEEK 2	**Building up confidence**		Student will: - give a short speech about themselves to help them overcomeinitial shyness of standing up and speaking in public
WEEK 3	**Unit 1: The firstfew minutes**	• *Presenting*, pp. 8-13 • *Effective Presentations*: p.7 + video clip; p.13+ videoclip	Students will: • learn the importance of making agood first impression • learn useful phrases for greeting the audience, introducing themselvesand others, and giving the purpose of their presentation

WEEK 4	**Unit 3: Organizing whatyou want to say**	• *Presenting*, pp. 22-27) • *Effective Presentations*: p.19 +video clip	Students will: • look at the importance of structuring their presentation • learn the useful phrases for outlining their presentation, organizing ideas and moving between different sections of their presentation
WEEK 5	**Unit 6: Summarizing and concluding**	• *Presenting*, pp. 40-45 • *Effective Presentations*: p.41 +video clip	Students will: • look at ways of finishing apresentation effectively • learn useful phrases for endingtheir presentation, summarizing, handing over and thanking
WEEK 6	**Unit 2: Using equipment**	• *Presenting*, pp. 14-21) • *Effective Presentations*: p.31 +video clip	Students will: • use equipment and visuals tosupport their presentation • learn useful phrases for referringto visuals, ensuring their audience can see and expanding on notes
WEEK 7	**Delivery techniques: Putting it alltogether**	[2] *Effective Presentations*: p.50 + video clip Assignment: Topic(s) for group presentation)	Students will: • watch a model presentation and discuss do's and don'ts for effectivedelivery • pick group members and plan their presentations for Week 8
WEEK 8	Group presentations for the instructor's evaluation and advice		Students will: • take turn to deliver a presentation on the topic(s) assigned by the instructor • consult the instructor for advice on the mid-term exam preparation
MIDTERM EXAMINATION Students will give a five-to-six minute informative presentation on a topic to be determined.			
WEEK 9	**Introduction to persuasive speeches**	[3] *The art of public speaking*, Chapter 15 (Handout given by the instructor)	Students will: • know types of persuasive speeches • know typical organizations of apersuasive speech

WEEK 10	**Methods of persuasion**	[3] *The art of public speaking*, Chapter 16 (Handout given by the instructor)	Students will learn to persuade the audience by: • building credibility • using evidence • reasoning • appealing to emotions
WEEK 11	**Unit 4: Maintaining interest**	• *Presenting*: pp. 28-33) • *Effective Presentations*: p.25 +video clip)	Students will: • look at maintaining interestthrough effective delivery • learn useful phrases for clarifyingwhat you mean, checking if the audience is following and involving the audience
WEEK 12	**Unit 5: Dealing with problems and questions**	○ *Presenting*: pp. 34-39) ○ *Effective Presentations*: p.44(Question time)	Students will: • learn strategies for coping inunexpected situations • learn useful phrases for dealingwith problems and questions
WEEK 13	**Unit 6: Body language**	[2] *Effective Presentations* : pp.36-39	Students will: • practise using language and bodylanguage to communicate the message clearly and persuasively • watch video clips about bodylanguage • learn how to control posture, eye contact, gestures and voice inflection
WEEK 14	**Practice**	(to be determined by the instructor)	Students will: - deliver individual or group presentations (assigned by the instructor)
WEEK 15	**Wrap-up andadvice**	(to be determined by the instructor)	Students will: • consult the instructor for advice onthe final exam preparation • continue to deliver individual or group presentations (if any)
FINAL EXAMINATION Students will deliver a seven-to-eight-minute persuasive presentation on a topic to bedetermined			

4. Assessment plan

	Very Poor	Poor	Average	Good	Excellent
Pronunciation, Voice Techniques (Pauses, Volume, Speed Change, Stress, Tone, Etc)	- Mumbles, often mispronounces, very difficult to understand. - Dead person talking, voice to text software does better	- Slurred speech, mispronounces some words. Difficult to understand. - Quiet, monotone, sing/song, little or no expression, boring.	- Clear voice, few pronunciation errors. Some slurring Most can understand the presentation - Some use of voice to show interest	- Crisp, clear voice, correct, precise pronunciation, all can understand. - proper volume; steady rate; enthusiasm; confidence	- Native like
Grammar& Vocabulary (Usage And Appropriateness For Audience)	- Frequent grammar or spelling errors - Inappropriate level. for the audience, Misuse vocabulary	- Noticeable Errors - Often too simple or sophisticated, inconsistent. Some vocabulary incorrectly used	- Minor errors - Generally appropriate, little variation or creativity	- No errors, but simple language - Always appropriate for the audience. Excellent use of vocabulary	- No errors. Excellent use of grammar to support ideas - Creative use of language
Body Language, Gestures, Eye Contact (Turns back to audience and reads screen – 0)	- Dead person on stage - Almost no eye contact, reads notes/screen	- Excessive movement or many distracting gestures - Occasionally eye contact, mostly reads notes/screen	- Some distracting gestures, and some movement and useful gestures - Generally maintains eye contact frequently reads notes/screen	- No distracting gestures. Body language supports speech - Excellent eye contact, seldom uses notes	- Excellent use of body language - Constant eye contact, no use of notes
Organization: Intro, Main, Ending, Coherence (see RATING CHECKLIST)	- Difficult to follow as disorganized	- Generally follows outline, poor introduction or conclusion.	- Follows outline, material generally well organized. Some use of transitions and linkage of ideas. Conclusion acceptable	- Follows outline, material well organized. - Ideas clearly linked. Some use of transitions	- Excellent, clear linkage of ideas. - Good transitions Arouses interest in Introduction, and summarizes clearly main points in conclusion
Content: Relevant/ Interesting/ Accurate	- Several errors or lacks critical information	- Some errors and has irrelevant information	- Information is generally accurate, minor errors, generally meets needs of the audience	- Accurate information, related to needs of audience	- No errors, answers all needs of the audience
Visual Aids: Appropriate, Clear (Movies, sound – 0)	- Slides consist of full paragraphs of text, no or superfluous graphics - Tiny font	- Slides have full sentences and occasional superfluous graphics, Difficult to read	- Slides have short phrases, Graphics relate to text and presentation. Easily read	- Attractive, informative graphics, only key words, easily understood, Good use of masking	- Professional quality, Excellent use of visual, no unrelated graphics, easily read, supports presentation
Overall effectiveness	- Ineffective, alienated audience	- Little positive effect or exchange of info.. Audience bored	- Audience learned something, no change in attitude	- Audience generally positive and learned from presentation	- Audience was kept interested and would remember key points

Assessment Type	**CLO1**	**CLO2**	**CLO3**
On-going Assessment (30%) (discussion, group presentation, individual presentation, and so on) *(It is requested that lecturers collect students' scripts or any type of evidence of their participation for possiblefact check).*	80% Pass	80% Pass	80% Pass
Midterm exam (30%) (Students will give a five-to-six-minute informative presentation on a topic to be determined)	80% Pass	80% Pass	80% Pass
Final exam (40%) (Students will deliver a seven-to-eight-minute persuasive presentation on a topic to be determined.)	80% Pass	80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics & Marksheets

6. Midterm exam rubrics and marksheets

INTERNATIONAL UNIVERSITY
DEPARTMENT OF ENGLISH

SPEAKING AE2 - **MIDTERM** EXAMINATION
RATING CHECKLIST

ACADEMIC YEAR 2021 - 2022
DATE: _____

Student name : _____ Student ID : _____
Topic : _____

Wtg.	*Criteria*	*Very poor*	*Poor*	*Average*	*Good*	*Excellent*	*Comments*
15	**Pronunciation & Voice Techniques (Pause, Volume, Speed Change, Stress, Tone, etc.)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
15	**Language use: Grammar & Vocabulary (usage and appropriateness for audience)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Body Language: Gestures, Eye contact, Facial expressions** (turns back to the audience and reads from screen: 0 pt)	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
20	**Organization: Intro, Body, Ending, Coherence** (see below)	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
20	**Content: Relevance, Accuracy**	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
10	**Visual aids: Appropriateness, Clarity** (Movies, sound: 0 pt)	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
10	**Overall effectiveness**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
	FINAL SCORE: /100						

Negative points: ✧ Timing: <3m: *-15pts* 3m - 3m29: *-10pts* 3m30 - 3m59: *-5pts* 4m - 6m: OK >6m: *-5pts*

Organization:	*Yes*	*No*
A. Introduction		
a. Greeting, name, position *(Good morning ladies and gentlemen. My name is___. I'm a___)*	☐	☐
b. Purpose/ Objective *(The purpose of this talk is to ____)*	☐	☐
c. Connect with the audience *(I can see that all of you love to___)*	☐	☐
d. Outline/ Main part *(I've divided my presentation into ___ parts)*	☐	☐
e. Questions *(Should you have any questions, please save them until the end of my presentation)*	☐	☐
B. Body *(Transitions: Let's start with___/ That brings me to___/ Firstly, Secondly, Next, Lastly)*	☐	☐
C. Ending		
a. Signaling the end *(That brings me to the end of my presentation)*	☐	☐
b. Summary *(Let me just run over the key points again)*	☐	☐
c. Closing *(Thank you very much for your attention)*	☐	☐
d. Inviting questions *(I'd be glad to answer any questions you might have)*	☐	☐

Examiner : .....

7. Final exam rubrics and marksheets

	Very Poor	Poor	Average	Good	Excellent
Pronunciation, Voice Techniques (Pauses, Volume, Speed Change, Stress, Tone, etc.)	– Mumbles, often mispronounces, very difficult to understand. – Dead person talking, voice to text software does better	– Slurred speech mispronounces some words. Difficult to understand. – Quiet, monotone, sing/song, little or no expression, boring.	– Clear voice, few pronunciation errors. Some slurring Most can understand the presentation – Some use of voice to show interest	– Crisp, clear voice, correct, precise pronunciation, all can understand. – Proper volume; steady rate; enthusiasm; confidence	– Native like
Grammar & Vocabulary (Usage and Appropriateness for Audience)	– Frequent grammar or spelling errors – Inappropriate level. for the audience, Misuse vocabulary	– Noticeable Errors – Often too simple or sophisticated, inconsistent. Some vocabulary incorrectly used	– Minor errors – Generally appropriate, little variation or creativity	– No errors, but simple language – Always appropriate for the audience. Excellent use of vocabulary	– No errors. Excellent use of grammar to support ideas – Creative use of language
Body Language: Posture, Gestures, Eye contact, Facial expression (Turns back to audience and reads screen – 0)	– Dead person on stage – Almost no eye contact, reads notes/screen	– Excessive movement or many distracting gestures – Occasionally eye contact, mostly reads notes/screen	– Some distracting gestures, and some movement and useful gestures – Generally maintains eye contact frequently reads notes/screen	– No distracting gestures. Body language supports speech – Excellent eye contact, seldom uses notes	– Excellent use of body language – Constant eye contact, no use of notes
Organization: Intro, Main, Ending, Coherence (see RATING CHECKLIST**)**	– Difficult to follow as disorganized	– Generally follows outline, poor introduction or conclusion.	– Follows outline, material generally well organized. Some use of transitions and linkage of ideas. – Conclusion acceptable	– Follows outline, material well organized. – Ideas clearly linked. Some use of transitions	– Excellent, clear linkage of ideas. – Good transitions Arouses interest in Introduction, and summarizes clearly main points in conclusion
Content: Relevant/Accurate, Informative and Persuasive	– Several errors or lacks critical information	– Some errors and has irrelevant information – Just focus on giving information	– Information is generally accurate, minor errors – Give reasons with little or no emphasis on persuasion	– Accurate information, related to needs of audience – Give frequent emphasis on persuasion	– No errors, answers all needs of the audience – Persuade the audience well
Visual Aids: Appropriateness, Clarity *(Use of video clip exceeding 20 seconds – 0)*	– Slides consist of full paragraphs of text, no or superfluous graphics – Tiny font	– Slides have full sentences and occasional superfluous graphics, – Difficult to read	– Slides have short phrases; Graphics relate to text and presentation. Easily read	– Attractive, informative graphics, only key words, easily understood, good use of masking	– Professional quality, Excellent use of visual, no unrelated graphics, easily read, supports presentation
Question response	– Welcomes the question	– Listens carefully, doesn't interrupt	– Thinks before answering – Clarifies, rephrases as needed	– Answers correctly and briefly	– Checks to see if questioner is satisfied

INTERNATIONAL UNIVERSITY
DEPARTMENT OF ENGLISH

SPEAKING AE2 - **FINAL EXAMINATION**
RATING CHECKLIST

ACADEMIC YEAR 2021 – 2022
DATE: _____

Student name : ..... Student ID : .....
Topic : .....

Wtg.	*Criteria*	*Very poor*	*Poor*	*Average*	*Good*	*Excellent*	*Comments*
15	**Pronunciation & Voice Techniques (Pause, Volume, Speed Change, Stress, Tone, etc.)**	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Language use: Grammar & Vocabulary (usage and appropriateness for audience)**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
15	**Body Language: Posture, Gestures, Eye contact, Facial expression** (turns back to the audience and reads from screen: 0 pt)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
15	**Organization: Intro, Body, Ending, Coherence** (see below)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
20	**Content: Relevant, Accurate, Informative and Persuasive**	*(1-4)*	*(5-8)*	*(9-12)*	*(13-16)*	*(17-20)*	
15	**Visual aids: Appropriateness, Clarity** (Movies, sound: 0 pt)	*(1-3)*	*(4-6)*	*(7-9)*	*(10-12)*	*(13-15)*	
10	**Question response**	*(1-2)*	*(3-4)*	*(5-6)*	*(7-8)*	*(9-10)*	
	SCORE (max.100): _____	*BONUS (max.10): _____*				**TOTAL SCORE (max.100): _____**	

Deduction points: ✧ No references: -10 ✧ Timing: <5m: *-15pts* 5m - 5m29: *-10pts* 5m30 - 5m59: *-5pts* >8m: *-5pts*

Bonus points: *Up to **10pts for creativity**, which involves PowerPoint design, Organization of information, Presentation style ...*

Organization:	*Yes*	*No*
A. Introduction		
a. Greeting, name, position *(Good morning, ladies and gentlemen. My name is___. I'm a___)*	☐	☐
b. Connect with the audience *(I can see that all of you love to___)*	☐	☐
c. Purpose/ Objective *(The purpose of this talk is to ____)*	☐	☐
d. Time length *(My presentation should last for ___)*	☐	☐
e. Outline/ Main part *(I've divided my presentation into ___ parts)*	☐	☐
f. Questions *(Should you have any questions, please save them until the end of my presentation)*	☐	☐
B. Body *(Transitions: Let's start with___/ That brings me to___/ Firstly, Secondly, Next, Lastly)*	☐	☐
C. Ending		
a. Signaling the end *(That brings me to the end of my presentation)*	☐	☐
b. Summary *(Let me just run over the key points again)*	☐	☐
c. Closing *(Thank you very much for your attention)*	☐	☐
d. Inviting questions *(I'd be glad to answer any questions you might have)*	☐	☐

Examiner : _____

Date revised: 15 August, 2022

Course Name: Writing AE2

Course Code: EN011IU

1. General information

Course designation	*This course introduces basic concepts in research paper writing, especially the role of generalizations, definitions, classifications, and the structure of a research paper to students who attend English- medium college or university. It also provides them with methods of developing and presenting an argument, a comparison or a contrast.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Lecturers of Department of English
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (lecture, exercise): 30 Private study including examination preparation, specified in hours: 60
Credit points	2
Required and recommended prerequisites for joining the course	Students must complete Writing AE1 course
Course objectives	Students are required to work on the tasks selected to maximize their exposure to written communication and are expected to become competent writers in the particular genre: the research paper. As writing is part of an integrated skill of reading and writing where reading serves as input to trigger writing, this course is designed to familiarize non-native students with academic literature in their major study by having them read and critically respond to texts of a variety of topics ranging from natural sciences such as biology to social sciences and humanities like education, linguistics and psychology.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Understand the structure of a research paper and employ appropriate academic language in writing a research paper</td></tr>
<tr><td>Skill</td><td>CLO2. Read critically, analyze, and annotate academic articles and journals
CLO3. Employ the research writing skills obtained to work on their own paper in their major study.</td></tr>
<tr><td>Attitude</td><td>CLO4. Reason around ethical issues in writing research paper and avoid committing plagiarism</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><td>Topic</td><td>Weight</td><td>Level</td></tr>
<tr><td>Unit 1: The Academic Writing Process Introduction</td><td>4</td><td>I, T, U</td></tr>
<tr><td>Unit 2: Researching and Writing</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 3: Fundamentals & Feedback</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 4: Definitions, Vocabulary & Clarity</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 5: Generalizations, Facts and Honesty</td><td>4</td><td>T, U</td></tr>
<tr><td>Unit 6: Seeing Ideas and Sharing Texts</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 7: Description, Methods & Reality</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 8: Results, Discussion & Relevance</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 9: The Whole Academic Text</td><td>2</td><td>T, U</td></tr>
<tr><td>Unit 10: Creating the Whole Text</td><td>4</td><td>T, U</td></tr>
<tr><td>Course Review</td><td>2</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Essay writing</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance
Regular on-time attendance in this course is expected. A student will be allowed no more than three absences. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination.
Assignment (Literature review)</td></tr>
</table>

	Purpose: Students will use the knowledge of paraphrasing, summarising, developing arguments, and APA styles to write a 1,000-word literature review on a research scope of their choice. Task: • Follow guidelines on how to write a literature review. • Use relevant academic writing skills such as paraphrasing, summarising, developing arguments, and APA 7th Style Guidelines – see https://www.apastyle.org/ • Develop arguments in relation to the research scope and identify the research gap **Notes:** All papers should be typed, double-spaced, in 13-pt font, and with 1-inch margins. All papers must be original for this class. Criterion-referenced grading is used in this course. *Missed Tests* Students are not allowed to miss any of the tests (both Mid-term and Final). There are very few exceptions. Only with extremely reasonable excuses (eg. certified paper from doctors), students may re- take the examination. *Class Behaviors* Students are required to treat their studying in college as a full-time job and spend an adequate amount of time for this Writing AE2 course with approximately 8-10 hours per week (both in class and self- study). Accordingly, students are supposed to follow the obligations below: • Prepare thoroughly for each class in accordance with the course syllabus and complete home assignments as the instructor's request. • Participate fully and constructively in all course activities and discussions (if any). • Display appropriate courtesy to all involved in the class. • Provide constructive feedback to faculty members regarding their performance. *Plagiarism* All forms of plagiarism and unauthorised collusion are seriously regarded and could result in penalties. Plagiarism occurs when students copy or reproduce people's words or ideas and then present them as students' own work without proper acknowledgement, including when students copy the work of their fellow students. Plagiarism in student submissions can be detected by: • some web-based programs such as SafeAssign or Turnitin, or • examiner's judgments with evidence of originals The rater will review the paper to check if citations or references are provided properly. Penalties due to improper citations or references include:

	<table><tr><th>Degree of magnitude</th><th>Description</th></tr><tr><td>Below 15%</td><td>Marked as it is.</td></tr><tr><td>15% - 25%</td><td>The score is deducted by **25%.**</td></tr><tr><td>25% - 40%</td><td>The score is deducted by **50%**</td></tr><tr><td>Over 40%</td><td>The score is **0.**</td></tr></table> Notes: Part of the test is marked as it is if no plagiarism is detected. Students who plagiarize over 40% twice will be prohibited from sitting the final examination. *Writing Center (Room 509)* Students are encouraged to visit the Writing Center or to schedule an appointment for additional help.
Reading list	[1] Hamp-Lyons, L., & Heasley, B. (2006). *Study Writing.* Cambridge, UK: Cambridge University Press [2] Articles and Essays taken from *The Allyn and Bacon Guide to Writing* by Ramage et al (2009), Pearson Longman. [3] Cormack, J. & Slaught, J. (2009). *English for academic study: Extended writing and research skills*. Cambridge: Cambridge University Press. Garnet Education [4] Folse, K. S. & Pugh, T. (2010). *Great writing 5: Greater essays*. Boston: Heinle, Cengage Learning. [5] Keezer, S. (Ed.) (2003). *Write your research report: A real-time guide*. New Jersey: Pearson Learning Group. [6] Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners*. Sage Publications

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						
2						
3						
4						

3. Planned learning activities and teaching methods

WEEK	CONTENT—SUGGESTED TASKS	ASSIGNMENT/ HOMEWORK
1	**Orientation of the Course** **Unit 1: The Academic Writing Process Introduction**	
2	**Unit 1: The Academic Writing Process (Cont.)** Thinking about writing processes Distinguishing between academic and personal styles of writing Grammar of academic discourse	HW: Task 10
3	**Unit 2: Researching and Writing** Recognizing categories and classification The language of classification The structure of a research paper	HW: Task 17
4	**Unit 3: Fundamentals & Feedback** Exploring comparison and contrast structures The language of comparison and contrast Using comparisons and contrasts to evaluate and recommend	HW: Task 12
5	**Unit 3: Fundamentals & Feedback (Cont.)** The research paper Identifying a research gap The writing process	**Assignment 1: Task 20**
6	**Unit 4: Definitions, Vocabulary & Clarity** The clarity principle The language of definition The place of definition The writing process	HW: Task 15
7	**Unit 5: Generalizations, Facts and Honesty** Honesty principle The language of generalization	HW: Task 13
8	**Unit 5: Generalizations, Facts and Honesty (Cont.)** Writing a literature review The writing process Brainstorming and clustering APA 7th Style Guidelines – see https://www.apastyle.org/	**Assignment 2: Writing Literature review**
MID-TERM EXAMINATION		

9	**Unit 6: Seeing Ideas and Sharing Texts** Writing about events in time Connecting events Learning about peer reviews	HW: Tasks 12 & 13
10	**Unit 7: Description, Methods & Reality** Describing processes and products The language for writing about processes Writing the Methods section Giving and getting formal peer feedback	HW: Tasks 9 & 11
11	**Unit 8: Results, Discussion & Relevance** What is an argument? The language of argument The Results and Discussion sections Finding an academic voice	HW: Task 9
12	**Unit 9: The Whole Academic Text** S-P-S-E: Focus on structure S-P-S-E in the introduction The language of coherence and connection Teacher evaluation	HW: Task 9
13	**Unit 10: Creating the Whole Text** Structure of the research paper Creating your own research	
14	**Unit 10: Creating the Whole Text** Plagiarism Creating citations Paraphrase and summary Authorial identity	
15	**Course Review**	**Submitting Literature review**
FINAL EXAM		

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	
Midterm exam (30%)	80% Pass		80% Pass	80% Pass

Final exam (40%)	80% Pass		80% Pass	80% Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

5.1. Midterm exam sample rubrics (100 points)

TASK 1: 30 points

CATEGORIES	CRITERIA	POINTS	CLO
Category	Farm animals seem to have more complex cognitive and social skills	**7.5**	CLO 1,2
Sub-category 1	1. Sheep experience stress a. increase stress (when isolated from the flock) b. reduce stress (when seeing familiar sheep faces)	**7.5**	
Sub-category 2	2. Cows' co-operative partnerships & physiological response on learning something new a. Those learning tasks experience an increase in heart rate (when facing same situation). b. Those not learning tasks do not experience a heart rate increase.	**7.5**	CLO 1,2
Sub-category 3	3. Pigs' different reactions react differently based on past experience a. avoid the place where they have been shut for long b. go for the place where they were released from quickly.	**7.5**	CLO 1,2
	Total	**30**	

TASK 2: 70 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	All main points relevant to topic Essay question fully answers	**20**	CLO 1,3,4
Organization	Topic and purpose of the essay discussed in the introduction Each main point discussed in a paragraph All main points summarized and rephrased in the conclusion	**20**	CLO 1,3,4
Coherence	Paragraphs ordered in a systematic manner based on, for example, importance, priority, etc. Comparison/contrast transitions are properly used.	**15**	CLO 1,3,4
Style and Tone	Formal writing with full forms Polite writing Academic vocabulary	**15**	CLO 1,3,4

Total	**70**	

5.2. Final exam rubrics: 100 points

CATEGORIES	CRITERIA	POINTS	CLO
Content	• Presenting his/her view on the question clearly and persuasively	**20**	CLO 1,3,4
Structure of ideas	• Introduction with thesis statement, and conclusion with summary and comment • Topic sentences well supported with explanations, examples, etc.	**40**	CLO 1,3,4
Convincing argumentative techniques, e.g., counterargument		**20**	CLO 1,3,4
Language use: *use vocabulary and grammatical structures*		**20**	CLO 1,3,4
Total		**100**	

Date revised: 15 August, 2022

Course Name: Object-Oriented Programming

Course Code: IT069IU

1. General information

Course designation	This subject introduces students to the object-oriented programming from basic notions to professional principles for designing an object-oriented software.
Semester(s) in which the course is taught	3
Person responsible for the course	Dr. Tran Thanh Tung
Language	English
Relation to curriculum	Compulsory (all programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Prerequisite course of OOP: C/C++ Programming
Course objectives	Introduction to object-oriented programming and design. Topics include core terminologies and basic design principles of object-oriented programming such as classes, objects, abstraction, encapsulation, inheritance, polymorphism, the SOLID design principles, and design patterns
Course learning outcomes	CLO 1. Explain and use concepts in object-oriented programming including classes, objects, abstraction, encapsulation, inheritance, and polymorphism. CLO 2. Implement an object-oriented solution in JAVA programming language. CLO 3. Analyze design principles and design patterns in object-oriented programing

Competency level	**Course learning outcome (CLO)**

Knowledge	CLO1
Skill	CLO2, **CLO3**
Attitude	

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to Java	3	I
Introduction to Object-Oriented Programming	3	I, T
Classes and Objects	3	T
Inheritance and composition	3	T
Polymorphism	3	T
Design with interfaces and abstract classes	3	T
Building Objects	3	T
Exception handling	3	T
Generic classes and methods	3	T
Introduction to SOLID principles Single responsibility principle	3	T, U
Open/closed principle	1.5	T, U
Lisko substitution principle	1.5	T, U
Interface segregation principle	1.5	T, U
Dependency inversion principle	1.5	T, U
Reusing Designs Through Design Patterns	6	T, U

Examination forms

Short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. Paul J. Deitel (Author), Harvey Deitel (Author), Java How To Program, 11th Edition, Prentice Hall, 2017
2. Matt Weisfeld, The Object-Oriented Thought Process, 3rd Edition, Addison-Wesley, 2009
3. Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides, Design Patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley Professional, 1994
4. Eric Freeman, Bert Bates, Kathy Sierra and Elisabeth Robson, Head First Design Patterns: A Brain-Friendly Guide, O'Reilly Media, 2004

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	XX					
2		XX				X
3		XXX				X

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Java	1	Quiz	Lecture	[1]
2	Introduction to Object-Oriented Programming	1	Quiz	Lecture, Discussion	[1,2]
3	Classes and Objects	2	Quiz, Lab, Midterm	Lecture, Discussion, In-class exercises	[1,2]
4	Inheritance and composition	2	Quiz, Lab, Midterm	Lecture, Discussion, In-class exercises	[1,2]
5	Polymorphism	2	Quiz, Lab, Midterm	Lecture, Discussion, In-class exercises	[1,2]
6	Design with interfaces and abstract classes	2,3	Quiz, Lab, Midterm	Lecture, Discussion, In-class exercises	[1,2]
7	Building Objects	2,3	Quiz, Lab, Midterm	Lecture, Discussion, In-class exercises	[1,2]
8	Exception handling	1,2	Quiz	Lecture	[1]
9	**Midterm**				

10	Generic classes and methods	2,3	Quiz, Lab, Final	Lecture, Discussion, In-class exercises	[1,2]
11	Introduction to SOLID principles Single responsibility principle	2,3	Quiz, Project, Final	Lecture, Discussion, In-class exercises	[1,3,4]
12	Open/closed principle Lisko substitution principle	2,3	Quiz, Project, Final	Lecture, Discussion, In-class exercises	[1,3,4]
13	Interface segregation principle Dependency inversion principle	2,3	Quiz, Project, Final	Lecture, Discussion, In-class exercises	[1,3,4]
14	Reusing Designs Through Design Patterns, part 1	2,3	Quiz, Project, Final	Lecture, Discussion, In-class exercises	[1,3,4]
15	Reusing Designs Through Design Patterns, part 2	2,3	Quiz, Project, Final	Lecture, Discussion, In-class exercises	[1,3,4]
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz (5%)	10%		20%
Labs (10%)	30%	30%	
Midterm examination (30%)	50%	40%	
Projects/Presentations/ Report (15%)	10%		30%
Final examination (40%)		30%	50%

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: ……..	HW/Assignment:		
Date: ……	…….		
	Evaluator:		
	……		
	Max.	**Score**	**Comments**
Technical content (60%)			

Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined	Issue/ problem to be considered critically is stated without clarification or description.

			, and/ or backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledge s different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified .

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

	credibility/ authority on the topic.	authority on the topic.	authority on the topic.	
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Discrete Mathematics

Course Code: IT153IU

1. General information

Course designation	The course provides students the ability to reason and think mathematically and logically; and apply this ability to analyze and solve discrete practical problems in Computer Science and IT.
Semester(s) in which the course is taught	4
Person responsible for the course	Assoc. Prof. Nguyen Van Sinh
Language	English
Relation to curriculum	Compulsory (NE, CE, CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) Private study including examination preparation, specified in hours: 90
Credit points	Number of credits : 3 Lecture: 3 Laboratory: 0
Required and recommended prerequisites for joining the course	C/C++ Programming Calculus 1, 2
Course objectives	This course provides students the based knowledge of discrete mathematics. To develop the ability to reason and think mathematically and logically; and to apply this ability to analyzing and solving discrete practical problems in computer science. This is an application-oriented course based upon the study of events that occur in small, or discrete in computer science, segments in business, industry, government and the digital areas. Students will be introduced to the mathematical tools of logic and set theory, counting, number theory, and graph theory. Practical applications will be introduced throughout the course
Course learning outcomes	CLO 1. Understand and apply count/enumerate objects in a systematic way. CLO 2. Understand mathematical reasoning in order to read, comprehend and construct mathematical arguments; Understand to work with discrete structures and practical problems in computer science and IT CLO 3. Apply algorithm thinking and modeling; Apply knowledge in computer science for problems solving

<table>
<tr><td></td><td>CLO 4. Have a sense of preparation of good mathematical knowledges to approach and solve problems in computer science and information technology.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1, CLO2</td></tr>
<tr><td>Skill</td><td>CLO2, CLO3</td></tr>
<tr><td>Attitude</td><td>CLO4</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 teaching hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Week 1: Course syllabus and introduction; Logic and propositions</td><td>3</td><td>I,T</td></tr>
<tr><td>Week 2: Logic and propositions (continue)</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 3: Propositional Equivalences; predicates and quantifiers</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 4: Nested Quantifiers and Methods of Proof</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 5: Induction and recursion</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 6&7: Number of theory</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 8: Counting: part 1, 2; midterm review</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 9: Counting: part 3</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 10: Advanced counting</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 11: Boolean algebras</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 12: Graph theory</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 13: Optimal problem solving on graphs</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 14: Introduction and application of tree</td><td>3</td><td>I,T,U</td></tr>
<tr><td>Week 15: Search on tree; review for final exam</td><td>3</td><td>I,T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>1. Kenneth H. Rosen, Discrete Mathematics and Its Applications 8th edition, 2019.
2. Oscar Levin, Discrete mathematics An Open Introduction. 3rd edition, 2019.
3. Vietnamese book: N.V.Sinh, T.M.Hà, N.T.T.Sang, N.M.Quân, “Nền tảng Toán học trong Công nghệ Thông</td></tr>
</table>

	tin", NXB - Đại học Quốc gia TPHCM, ISBN: 978-604-73-6518-0, 2018.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2	X	X				
3		X				
4						X

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Course syllabus and introduction; Logic and propositions	1,2	Questions and answers	Lecture, Discussion, In-class exercises	[1, 2]
2	Logic and propositions (continue)	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]
3	Propositional Equivalences; predicates and quantifiers	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]
4	Nested Quantifiers and Methods of Proof	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]
5	Induction and recursion	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]
6	Number of theory	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]
7	Number of theory (continue)	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2]

8	Counting: part 1, 2; midterm review	2,3,4	Quiz, Homework, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
	Midterm examination				
9	Counting: part 3	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2]
10	Advanced counting	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2]
11	Boolean algebras	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
12	Graph theory	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
13	Optimal problem solving on graphs	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
14	Introduction and application of tree	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
15	Search on tree; review for final exam	2,3,4	Quiz, Homework, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
1	**Final examination**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Quiz/Homework/Assignment (25%)	20%	30%	30%	20%
Midterm examination (30%)	25%	25%	25%	25%
Final examination (45%)		30%	40%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports

Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is	Issue/ problem to be considered critically is stated but description leaves some	Issue/ problem to be considered critically is stated without clarification or description.

	relevant information necessary for full understanding.	not seriously impeded by omissions.	terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others'	Specific position (perspective, thesis/ hypothesis) acknowledges different	Specific position (perspective, thesis/ hypothesis) is stated, but is

	complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	points of view are acknowledged within position (perspective, thesis/ hypothesis).	sides of an issue.	simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified .

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

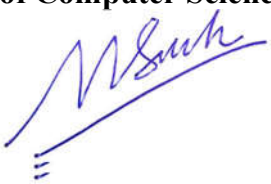
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Computer Networks

Course Code: IT091IU

1. General information

Course designation	This subject covers the fundamental knowledge of computer networks
Semester(s) in which the course is taught	3,5
Person responsible for the course	Assoc. Prof. Vo Thi Luu Phuong.
Language	English
Relation to curriculum	Compulsory (CS, NE, CE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	C/C++ Programming or Fundamentals of Programming
Course objectives	This course covers the fundamental knowledge of computer networks such as OSI, TCP/IP models, network architectures, LAN, WAN, the typical network protocols. The students will also study to design, implement and monitor a small / medium scale network.
Course learning outcomes	CLO 1. Analyze the components, architecture, and protocols in computer networks; CLO 2. Apply the theory in designing a small/medium computer networks; CLO 3. Show the ability to work in teams;

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO2

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level

	Introduction of computer networks	2	T, U
	Network applications: HTTP, FTP, DNS, SMTP	2	T, U
	Transport layer: congestion control, TCP, UDP	2	T, U
	IP addressing, CIDR, VLSM	2	T, U
	Network layer: routing algorithms, routing protocols	2	T, U
	Datalink layer and physical layer	2	T, U
	Wireless and mobile networks	2	T
	Some advanced topics in contemporary networks	1	U
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	1. J. F. Kurose and K. W. Ross, Computer Networking: A Top Down Approach 7th, 2014		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	✓✓					
2		✓✓✓				
3					✓	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-2	Introduction of computer networks	1	Midterm	lecture	Chapter 1, [1]
3-4	Network applications: HTTP, FTP, DNS, SMTP	1	Midterm, Lab	lecture, lab	Chapter 2, [1]
5-6	Transport layer: congestion control, TCP, UDP	1	Midterm, Lab	lecture, lab	Chapter 3, [1]
	Midterm				
7-8	IP addressing, CIDR, VLSM	2	Final, Lab	lecture, lab	Chapter 4, [1]

9-10	Network layer: routing algorithms, routing protocols	1,2	Final, Lab	lecture, lab	Chapter 5, [1]
11-12	Datalink layer and physical layer	1,2	Final, Lab	lecture, lab	Chapter 6, [1]
13-14	Wireless and mobile networks	1	Final	lecture	Chapter 7, [1]
15	Some advanced topics in contemporary networks	3	Group project	group work	Literature
10	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Exercises, quizzes, attendants (10%)	30%		30%
Group project (5%)		30%	40%
Labs (25%)		30%	30%
Midterm examination (30%)	40%		
Final examination (30%)	30%	40%	

1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		

TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

	experts are questioned thoroughly.	experts are subject to questioning.	synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Calculus 2

Course Code: MA003IU

1. **General information**

Course designation	This course is a continuation of Calculus 1. Its aim to equip student with basis concepts of sequence, series, vector functions, functions of several variables, multiple integrals and their applications
Semester(s) in which the course is taught	1, 2
Person responsible for the course	*Assoc. Prof.Mai Duc Thanh, Assoc. Prof. Tran Vu Khanh, Dr. Nguyen Minh Quan, Dr. Nguyen Anh Tu, Dr. Ta Quoc Bao.*
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lectures, assignments
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 120 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 60 (lectures) Private study including examination preparation, specified in hours[6]: 60
Credit points	4
Required and recommended prerequisites for joining the course	Calculus 1
Course objectives	4. To provide students with the main ideas and techniques of calculus. These include sequences, series, functions of several variables, optimal problems, multiple integrals, vector calculus. 5. To introduce practical applications of these ideas and techniques, through practical examples taken from many areas of engineering, business, and life sciences. 6. To develop skills in mathematical modelling and problem solving, ability to think logically, and adapt these skills creatively to new situations

[6] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Course learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	**Course learning outcome (CLO)**
	Knowledge	CLO1. Have basic knowledge of series, functions of several variables, mupliple integrals (Program outcomes: a) CLO2. Have basic knowledge of vector calculus (Program outcomes: a)
	Skill	CLO3. Can compute partial derivatives, multiple integral (Program outcomes: a, j) CLO4. Can show the convergence of a sequence and a series and u, se power series to simplify computation. Can show the optimal problem using partial derivaties, can find the volume of an object in higher dimension by using the multiple integrals (Program outcomes: i, h)
	Attitude	CLO5. Confident when dealing with partial derivaties, multiple integrals. Comfortable with using partial derivatives and multiple integrals in practical situations. (Program outcome: j, k)

<table>
<tr><td>Content</td><td>

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (4 hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Sequences and Convergence</td><td>1</td><td>I, T</td></tr>
<tr><td>Series</td><td>1</td><td>I, T</td></tr>
<tr><td>Tests for Convergence</td><td>1</td><td>T, U</td></tr>
<tr><td>Power series</td><td>1</td><td>T, U</td></tr>
<tr><td>Representations of Functions as Power series</td><td>1</td><td>T, U</td></tr>
<tr><td>Taylor and Maclaurin series</td><td>1</td><td>T, U</td></tr>
<tr><td>Vector Functions and Space Curves, Limit and continuity of vector functions</td><td>1</td><td>I, T</td></tr>
<tr><td>Derivatives and Integrals of vector functions, Length of space curves</td><td>1</td><td>T, U</td></tr>
<tr><td>Functions of Several Variables, Limits and Continuity</td><td>1</td><td>I,T</td></tr>
<tr><td>Partial Derivatives, Tangent Plane and Linear Approximations</td><td>1</td><td>T, U</td></tr>
<tr><td>Chain Rules, Directional Derivatives and Gradient</td><td>1</td><td>T, U</td></tr>
<tr><td>Maximum and Minimum Values of Functions of two variables</td><td>1</td><td>T, U</td></tr>
<tr><td>Lagrange Multipliers and Applications</td><td>1</td><td>T, U</td></tr>
<tr><td>Double Integrals in Rectangles, Iterated Integrals</td><td>1</td><td>I, T</td></tr>
<tr><td>Double, Triple Integrals in General regions and Applications</td><td>2</td><td>T,U</td></tr>
</table>

</td></tr>
<tr><td>Examination forms</td><td>Written examination</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>J. Stewart, Calculus, Thomson Learning, 7th edition, 2012.</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	PLO										
CLO	a	b	c	d	e	f	g	h	i	j	k
1	x										
2	x										
3										x	
4										x	
5										x	x

3. Planned learning activities and teaching methods

Week	Topics	CLO	Assessment	Teaching and Learning activiti
1	Sequences, Series, The Integral Test and Estimates Sums, Thecomparison Tests	2, 4	HW	Lectures and Quiz
2	Alternating Series, Absolute Convergence and the Ratio and Roots Tests, Strategy for Testing Series	2, 4	HW	Lectures and Quiz
3	Power Series, Representations of Functions as Power Series, Taylor & Maclaurin Series, Applications of Taylor Polynomials	4, 5	Quiz	Lectures and Quiz
4	3D Coordinate Systems, Vectors, The Dot Product, The Cross Product, Equations of Lines and Planes, Functions of Surface.	2, 4	HW	Lectures and Quiz
5	Vector Functions and Space Curves, Derivaties and Integrals of Vector Functions, Arc Length, Parametric Surfaces	4, 5	HW	Lectures and Quiz
6	Functions of Several Variables, Limit and Continuty,	2, 4, 5	Quiz	Lectures and Quiz
7	Partial Derivatives, Tangent Plances and Linear Approximations,	3, 5	HW	Lectures and Quiz
8	Chain Rule, Directional Derivaties and Gradient Vectors,	3, 5	HW	Lectures and Quiz
Midterm Exam				
9	Maximun and Minimun Values, Larange Multipliers	2, 4	HW	Lectures and Quiz
10	Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions	2, 4	HW	Lectures and Quiz

11	Double Integrals in Polar Coordinates, Application of Double Integrals.	4, 5	HW	Lectures and Quiz
12	Triple Integrals, Triple Integrals in Cylindrical and Spherial Coordinates. Change of Variables in Multiple Integrals	2, 4	Quiz	Lectures and Quiz
13	Vector Fields, Line Integrals, the Fundamental Theorem for Line Integrals	4, 5	HW	Lectures and Quiz
14	Green's Theorem, Curl and Divergence, Surface Integrals	2, 4, 5	HW	Lectures and Quiz
15	Stokes' Theorem, Divergence Theorem.	1, 2, 3, 4	Exercises	
Final Exam				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**
In-class exercises/ quizzes (10%)	Qz1->Qz4 80% Pass	Qz5->Qz8 80%Pass	Qz1->Qz4 80% Pass	Qz5->Qz8 80% Pass	Qz2, 4, 6, 8 70% Pass
Homework exercises (10%)	HW1->H3 70% Pass	HW4, HW5 70%	HW1->HW3 70% Pass	HW4, HW5 70%	HW1->HW5 60% Pass
Midterm exam (30%)	Q1, Q2 80% Pass		Q3, Q4 70% Pass		Q5 50%
Final exam (50%)		Q1, Q2 80%Pass		Q3, Q4 70%Pass	Q5 50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Course Name: Linear Algebra

Course Code: IT154IU

1. General information

Course designation	Linear algebra provides a mathematical framework for organizing information and then using that information to solve problems, especially data analytics problems. Linear algebra is essential for understanding and creating machine learning algorithms, especially neural network and deep learning models.
Semester(s) in which the course is taught	2, 3
Person responsible for the course	Mai Hoang Bao An, PhD.
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, demo.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 135 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) Private study including examination preparation, specified in hours: 90
Credit points	Number of credits: 3 Lecture: 3 Laboratory: 0
Required and recommended prerequisites for joining the course	Calculus 2
Course objectives	This course will provide students with the foundations of linear algebra knowledge necessary for machine learning and neural network modelling. Students will learn the overview of basic matrices and vector algebra as applied to linear systems. Then they will learn how to manipulate matrices to derive useful knowledge from data, quantify the degree of learning, and optimizing the speed of learning in vector spaces and linear transformations for data discovery. The hands-on lessons and assignments will equip students with the mathematical background required to build and train simple neural networks in data mining applications.
Course learning outcomes	CLO 1. Understand concepts of vector space, matrices, tensor, linear system and their application in other fields of study. Get familiar with the fundamental concepts of linear spaces. CLO 2. Know how to use Python to handle with matrices and linear systems. Get to know and understand the fundamental concepts of abstract vector spaces and their relationships with matrix algebra.

CLO 3. Understand the concepts and applications of linear dependence/independence, spans and linear transformation. Apply principles of matrix algebra to linear transformation. Understand the Isomorphic Vector Spaces and applications.
CLO 4. Determine eigenvalues and eigenvectors and solve eigenvalue problems. Introduction to determinant and its properties and applications. The use case of carrying out matrix operations in machine learning.

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO 1, CLO 2, CLO 3, CLO 4
Skill	CLO 2, CLO 4
Attitude	CLO 1, CLO 2, CLO 3, CLO 4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to python, colab What is linear structures	1	I, U
Fundamentals and geometry of $\mathbb{R}^n$ space Matrix algebra: vectors, matrices. Linear systems, parametric equations and systems of linear equations	2	T, U
Solving systems of linear equations Subspace of $\mathbb{R}^n$, linear independence, base and dimension in $\mathbb{R}^n$ Python in linear algebra	2	T, U
Solving linear system with numpy Norm in $\mathbb{R}^n$ with Python	1	T, U
Abstract vector spaces, base and dimension for abstract vector spaces. Special kinds of matrices and vectors.	1	T, U
Span in abstract vector spaces. Fundamentals of linear transformations. Demo of linear transformations in Python.	2	T, U
Linear Transformation in abstract vector space Linear Transformation and Inverses	1	T, U
Geometric Transformation of Plane, Image and Kernel, Isomorphism and linear map Isomorphic Vector Spaces	1	I, T, U
Introduction to determinant Determinant expansions. Properties of determinant.	1	I, T
Elementary Row Operations and the Determinant	2	I, T, U

	Eigenvectors and Eigenvalues, Eigen-decompositions Introduction to some application of linear algebra: PCA, OLS, …		
Examination forms	Short-answer questions, Long-answer questions, programming questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	**1.** R.O. Hill, Elementary Linear Algebra and Its applications, 3rd edition **2.** B. Kolman and David R. Hill, Introductory Linear Algebra: An Applied First Course (8th edition, 9th edition) **3.** Jim Hefferon, Linear Algebra, 4th edition. **4.** github: Python in linear algebra, matrix computing.		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x					
2		x				
3		x	x			
4			x			

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to python, colab What is linear structures Introduction to matrix	1		Lecture, Discussion	[1, 2, 3]. Chapter 1
2-3	Fundamentals and geometry of $\mathbb{R}^n$ space Matrix algebra: vectors, matrices. Linear systems, parametric equations and systems of linear equations	1	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 2, 3, 4
4-5	Solving systems of linear equations	1, 2	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 4, 5, 6

	Subspace of $\mathbb{R}^n$, linear independence, base and dimension in $\mathbb{R}^n$ Python in linear algebra				[4] Chapter 1,2,3
6	Solving linear system with numpy Norm in $\mathbb{R}^n$ with Python	1, 2		Lecture, In-class Discussion	[4]. Chapter 3, 4, 5
7	Abstract vector spaces, base and dimension for abstract vector spaces. Special kinds of matrices and vectors.	1, 2	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 6, 7, 8
8	**Midterm**				
9-10	Span in abstract vector spaces. Fundamentals of linear transformations. Demo of linear transformations in Python.	3, 4	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 8, 9, 10 [4] Chapter 6, 7
11	Linear Transformation in abstract vector space Linear Transformation and Inverses	3	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 10, 11, 12
12	Geometric Transformation of Plane, Image and Kernel, Isomorphism and linear map Isomorphic Vector Spaces	3	Exercises	Lecture, In-class exercises	[1, 2, 3]. Chapter 11, 12, 13
13	Introduction to determinant Determinant expansions. Properties of determinant	3, 4	Quiz	Lecture, In-class Quiz	[1, 2]. Chapter 13. 14, 15
14-15	Elementary Row Operations and the Determinant Eigenvectors and Eigenvalues, Eigen-decompositions Introduction to some application of linear algebra: PCA, OLS, …	3, 4	Exercises	Lecture, In-class exercises	[2, 3]. Chapter 14, 15, 16 [4] Chapter 8, 9, 10
16	Revision			Review-test	
17	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Labs (20%)	25%	25%	25%	25%

Midterm examination (30%)	50%	50%		
Projects/Presentations/ Report (10%)			50%	50%
Final examination (40%)		25%	25%	50%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others'	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when

			assumptions than one's own (or vice versa).	presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies,	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from

	quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Algorithms and Data Structure

Course Code: IT013IU

1. General information

Course designation	This subject introduces students to basic data structures and algorithms
Semester(s) in which the course is taught	4,6
Person responsible for the course	Dr. Tran Thanh Tung
Language	English
Relation to curriculum	Compulsory (All programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	Introduction to data structures and algorithms, including their design, analysis, and implementation.
Course learning outcomes	CLO 1. Understand basic data structures and algorithms CLO 2. Analyze and evaluate data structures and algorithms. CLO 3. Design algorithms and select data structures for real world applications.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO3

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (~~3~~ hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Review OOP & Java	3	I
Arrays	3	T
Complexity	3	T
Sorting	3	T, U
Queue, Stack	3	T

		List	6	T
		Recursion	3	T, U
		Advanced Sorting	6	T
		Binary Tree	3	T
		Hash Table	3	T
		Graphs	3	T
		Algorithms on graphs	3	T, U
Examination forms	Short-answer questions			
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	**1.** Michael T. Goodrich and Roberto Tamassia, Data Structures and Algorithms in Java 6th, 2014 **2.** Cormen, Thomas H., et al. Introduction to algorithms. MIT press, 2009. **3.** Lafore, Robert. Data structures and algorithms in Java. Sams publishing, 2017.			

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	XX					
2		XXX				
3						X

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Review OOP & Java	1	Quiz	Lecture	
2	Arrays	1	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
3	Complexity	2	Quiz	Lecture, Discussion	[2]
4	Sorting	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]

5	Queue, Stack	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
6	List part 1	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
7	List part 2	2,3	Lab, Quiz, Midterm	Lecture, Discussion	
8	Recursion	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
9	**Midterm**				
10	Advanced Sorting part 1	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
11	Advanced Sorting part 2	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,2,3]
12	Binary Tree	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
13	Hash Table	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,3]
14	Graphs	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[2,3]
15	Algorithms on graphs	2,3	Lab, Quiz, Final	Lecture, Discussion	[2,3]
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz (5%)	20%	5%	
Labs (10%)		10%	
Midterm examination (30%)	40%	30%	30%
Projects/Presentations/ Report (15%)		15%	40%
Final examination (40%)	40%	40%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			

Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or	Issue/ problem to be considered critically is stated without clarification or description.

			backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective,	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position	Specific position (perspective, thesis/ hypothesis) acknowledge s different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	(perspective, thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified .

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the

	enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated,	Central message is clear and consistent with	Central message is basically understandable but is not often	Central message can be deduced but is not explicitly stated

	appropriately repeated, memorable, and strongly supported.)	the supporting material.	repeated and is not memorable.	in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Principles of Database Management

Course Code: IT079IU

1. General information

Course designation	This course focuses on the design and implementation of database management systems
Semester(s) in which the course is taught	4
Person responsible for the course	Assoc. Prof. Dr. Nguyen Thi Thuy Loan
Language	English
Relation to curriculum	Compulsory (NE, CS,DS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	IT116IU (C Programming)
Course objectives	This subject introduces the students to basic database design and implementation concepts. Database design techniques, including relational design and E-R analysis, are presented. Database queries using SQL are covered in lectures and supported by practical exercises.
Course learning outcomes	CLO 1. Produce an (Extended) Entity-Relationship (E-R) model from specifications. CLO 2. Apply data normalization principles to transforming an ER model into a database schema. CLO 3. Construct efficient SQL queries to retrieve and manipulate data as required.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO3

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

		Topic	Weight	Level
		Introduction to Database Systems	3	I
		Relational Model and Relational Algebra	6	T, U
		Structured Query Language	6	T, U
		(Extended) Entity Relationship Model	6	T, U
		Relational Database Design	9	T, U
		Normalization	6	T, U
		Advanced SQL	6	T, U
		Review	3	I, U
Examination forms	Multiple-choice questions, short-answer questions			
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.			
Reading list	**1.** Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concept 7th, 2020 **2.** Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi, Modern Database Management 13th, 2019 **3.** Ramez Elmasri, Shamkant Navathe, Fundamentals of Database Systems 7th, 2016			

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	XXX					
2		XXX			X	
3		XX			XX	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Database Systems	1	Quiz	Lecture	[1,3]
2	Relational Model and relational Algebra	2	Quiz, Midterm, Project	Lecture, Discussion, In-class, exercise	[1,3]
3	Structured Query Language	3	Quiz, Lab, Project, Midterm	Lecture, Discussion, In-class, exercise	[1,2,3]

4	(Extended) Entity Relationship Model	2	Quiz, Project, Midterm	Lecture, Discussion, In-class, exercise	[1,2,3]
5	**Midterm**				
6	Relational Database Design	2,3	Project, Final, Quiz, Lab	Lecture, Discussion, In-class, exercise	[1,2]
7	Normalization	2,3	Quiz, Project, Final	Lecture, Discussion, In-class, exercise	[2,3]
8	Advanced SQL	3	Quiz, Project, Final	Lecture, Discussion, In-class, exercise	[1,3]
9	Review	2,3	Quiz	Discussion, In-class, exercise	[1,2,3]
10	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Labs (10%)		10%	20%
Midterm examination (25%)	40%		20%
Quiz (5%)	10%	20%	
Projects/Presentations/ Report (20%)	30%	20%	30%
Final examination (40%)	20%	50%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		

Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledge s different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	synthesized within position (perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified .

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of	Language choices are thoughtful and generally support the effectiveness of the	Language choices are mundane and commonplace and partially support the effectiveness of	Language choices are unclear and minimally support the effectiveness of the presentation.

	the presentation. Language in presentation is appropriate to audience.	presentation. Language in presentation is appropriate to audience.	the presentation. Language in presentation is appropriate to audience.	Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated,	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

	memorable, and strongly supported.)			

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Philosophy Marx - Lenin

Course Code: PE015IU

1. Thông tin chung

Tên môn học (tiếng Việt):	Triết học Mác-Lênin
Tên môn học (tiếng Anh):	Philosophy Marx – Lenin
Mã số môn học:	PE015IU
Thuộc khối kiến thức:	Cơ sở
Số tín chỉ:	3
Số tiết lý thuyết:	*30 (trên lớp)*
Số tiết thực hành:	*15 (trên lớp)*
Số tiết tự học:	*90 (về nhà)*
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Môn học trang bị cho sinh viên những nội dung cơ bản về thế giới quan, phương pháp luận triết học Mác - Lênin.

2.2. Giúp cho sinh viên vận dụng những tri thức về thế giới quan, phương pháp luận triết học triết học Mác - Lênin một cách sáng tạo trong hoạt động nhận thức và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về triết học Mác-Lênin

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Giáo trình Triết học Mác - Lênin,* Nxb. Chính trị quốc gia, Hà Nội.
- Bộ Giáo dục và Đào tạo (2012), *Giáo trình Những Nguyên lý cơ bản của chủ nghĩa Mác - Lênin,* Nxb. Chính trị quốc gia, Hà Nội.
- Hội đồng Trung ương (2008), *Giáo trình Triết học Mác-Lênin,* Nxb. Chính trị quốc gia, Hà Nội.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
5.1. Kiến thức					
LO.1	TRIẾT HỌC VÀ VAI TRÒ CỦA TRIẾT HỌC TRONG ĐỜI SỐNG XÃ HỘI	LO. 1.1 - Khái lược được triết học, một số khái niệm cơ bản trong triết học	2.1	1.1.3	I3
		LO. 1.2 - Nhận biết được sự đối lập giữa chủ nghĩa duy vật và chủ nghĩa duy tâm trong việc giải quyết vấn đề cơ bản của triết học			
		LO. 1.3 - Nắm được chủ nghĩa duy vật biện chứng - hình thức phát triển cao nhất của chủ nghĩa duy vật biện chứng			
		LO. 1.4 - Nắm rõ được sự ra đời, đối tượng, chức năng và vai trò của triết học Mác - Lênin			
LO.2	CHỦ NGHĨA DUY VẬT BIỆN CHỨNG	LO.2.1- Hiểu rõ vật chất theo quan điểm của chủ nghĩa duy vật biện chứng	2.1	1.1.3	T4

		LO.2.2 - Hiểu rõ ý thức theo quan điểm của chủ nghĩa duy vật biện chứng	2.1 2.1		
		LO.2.3 - Giải quyết được mối quan hệ giữa vật chất và ý thức theo quan điểm của chủ nghĩa duy vật biện chứng	2.1		
		LO.2.4 - Hiểu được phép biện chứng và phép biện chứng duy vật			
		LO.2.5 - Hiểu rõ được hai nguyên lý cơ bản của phép biện chứng duy vật và rút ra ý nghĩa phương pháp luận của từng nguyên lý	2.1 2.2 2.1 2.2		
		LO.2.6 - Hiểu rõ được các cặp phạm trù cơ bản của phép biện chứng duy vật và rút ra ý nghĩa phương pháp luận từng cặp phạm trù	2.1 2.2 2.1 2.2		
		LO.2.7 - Hiểu rõ được các quy luật cơ bản của cơ bản của phép biện chứng duy vật và rút ra ý nghía phương pháp luận từng quy luật	2.1 2.2		
		LO.2.8 - Hiểu rõ được thực tiễn, nhận thức, vai trò của thực tiễn đối với nhận thức và chân lý	2.1		

LO.3	CHỦ NGHĨA DUY VẬT LỊCH SỬ	LO.3.1 - Nắm được vai trò của sản xuất vật chất và phương thức sản xuất đối với sự tồn tại và phát triển xã hội	2.1 2.2	1.1.3	T4
		LO.3.2 - Hiểu rõ được mối quan hệ biện chứng giữa lực lượng sản xuất và quan hệ sản xuất			
		LO.3.3 - Hiểu rõ được mối quan liệ biện chứng giữa CSHT và KTTT; sự phát triển tự nhiên của các hình thái KT-XH			
		LO.3.4 - Hiểu rõ được giai cấp, đấu tranh giai cấp; dân tộc và mối quan hệ giữa giai cấp, dân tộc và nhân loại			
		LO.3.5 - Hiểu rõ được nhà nước và mạng xã hội			
		LO.3.6 - Hiểu rõ dược mối quan lệ biện chứng giữa tồn tại xã hội và ý thức xã hội			
		LO.3.7 - Hiểu rõ được con người bản chất con người; hiện tượng tha hóa và giải phóng con người mối quan hệ giữa cá nhân và xã hội, vai trò của quần chúng nhân dân			
5.2. Kỹ năng					
LO.4	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.4.1. Có kỹ năng khái quát hóa để rút ra *Từ khóa tri thức* đối với mỗi nội dung và tư duy có hệ thống LO.4.2. Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn LO.4.3. Có kỹ năng giao tiếp xã bội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều hành nhóm làm việc	2.1 2.2	2.1.1 2.3.1 2.4.4 2.5 3.1.5	U4

5.3. Thái độ					
LO.5	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.5.1. Có ý thức trách nhiệm bảo vệ tính khoa học, cách mạng, nhân văn của CN Mác - Lênin LO.5.2. Có ý thức, trách nhiệm cá nhân đối vối tập thể, cộng đồng	2.1 2.2	3.1	U3

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (Tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (1 tiết)	**Giới thiệu về môn học**	LO.l, LO.4;	**Dạy:** - Giới thiệu đề cương môn học - Giới thiệu nội dung đề tài thuyết trình nhóm GHW) **Học ở lớp:** - Chia nhóm (5 sv/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** -Chọn đề tài thuyết trình của nhóm (GHW) Đọc trước tài liệu chương 1.	
2 (15 tiết)	**Chương 1** TRIẾT HỌC VÀ VAI TRÒ CỦA TRIẾT HỌC TRONG ĐỜI SỐNG XÃ HỘI	LO.l; LO.4 LO.5	**Dạy:** **1.** TRIẾT HỌC VÀ VẤN ĐỀ CƠ BẢN CỦA TRIẾT HỌC 1. Khái lược về triết học 2. Vấn đề cơ bản của triết học 3. Biện chứng và siêu hình II. TRIẾT HỌC MÁC - LÊNIN VÀ VAI TRÒ CÙA TRIẾT HỌC MÁC - LÊNIN TRONG ĐỜI SỐNG XÃ HỘI 1. Sự ra đời và phát triển của triết học Mác - Lênin 2. Đối tượng và chức năng của triết học Mác - Lênin 3. Vai trò của triết học Mác - Lênin trong đời sống xã hội và trong sự nghiệp đổi mới ở Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** - Phác thảo nội dung thuyết trình nhóm GHW Đọc trước tài liệu chương 2.	Thi giữa kỳ (Quiz)

3 (15 tiết)	**Chương 2** CHỦ NGHĨA DUY VẬT BIỆN CHỨNG	LO.2 LO.4 LO.5	**Dạy:** I. VẬT CHẤT VÀ Ý THỨC 1. Vật chất và các hình thức tồn tại của vật chất 2. Nguồn gốc, bản chất và kết cấu của ý thức 3. Mối quan hệ giữa vật chất và ý thức II. PHÉP BIỆN CHỨNG DUY VẬT 1. Hai loại hình biện chứng và phép biện chứng duy vật Nội dung của phép biện chứng duy vật III. LÝ LUẬN NHẬN THỨC 1. Các nguyên tắc của lý luận nhận thức duy vật biện chứng 2. Nguồn gốc, bản chất của nhận thức 3. Thực tiễn và vai trò của thực tiễn đối với nhận thức 4. Các giai đoạn cơ bản của quá trình nhận thức Chân lý **Học ở Lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 3	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)
4 (14 tiết)	**Chương 3** CHỦ NGHĨA DUY VẬT LỊCH SỬ	L0.3 L0.4 L0.5	**Dạy:** I. HỌC THUYẾT HÌNH THÁI KINH TẾ - XÃ HỘI 1. Sản xuất vật chất là cơ sở của sự tồn tại và phát triển xã hội 2. Biện chứng giữa lực lượng sản xuất và quan hệ sản xuất 3. Biện chứng giữa cơ sở hạ tầng và kiến trúc thượng tầng của xã hội 4. Sự phát triển các hình thái kinh tế - xã hội là một quá trình lịch sử - tự nhiên II. GIAI CẤP VÀ DÂN TỘC 160 1. Vấn đề giai cấp và đấu tranh giai cấp 2. Dân tộc 3. Mối quan hệ giai cấp - dân tộc - nhân loại III. NHÀ NƯỚC VÀ CÁCH MẠNG XÃ HỘI 1. Nhà nước 2. Cách mạng xã hội IV. Ý THỨC XÃ HỘI 1. Khái niệm tồn tại xã hội và các yếu tố cơ bản của tồn tại xã hội 2. Ý thức xã hội và kết cấu của ý thức xã hội V. TRIẾT HỌC VỀ CON NGƯỜI 1. Khái niệm con người và bản chất con người 2. Hiện tượng tha hóa con người và vấn đề giải phóng con người	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

			3. Quan hệ cá nhân và xã hội; vai trò của quần chúng nhân dân và lãnh tụ trong lịch sử Vấn đề con người trong sự nghiệp cách mạng ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Hoàn thiện bài thuyết trình	

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	15%	Thuyết trình và bản báo cáo nhóm	LO.2 LO.3 LO.4 LO.5
2	Quiz	Bài thi giữa kỳ	Thi theo đề thi chung	20%	Tự luận đề mở	LO.l LO.2;
3	Die	Thảo luận, chuyên cần tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. sv có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	LO.4 LO.5
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận đề đóng	LO.2; LO.3; LO.4;
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	Nhận biết được sự đối lập giữa chủ nghĩa duy vật và chủ nghĩa duy tâm trong việc giải quyết vấn đề cơ bản của triết học; vai trò của triết học Mác – Lênin	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.4	Nắm rõ nội dung: Vật chất, ý thức và mối quan hệ giữa chúng; các nguyên lý, các quy luật và các phạm trù cơ bản của phép biện chứng duy vật	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được nội dung của chủ nghĩa duy vật lịch sử	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn
- Quy định về Bài thuyết trình nhóm GHW

Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đãng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp nộp cho GV buổi 1.

Tuần 4 (buổi thứ 4) thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết

quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

Course Name: Marxist - Leninist Political Economy

Course Code: PE016IU

1. Thông tin chung

Tên môn học (tiếng Việt):	Kinh tế chính trị Mác-Lênin
Tên môn học (tiếng Anh);	Marxist - Leninist Political Economy
Mã số môn học:	PE016IU
Thuộc khối kiến thức:	Cơ sở
Số tín chì:	02
Số tiết lý thuyết:	*20 (trên lớp)*
số tiết thực hành:	*10 (trên lớp)*
Số tiết tự học:	*60 (về nhà)*
Môn học song hành:	1. Triết học Mác - Lênin
Giảng viên phụ trách:	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Một là, trang bị cho sinh viên những kiến thức cơ bản, cốt lõi của Kinh tế chính trị Mác - Lênin trong bối cảnh phát triển kinh tế của đất nước và thế giới ngày nay. Đảm bảo tính cơ bản, hệ thống, khoa học, cập nhật tri thức mới, gắn với thực tiễn, tính sáng tạo, kỹ năng, tư duy, phẩm chất người học, tính liên thông khắc phục trùng lặp, tăng cường tích hợp và giảm tải, lược bớt những nội dung không còn phù hợp hoặc những nội dung mang tính kinh viện đối với sinh viên các trường Cao đẳng, Đại học không chuyến lý luận.

2.2. Hai là, trên cơ sở đó hình thành tư duy, kỹ năng phân tích, đánh giá và nhận diện bản chất của các quan hệ lợi ích kinh tế trong phát triển kinh tể - xã hội của đất nước góp phần giúp sinh viên xây dựng trách nhiệm xã hội phù hợp trong vị trí

việc làm và cuộc sống sau khi ra trường.

2.3. Ba là, góp phần xây dựng lập trường, ý thức hệ tư tưởng Mác - Lê nin đối với sinh viên.

3. **Mô tả môn học** (Course Outlines)

Nội dung chương trình gồm 6 chương: Trong đó chương 1 bàn về đối tượng, phương pháp nghiên cứu và chức năng của Kinh tế chính trị Mác - Lênin. Từ chương 2 đến chương 6 trình bày nội dung cốt lõi của Kinh tế chính trị Mác - Lê nin theo mục tiêu của môn học. Cụ thể các vấn đề như: Hàng hóa, thị trường và vai trò của các chủ thể trong nền kinh tế thị trường; Sản xuất giá trị thặng dư trong nền kinh tế thị trường; Cạnh tranh và độc quyền trong nền kinh tế thị trường; Kinh tế thị trường định hướng xã hội chủ nghĩa và các quan hệ lợi ích kinh tế ở Việt Nam; Công nghiệp hóa, hiện đại hóa và hội nhập kinh tế quốc tế ở Việt Nam.

4. **Tài liệu phục vụ học tập:**

- Tài liệu bắt buộc: Giáo trình kinh tế chính trị Mác - Lê nin dành cho bậc đại học không chuyên kinh tế chính trị.
- Tài liệu đọc thêm:

+ Robert, JR và Robert F. Hebert (2003), Lịch sử các học thuyết kinh tế, Bản tiếng Việt, Nxb Thống kê.

+ Viện Kinh tế chính trị học, Học viện Chính trị quốc gia Hồ Chí Minh (2018), Giáo trình Kinh tế chính trị Mác - Lê nin, NXB Lý luận Chính trị.

+ Các. Mác - Ph. Ăng gen: Toàn tập, tập 20, tập 23, tập 25, Nxb Chính trị quốc gia, 1994.

+ V.LLê nin toàn cập, tập 3, tập 27, NXB Tiến bộ Maxcơva, 1976.

+ Davig Begg, Stanley Fisher, Rudiger Dornbusch, Kinh tế học, Nhà xuất bản Giáo dục Hà Nội 1992.

+ Đảng Cộng sản Việt Nam (2016), Vãn kiện Đại hội Đại biểu toàn quốc lần thứ XII, Nxb Chính trị quốc gia, Hà Nội.

+ Đảng Cộng sản Việt Nam (2016), Báo cáo tổng kết một số van đề lý luận - thực tiễn qua ba mươi năm đổi mới (1986 - 2016), NXB Chính trị quốc gia, Hà

Nội.

+ Đảng Cộng sản Việt Nam (2017), Nghị quyết số 11-NQ/TW ngày 03/6/2017 về: "Hoàn thiện thể chế kinh tể thị trường định hướng xã hội chủ nghĩa"

+ Chỉ thị số 16/CT-TTg (2017) "về việc tăng cường năng lực tiếp cận cuộc cách mạng công nghiệp lần thứ 4".

+ Jeremy Rifkin (2014), Cuộc cách mạng công nghiệp lần thứ ba, bản dịch tiếng Việt, NXB Lao động xã hội.

+ Manfred B. Steger (2011), Toàn cầu hóa, Nxb Tri thức.

+ Klaus Schwab (2015): Cách mạng công nghiệp lần thứ tư, Nxb Chính trị quốc gia - Sự thật, 2018.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIO CTĐT**	**Mức độ giảng dạy**
5.1. Kiến thức					
LO.l	ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU VÀ CHỨC NĂNG CỦA KINH TẾ CHÍNH TRỊ MÁC - LÊNIN	LO. 1.1 -Nắm được sự hình thành và phát triển của Kinh tế chính trị Mác – Lênin	2.1		I3
		LO. 1.2 - Xác dinh được đối tượng nghiên cứu của kinh tế chính trị Mác - Lênin.			
		LO. 1.3 - Hiểu rõ được phương pháp nghiên cứu cùa kinh tể chính trị Mác- Lênin			
		LO. 1.4 - Hiểu rõ các chức năng của môn học kinh tế chính trị Mác - Lênin.			

LO.2	HÀNG HÓA, THỊ TRƯỜNG VÀ VAI TRÒ CỦA CÁC CHỦ THỂ THAM GIA THỊ TRƯỜNG.	LO.2.1- Hiểu rõ sản xuất hàng hóa và điều kiện ra đời của sản xuất hàng hóa	2.1		T4
		LO.2.2 - Hiểu rõ hàng hóa, hai thuộc tính của hàng hóa và mối quan hệ giữa hai thuộc tính			
		LO.2.3 - Hiểu rõ mối quan hệ giữa tính hai mặt của lao động sản xuất hàng hóa với hai thuộc tính của hàng hóa			
		LO.2.4 - Hiểu rõ mặt chất và lượng của giá trị hàng hóa và các nhân tố ảnh hưởng đến lượng giá trị hàng hóa			
		LO.2.5 - Hiểu rõ được nguồn gốc, bản chất và chức năng của tiền tệ.			
		LO.2.6 - Hiểu rõ về thị trường, vai trò của thị trường, cơ chế thị trường và nền kinh tế thị trường.			
		LO.2.7 - Hiểu rõ được một số quy luật kinh tế chủ yếu của kinh tế thị trường.			
		LO.2.8 - Hiểu rõ vai trò của các chủ thể tham gia thị trường.			

LO.3	GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.3.1 - Hiểu rõ được tư bản là gì, công thức chung của tư bản và mâu thuẫn công thức chung của tư bản.	2.1 2.1 2.1 2.3		T4
		LO.3.2 - Hiểu rõ được hàng hóa sức lao động là gì, tại sao nghiên cứu hàng hóa sức lao động giải quyết mâu thuẫn	2.3 2.1		
		LO.3.3 - Hiểu rõ được giá trị thặng dư là gì. Xác định được có mấy phương pháp sản xuất giá trị thặng dư.	2.1 2.1 2.3		
		LO.3.4 - Hiểu rõ được bản chất của tích lũy tư bản, nhưng nhân tố làm tăng quy mô tích lũy tư bản và hệ quả của tích lũy tư bản.			
		LO.3.5 - Hiểu rõ được các khái niệm: chi phí sản xuất, lợi nhuận, tỷ suất lợi nhuận, lợi nhuận bình quân, lợi			
		LO.3.6 - Hiểu rõ được lợi tức là gì.			

		LO.3.7 - Hiểu rõ được địa tô tư bản chủ nghĩa. Có mấy loại địa tô tư bản chủ nghĩa và giá cả ruộng đất.			
LO.4	CẠNH TRANH VÀ ĐỘC QUYỀN TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.4.1 - Hiểu rõ được quan hệ giữa cạnh tranh và độc quyền trong nền kinh tế thị trường.	2.1 2.1		
		LO.4.2 - Hiểu rõ được nguyên nhân hình thành độc quyền trong nền kinh tế thị trường.	2.1 2.1		
		LO.4.3 - Hiểu rõ được những đặc điểm kinh tế cơ bản của độc quyền trong chủ nghĩa tư bản theo quan điểm của V.I. Lênin			
		LO.4.4 - Hiểu rõ được nguyên nhân hình thành và phát triển của chủ nghĩa tư bản độc quyền nhà nước.			

		LO.4.5 - Hiểu rõ được bản chất của chủ nghĩa tư bản độc quyền nhà nước và những biểu hiện chủ yếu của độc quyền nhà nước trong chủ nghĩa tư bản.	2.3		
		LO.4.6 - Nắm được vai trò lịch sử của chủ nghĩa tư bản.	2.1		
LO.5	KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA VÀ CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM	LO.5.1 - Hiểu rõ dược khái niệm kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam	2.1		T4
		LO.5.2 - Hiểu rõ được tính tất yếu khách quan của việc phát triển kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam	2.1		
		LO.5.3 - Nắm được những đặc trưng của kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam.	2.1		
		LO.5.4 - Hiểu rõ thể chế kinh tế thị trường định hướng xã hội chủ nghĩa là gì và sự cần thiết phải hoàn thiện nó.	2.1		
		LO.5.5 - Nắm được những nội dung cơ bản của hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam	2.1		
		LO.5.6 - Hiểu rõ được khái niệm lợi ích kinh tế và quan hệ lợi ích kinh tế	2.2		

		LO.5.7 -Hiểu rõ được vai trò của nhà nước trong đảm bảo hài hòa các quan hệ lợi ích	2.1		
LO.6	CÔNG NGHIỆP HÓA, HIỆN ĐẠI HÓA VÀ HỘI NHẬP KINH TẾ QUỐC TẾ CỦA VIỆT NAM	LO.6.1 - Hiểu rõ được cách mạng công nghiệp là gi, khái quát được các cuộc cách mạng đã diễn ra trong lịch sử.	2.1		T4
		LO.6.2 - Hiểu rõ vai trò của cách mạng công nghiệp đối với sự phát triển	2.1		
		LO.6.3 - Hiểu được công nghiệp hóa là gì và các mô hình công nghiệp hóa tiêu biểu trên thế giới.	2.1		
		LO.6.4 - Hiểu rõ tính tất yếu khách quan của công nghiệp hóa, hiện đại hóa ở Việt Nam.	2.1		
		LO.6.5 - Nắm được những nội dung của công nghiệp hóa, hiện đại hóa ở Việt Nam.	2.3		
		LO.6.6 - Nắm được công nghiệp hóa, hiện đại hóa ở Việt Nam trong bối cảnh của cuộc cách mạng công nghiệp lần thứ 4.	2.1		
		LO.6.7 - Hiểu rõ được hội nhập kinh tế quốc tế là gì. Vì sao hội nhập kinh tế quốc tế là sự cần thiết khách quan.			

		LO.6.8 - Nắm được những nội dung và tác động tích cực và tiêu cực của hội nhập kinh tể quốc tế.	2.3		
		LO.6.9 - Nắm được phương hướng nâng cao hiệu quả hội nhập kinh tế quốc tế trong phát triển của Việt Nam	2.3		
5.2. Kỹ năng					
L0.7	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.7.1. Có kỹ năng khái quát hóa để rút ra *Từ khóa tri thức* đối với mỗi nội dung và tư duy có hệ thống	2.1		U4
		LO.7.2. Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn	2.2		
		LO.7.3. Có kỹ năng giao tiếp xã hội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều hành nhóm làm việc	2.4		
5.3. Thái độ					
LO.8	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.8.1. Có ý thức trách nhiệm bảo vệ tính khoa học, cách mạng, nhân văn của CN Mác - Lênin	2.1		U3
		LO.8.2. Có ý thức, trách nhiệm cá nhân đối vối tập thể, cộng đồng	2.2		
		LO.8.3. Có nhận thức về sự cần thiết học tập, nghiên cứu suốt đời và vận dụng nó trong đời sống.	2.3		

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (1 tiết)	Giới thiệu về môn học	LO.l, LO.7;	**Dạy:** - Tự giới thiệu về giảng viên - Giới thiệu đề cương và tài liệu môn học - Hướng dẫn cách thức dạy và học và cách đánh giá. - Giới thiệu nội dung đề tài thuyết trình nhóm GHW) **Học ở lớp:** - Chia nhóm (5 sv/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** -Chọn đề tài thuyết trình của nhóm (GHW) - Dọc trước tài liệu chương 1.	
2 (2 tiết)	**Chương I** ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU VÀ CHỨC NĂNG CÙA KINH TẾ CHÍNH TRỊ MÁC - LÊNIN	LO.l; LO.7 LO.8	**Dạy:** I. SỰ HÌNH THÀNH VÀ PHÁT TRIỂN CỦA KTCT MÁC - LENIN 1.Giai đoạn từ cổ đại dển thế kỷ 18 2.Giai đoạn từ sau thế kỷ 18 đến nay II. ĐỐI TƯỢNG, PHƯƠNG PHÁP NGHIÊN CỨU CỦA KINH TẾ CHÍNH TRỊ MÁC - LÊN1N. 1.Đối tượng nghiên cứu 2.Phương pháp nghiên cứu 3.Mục đích nghiên cứu III. CHỨC NĂNG CỦA KINH TẾ CHÍNH TRỊ MÁC - LÊNIN. 1.Chức năng nhận thức 2.Chức năng thực tiễn 3.Chức năng tư tưởng 4.Chức năng phương pháp luận	Thi giữa kỳ (Quiz)

3 (6 tiết)	**Chương 2** HÀNG HÓA, THỊ TRƯỜNG VA VAI TRÒ CỦA CÁC CHỦ THỂ THAM GIA THỊ TRƯỜNG.	LO.2 LO.7 LO.8	**Dạy:** I. LÝ LUẬN CỦA CÁC MÁC VỀ SẢN XUẤT HÀNG HÓA VÀ HÀNG HÓA. **1.**Sản xuất hàng hỏa -Khái niệm sản xuất hàng hóa - Điều kiện ra đời của sàn xuất hàng hóa. **2.**Hàng hóa - Khái niệm hàng hóa - Hai thuộc tính của hàng hóa - Lượng giá trị và các nhân tố ảnh hưởng đến lượng giá trị của hàng hóa - Tính hai mặt của lao động sản xuất hàng hóa. **3.**Tiền - Nguồn gốc và bản chất của tiền - Chức năng của tiền **4.**Dịch vụ và một số hàng hóa đặc biệt. II. THỊ TRƯỜNG VÀ VAI TRÒ CỦA CÁC CHỦ THỂ THAM GIA THỊ TRƯỜNG. 1.Thị trường - Khái niệm về thị trường - Vai trò của thị trường. - Cơ chế thị trường - Nền kinh tể thị trường. 2.Vai trò của các chủ thể tham gia thị trường. - Người sản xuất. - Người tiêu dùng. - Các chủ thể trung gian trong thị trường. - Nhà nước. **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 3.	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)

4 (6 tiết)	**Chương 3** GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.3 LO.7 LO.8	**Dạy:** I.LÝ LUẬN CỦA CÁC MÁC VỀ GIÁ TRỊ THẶNG DƯ 1.Nguồn gốc của giá trị thặng dư 2.Bản chất của giá trị thặng dư 3.Các phương pháp sản xuất giá trị thặng dư trong nền kinh tế thị trường tư bản chủ nghĩa. II.TÍCH LŨY TƯ BẢN -Bản chất của tích lũy -Những nhân tố góp phần làm tăng quy mô tích lũy -Một số hệ quả của tích lũy tư bản III.CÁC HÌNH THỨC BIỂU HIỆN GIÁ TRỊ THẶNG DƯ TRONG NỀN KINH TẾ THỊ TRƯỜNG 1.Lợi nhuận 2.Lợi tức 3.Địa tô tư bản chủ nghĩa **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp**: Hoàn thiện bài thuyết trình Đọc trước tài liệu chương 4	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

5 (5 tiết)	**Chương 4** CẠNH TRANH VÀ ĐỘC QUYỀN TRONG NỀN KINH TẾ THỊ TRƯỜNG	LO.4 LO.7 LO.8	**Dạy:** I. QUAN HỆ GIỮA CẠNH TRANH VÀ ĐỌC QUYỀN TRONG NN KINH TẾ THỊ TRƯỜNG. II. ĐỘC QUYỀN VÀ ĐỘC QUYỀN NHÀ NƯỚC TRONG NỀN KỈNH TẾ THỊ TRƯỜNG. 1.Lý luận của V.I. Lênin về độc quyền trong nên kinh tế thị trường. - Nguyên nhân hình thành và tác động của độc quyền. - Những đặc điểm kinh tế cơ bản của độc quyền trong chủ nghĩa tư bản 2.Lý luận của V.I. Lê nin về độc quyền nhà nước trong chủ nghĩa tư bản. - Nguyên nhân ra đời và phát triển của độc quyền nhà nước trong chủ nghĩa tư bản. - Bản chất của độc quyền nhà nước trong chủ nghĩa tư bản. - Những biểu hiện chủ yếu của độc quyền nhà nước trong chủ nghĩa tư bản. - Vai trò lịch sử của chủ nghĩa tư bản. - **Học ở lớp:** Thảo luận và phát biểu trên lớp - **Học ngoài lớp:** Đọc trước tài liệu chương 5	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

6 (5 tiết)	**Chương 5** KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA VÀ CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM	LO.5 LO.7 LO.8	**Dạy:** I. KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM **1.** Khái niệm kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam **2.** Tính tất yếu khách quan của việc phát triển kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam. **3.** Đặc trưng của kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam.	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

6 (5 tiết)	**Chương 5** KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA VÀ CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM	LO.5 LO.7 LO.8	II. HOÀN THIỆN THỂ CHẾ KINH TẾ THỊ TRƯỜNG ĐỊNH HƯỚNG XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM. 1.Sự cần thiết phải hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam 2.Hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam một số khía cạnh chủ yếu. III. CÁC QUAN HỆ LỢI ÍCH KINH TẾ Ở VIỆT NAM Lợi ích kinh tế và quan hệ lợi ích kinh tế. 1.Vai trò của nhà nước trong đảm bảo hài hòa các quan hệ lợi ích Học ở lớp: Thảo luận và phát biểu trên lớp Học ngoài lớp: Hoàn thiện bài thuyết trình	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	15%	Thuyết trình và bản báo cáo nhóm	LO.4 LO 5 LO6 LO.7 LO.8
2	Quiz	Bài thi giữa kỳ	Thi theo đề thi chung	20%	Tự luận đề mở	LO.2 LO.3
3	DIC	Thảo luận, chuyên cần tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. sv có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa,	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại	LO.7 LO.8

4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận đề đóng	LO.2 LO.3 LO.4 LO.5 LO.6 LO.7 LO.8
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.1	Nhận biết được vị trí của Kinh tế chính trị Mác - Lênin trong hệ thống lịch sử tư tưởng kinh tế và nắm được đối tượng, phương pháp và chức năng của kinh tế chính	Chương 1	Thỉ giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.7	Nắm rõ nội dung: sản xuất hàng hóa, điều kiện ra đời của sản xuất hàng hóa, khái niệm hàng hóa và hai thuộc tính của hàng hóa, chất và lượng của giá trị hàng hóa, mối quan hệ giữa tính hai mặt của lao động sản xuất hàng hóa với hai thuộc tính của hàng hóa, các nhân tố ảnh hưởng đến lượng giá trị của hàng hóa, nguồn gốc ra đời, bản chất và chức năng của tiền. Thị trường, cơ chế thị trường, nền kinh tế thị trường và vai trò các chủ thế tham gia thị trường	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm Ngân hàng đề thi của GV

LO.3 LO.7	Hiểu rõ và nắm được những nội dung: tư bản là gì? Công thức chung và mâu thuẫn công thức chung của tư bản. Hàng hóa sức lao động và tính chất đặc biệt của giá trị sử dụng hàng hóa sức lao động. Giá trị thặng dư và hai phương pháp sản xuất giá trị thặng dư. Tích lũy tư bản và những nhân tố làm tăng quy	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.4 LO.7	Hiểu rõ và nắm được những nội dung: quan hệ giữa cạnh tranh và độc quyền trong nền kinh tế thị trường. Tổ chức độc quyền là gì? Nguyên nhân hình thành các tổ chức độc quyền. Những đặc điểm kinh tế cơ bản của độc quyền theo quan điểm của V.I. Lênin. Lý luận về độc quyền nhà nước trong chủ nghĩa tư bản. Vai trò lịch sử của chủ nghĩa tư bản.	Chương 4	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.5 LO.7	Hiểu rõ và nắm được những nội dung: kinh tế thị trường định hướng xã hội chủ nghĩa ở Việt Nam, những đặc trưng của kinh tế thị trường định hướng xã hội chủ nghĩa. Thể chế kinh tế thị trường định hướng xã hội chủ nghĩa và sự cần thiết phải hoàn thiện thể chế kinh tế thị trường định hướng xã hội chủ nghĩa. Lợi ích kinh tế và quan hệ lợi ích kinh tế. Vai trò của nhà nước trong đảm bảo hài hòa các quan hệ lợi ích.	Chương 5	Thảo luận tại lớp (Discussion in class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

LO.6 LO.7	Hiểu rõ và nắm được những nội dung: cách mạng công nghiệp là gì? Vai trò của cách mạng công nghiệp đối với sự phát triển. Công nghiệp hóa là gì? Các mô hình công nghiệp hóa tiêu biểu trên thế giới. Công nghiệp hóa, hiện đại hóa ở Việt Nam là gì. Tính tất yếu khách quan phải công nghiệp hóa, hiện đại hóa ở Việt Nam. Công nghiệp hóa, hiện đại hóa ở Việt Nam trong bối cảnh cuộc cách mạng công nghiệp lần thứ 4. Hội nhập kinh tế quốc tế là gì, sự cần thiết khách quan phải hội nhập kinh tế quốc tế. Tác	Chương 6	Thảo luận tại lớp (Discussion in class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV

9. Một số lưu ý khác

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với giảng viên qua email: lethong0804@gmail.com
- Quy định về Bài thuyết trình nhóm GHW
- Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp nộp cho GV buổi ỉ.
- Tuần 4 (buổi thú' 4) thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.
- Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV
- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

Course Name: Computer Architecture

Course Code: IT089IU

1. General information

Course designation	This course introduces the principles of computer organization and the basic computer architecture.
Semester(s) in which the course is taught	4
Person responsible for the course	Dr. Le Hai Duong
Language	English
Relation to curriculum	Compulsory (CS, NE, CE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120 Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Digital Logic Design
Course objectives	This course provides students the principles of computer architecture and organization. It covers the subjects on assembly language and machine code, computer arithmetic and ALU design, computer performance, datapath and control, pipelining, memory hierarchy, I/O devices, multi-processor architectures, and mobile and multi-core processors.
Course learning outcomes	CLO 1. Understand the principles of computer architecture and the interfaces between its hardware and software components; CLO 2. Understand computer arithmetic (both integer and floating point), datapath, control , pipelining, pipeline hazards and their remedies, computer buses and I/O peripherals, and multiprocessor architecture;

<table>
<tr><td></td><td>CLO 3. Create assembly programs and their machine code equivalent;
CLO 4. Analyze the performance of computer;
CLO 5. Analyze computer memory and its organization, especially the interaction between cache and main memory.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1, CLO2</td></tr>
<tr><td>Skill</td><td>CLO3, CLO4, CLO5</td></tr>
<tr><td>Attitude</td><td></td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>History of computers, relations of software and hardware components;</td><td>1</td><td>I</td></tr>
<tr><td>Assembly language instructions</td><td>5</td><td>T, U</td></tr>
<tr><td>Computer arithmetic principles and hardware design</td><td>1</td><td>T</td></tr>
<tr><td>Computer performance</td><td>1</td><td>T,U</td></tr>
<tr><td>Datapath and its control</td><td>2</td><td>T</td></tr>
<tr><td>Microprocessor pipelining</td><td>2</td><td>T, U</td></tr>
<tr><td>Memory hierarchy</td><td>1</td><td>T</td></tr>
<tr><td>I/O devices and buses</td><td>1</td><td>T</td></tr>
<tr><td>Multiprocessor</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>1. David A. Patterson and John L. Hennessy, Computer Organization and Design 5th, 2013</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X					

2	X					
3		X				X
4	X					
5	X					

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	History of computers, relations of software and hardware components;	1	Quiz, exam	Lecture	[1]
2	Assembly language instructions	3	Quiz, exam	Lecture, lab, exercises	[1]
3	Computer arithmetic principles and hardware design	2	Quiz, exam	Lecture, exercises	[1]
4	**Midterm**				
5	Computer performance	4	Quiz, exam	Lecture, exercises	[1]
6	Datapath and its control	1, 2	Quiz, exam	Lecture, exercises	[1]
7	Microprocessor pipelining		Quiz, exam	Lecture, exercises	[1]
8	Memory hierarchy	5	Quiz, exam	Lecture, exercises	[1]
9	I/O devices and buses	2	Quiz, exam	Lecture, exercises	[1]
10	Multiprocessor	2	Quiz, exam	Lecture, exercises	[1]
11	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Midterm examination (30%)	70%	70%	25%		
Final examination (40%)			50%	70%	70%
Exercises/ Quiz (30%)	30%	30%	25%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**	**Benchmark**

	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when

			than one's own (or vice versa).	presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Object-Oriented Analysis and Design

Course Code: IT090IU

1. General information

1. Course designation	This course helps students learn about system life cycle development and the knowledge and skills required to develop object-oriented system.
Semester(s) in which the course is taught	4
Person responsible for the course	MSc. Dao Tran Hoang Chau
Language	English
Relation to curriculum	Compulsory (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 hours. Contact hours: Lecture 45 hours, Lab 30 hours: Private hours: 120 hours. Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	The course tries to solve the following questions• What are design approaches other than object-oriented design? What is object-oriented design? • What is a good design? How do you differentiate between a good and a bad design? What are the important characteristics of a good design?
Course learning outcomes	CLO 1. Identify client needs based on a written or verbal specification; CLO 2. Know how analyze and design a system with object-oriented concepts and design patterns; CLO 3. Know how to work in team effectively;

Competency level	Course learning outcome (CLO)
Knowledge	1, 2
Skill	1, 3
Attitude	3

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (45 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Software development life cycle;	2	T
Requirements gathering techniques;	1	T
Analyze client's requirements;	4	T
Design and implementation the system;	6	T, U
Design patterns;	2	T, U

Examination forms	Multiple-choice questions, short-answer questions
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	**1.** Craig Larman, Applying UML and Patterns - An introduction to Object-Oriented Analysis And Design 3rd, 2004

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x					
2		x				
3					x	

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Software development life cycle;	1	Midterm exam	Lecture, In-class activities	
2	Requirements gathering techniques;	1	Midterm exam	Lecture, In-class activities	
3	Analyze client's requirements;	1,3	Midterm exam, Assignment, Lab quiz	Lecture, In-class activities, Quiz	
4	Midterm				

5	Design and implementation the system;	2, 3	Final exam, Assignment, Lab quiz	Lecture, In-class activities, Quiz	
6	Design patterns;	2	Final exam	Lecture, In-class activities	
7	**Final exam**				

4. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Midterm examination (25%)	40%	25%	
Projects/Presentations/ Report (25%)	60%	30%	70%
Final examination (40%)		30%	10%
Exercises/ Quiz (10%)		15%	20%

1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		

TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are

	analysis or synthesis. Viewpoints of experts are questioned thoroughly.	or synthesis. Viewpoints of experts are subject to questioning.	coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	appropriate to audience.		appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated,	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often	Central message can be deduced but is not explicitly stated in the presentation.

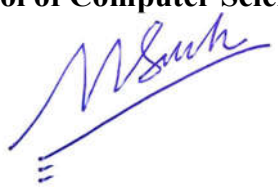
	memorable, and strongly supported.)		repeated and is not memorable.	

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Internet of Things

Course Code: IT134IU

1. General information

Course designation	The course explains the architecture, components of Internet of Thing networks.
Semester(s) in which the course is taught	
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	The students will study the communication techniques between the components from short range to long range such as Bluetooth, Zigbee, Wi-fi, Lora, NB-IoT,… Moreover, the data storage, organization and analytics are also studied in this course.
Course learning outcomes	CLO 1. The ability of designing and implementing some Internet of Thing systems; CLO 2. The ability of collecting data then applying some data mining techniques to analyze the data in some IoT applications.

Competency level	Course learning outcome (CLO)
Knowledge	CLO 1
Skill	CLO 1 and CLO 2
Attitude	CLO 1

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours)

	Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Week 1: Introduction to Internet of Things	1	I
Week 2 : IoT applications (1st presentation from industry)	1	U
Week 3: Sensors and actuators in IoTs	1	T
Week 4-8: Communication technologies in IoTs: PAN (Bluetooth, Zigbee), LAN (IEEE 802.11), WAN (LoRa, LTE)	5	T
Week 9: Data collection in IoT	1	T, U
Week 10: IoT applications (cont.) (2nd presentation from industry)	1	U
Week 11-14: Data analytics	4	T, U
Week 15: Review	1	U

Examination forms	Multiple-choice questions, short-answer questions
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	[1] Raj Kamal, Internet of Things Architecture and Design Principles, Mc Graw Hill India, 2017 [2] Hanes, David, et al. IoT fundamentals: Networking technologies, protocols, and use cases for the internet of things. Cisco Press, 2017. [3] Singh, Rajesh, et al. Internet of things with Raspberry Pi and Arduino. CRC Press, 2019. [4] Dow, Colin. Internet of things programming projects: build modern IoT solutions with the Raspberry Pi 3 and Python. Packt Publishing Ltd, 2018.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1		✓✓✓			✓✓	
2						✓

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources

1	Introduction to Internet of Things	1, 2	Homework	Lecture, Discussion, Inclass-Quiz	[1]
2	IoT applications (1st presentation from industry)	1	Homework	Lecture, Group work	[2]
3	Sensors and actuators in IoTs	1	Homework	Lecture, Discussion, Inclass-Quiz	[1]
4	**Midterm**		**Written exam**		
5 - 9	Communication technologies in IoTs: PAN (Bluetooth, Zigbee), LAN (IEEE 802.11), WAN (LoRa, LTE)	1	Homework	Lecture, Discussion, Inclass-Quiz	[1] [2]
10	Data collection in IoT	2	Homework	Lecture, Discussion, Inclass-Quiz	[1]
11	IoT applications (cont.) (2nd presentation from industry)	1, 2	Homework	Lecture, Group work	[2]
12 - 14	Data analytics	2	Homework	Lecture, Discussion, Inclass-Quiz, Presentation	[1]
15	Week 15: Review		Homework	Review-Test	
	Final exam		**Written exam**		

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**
Quiz (5%)		10%
Labs (20%)	20%	20%
Midterm examination (30%)	30%	20%
Projects/Presentations/ Report (5%)	25%	
Final examination (40%)	25%	50%

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**

Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries	Issue/ problem to be considered critically is stated without clarification or description.

			undetermined, and/ or backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	(perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	(perspective, thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

	authority on the topic.			
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Mobile Application Development

Course Code: IT133IU

1. General information

Course designation	Advanced programming course with focus on mobile environment
Semester(s) in which the course is taught	7
Person responsible for the course	MSc. Le Thanh Son
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-oriented analysis and design
Course objectives	This course is designed to introduce and familiarize students with programming in the mobile environment: Android platform will be used throughout the course. The course starts with introductions to basic components, concepts, structures of Android applications then move on with common user interface elements, persistent storage, database for mobile etc. Introduction to most common tools and techniques for writing Android application is also included with hands on experience in form of lab exercise programming project.
Course learning outcomes	CLO 1. Understand the structure of mobile application, especially Android application CLO 2. Understand most common mobile platform user interface, database, services CLO 3. Able to develop mobile application CLO 4. Team working

Competency level	Course learning outcome (CLO)
Knowledge	1

Skill	2, 3
Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to mobile programming	3	I
Android and Modal View Controller	3	I, T
Activity Lifecycle	3	I, T
Adroid SDK Versions and Compatbility	3	I, T
Creating UI: Layout and Widgets	3	T, U
ListFragment	3	
ViewPager	3	T, U
Dialogs	3	T, U
MediaPlayer	3	T, U
Action Bar	3	T, U
Saving and Loading Local Files	3	T, U
Context Menu and Contextual Action Mode	3	T, U
Taking Pictures and Handling Images	3	T, U
Intents	3	T, U
Browsing the Web & WebView	3	T, U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. C. Stewart, K. Marscicano, Android Programming: The Big Nerd Ranch Guide 3rd, 2017
2. D. Griffiths, Head First Android Development: A Brain-Friendly Guide 1st, 2015

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLO	1	2	3	4	5	6
1	x					

2	x					
3		xx				xxx
4			x			xxx

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to mobile programming	1	Quiz	Lecture	2
2	Android and Modal View Controller	1	Quiz	Lecture	2
3	Activity Lifecycle	1	Quiz	Lecture	2
4	Adroid SDK Versions and Compatbility	1	Quiz, Lab, Midterm	Lecture, Discussion	2
5	Creating UI: Layout and Widgets	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	ListFragment	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
7	ViewPager	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Dialogs	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
	Midterm				
9	MediaPlayer	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Action Bar	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Saving and Loading Local Files	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
12	Context Menu and Contextual Action Mode	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
13	Taking Pictures and Handling Images	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
14	Intents	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
15	Browsing the Web & WebView	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4

Quiz / Assigment (10%)	50%	10%	10%	70%
Labs (20%)	10%	30%	30%	30%
Midterm examination (30%)	30%	30%	30%	
Final examination (40%)	10%	30%	30%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a	Shows an emerging awareness of present assumptions (sometimes labels assertions as

	relevance of contexts when presenting a position.		position. May be more aware of others' assumptions than one's own (or vice versa).	assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**	**Benchmark**

	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Human-Computer Interaction

Course Code: IT044IU

1. **General information**

Course designation	This course provides students with fundamental interaction principles between human and computers.
Semester(s) in which the course is taught	7,8
Person responsible for the course	Dr. Vi Chi Thanh
Language	English
Relation to curriculum	Elective (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This course provides students with fundamental interaction principles between human and computers.
Course learning outcomes	CLO 1. Know how to gather requirements. CLO 2 Apply human-computer interaction principles in user interface design process CLO 3 Choose the appropriate interface evaluation method CLO 4. Understand different design principles for mobile applications, the Web, and emerging technologies. **Competency level** / **Course learning outcome (CLO)** Knowledge: 2, 3, 4 Skill: 1 Attitude: 1

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Human factors</td><td>1</td><td>I</td></tr>
<tr><td>Human perception and cognition principles</td><td>2</td><td>T</td></tr>
<tr><td>User-centered design</td><td>2</td><td>T,U</td></tr>
<tr><td>Requirements gathering techniques</td><td>1</td><td>T,U</td></tr>
<tr><td>Interface design process</td><td>2</td><td>T,U</td></tr>
<tr><td>Prototyping techniques</td><td>2</td><td>T,U</td></tr>
<tr><td>Interface evaluation methodology</td><td>1</td><td>T,U</td></tr>
<tr><td>Interaction styles and techniques</td><td>1</td><td>T</td></tr>
<tr><td>HCI for mobile applications, the Web, and emerging technologies</td><td>2</td><td>T,U</td></tr>
<tr><td>Data analysis</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Sharp, H., Preece, J., Rogers, Y. (2019). Interaction Design: Beyond Human-Computer Interaction. United Kingdom: Wiley.

[2] Dix, A. (2003). Human-computer Interaction. Germany: Pearson/Prentice-Hall.

[3] MacKenzie, I. S. (2012). Human-Computer Interaction: An Empirical Research Perspective. Netherlands: Elsevier Science.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	1	2	3	4	5	6
1			x			
2	x				x	
3		x			x	
4		x				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Human factors	1	Midterm exam	In-class activities	
2,3	Human perception and cognition principles	2	Midterm exam	In-class activities	
4,5	User-centered design	2	Midterm exam, Project, Lab quiz	In-class activities	
6	Requirements gathering techniques	1	Midterm exam, Project	In-class activities	
7,8	Interface design process	2	Midterm exam, Project	In-class activities	
Midterm exam					
9,10	Prototyping techniques	2	Project	In-class activities	
11	Interface evaluation methodology	3	Final exam, Project	In-class activities	
12	Interaction styles and techniques	3	Final exam	In-class activities	
13,14	HCI for mobile applications, the Web, and emerging technologies	4	Lab quiz	In-class activities	
15	Data analysis	2, 4	Final exam, Project	In-class activities	
Final exam					

4. Assessment plan

Assessment Type	CLO 1	CLO 2	CLO 3	CLO 4
Quiz (5%)	10%		20%	20%
Labs (10%)	30%	30%		
Midterm examination (30%)	50%	40%		
Projects/Presentations/ Report (15%)	10%		30%	30%

Final examination (40%)		30%	50%	50%

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.

2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and	Thoroughly (systematically and methodically) analyzes own and others'	Identifies own and others' assumptions and several relevant contexts when	Questions some assumptions. Identifies several	Shows an emerging awareness of present assumptions

assumptions	assumptions and carefully evaluates the relevance of contexts when presenting a position.	presenting a position.	relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	(sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Cloud Computing

Course Code: IT164IU

1. General information

Course designation	The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure.
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Elective (CS, NE, CE)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 182.5 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Lecture: 37.5 hours + Laboratory: 25 hours. Private study including examination preparation, specified in hours: 120 hours.
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	This course concentrates on parallel programming techniques for cloud computing and large-scale distributed systems which form the cloud infrastructure. The topics include overview of cloud computing, cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft, Yahoo, VMWare, etc. Students will also apply what they learn in one programming assignment and one project executed over Amazon Web Services.
Course learning outcomes	CLO 1. Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure. CLO 2. Able to deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.

<table>
<tr><td></td><td>CLO 3. Solve a real-world problem using cloud computing through group collaboration.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>1</td></tr>
<tr><td>Skill</td><td>2, 3</td></tr>
<tr><td>Attitude</td><td>3</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Cloud Computing</td><td>1</td><td>I</td></tr>
<tr><td>Cloud Computing Platforms</td><td>3</td><td>T</td></tr>
<tr><td>Parallel Programming in the Cloud</td><td>3</td><td>T, U</td></tr>
<tr><td>Distributed Storage Systems</td><td>3</td><td>T, U</td></tr>
<tr><td>Virtualization</td><td>2</td><td>T, U</td></tr>
<tr><td>Cloud Security</td><td>2</td><td>T</td></tr>
<tr><td>Multicore Operating Systems</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions, Programming exercises</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>2. Rountree, Derrick, and Ileana Castrillo. The basics of cloud computing: Understanding the fundamentals of cloud computing in theory and practice. Newnes, 2013.
3. Patterson, Scott. Learn AWS Serverless Computing: A Beginner's Guide to Using AWS Lambda, Amazon API Gateway, and Services from Amazon Web Services. Packt Publishing Ltd, 2019.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6
1	X					

2		XX				
3						X

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to Cloud Computing	1	Quiz	Lecture	1
2	Cloud Computing Platforms – Part 1	1	Quiz	Lecture	1
3	Cloud Computing Platforms – Part 2	1	Quiz	Lecture, Discussion, In-class Exercise	2
4	Cloud Computing Platforms – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
5	Parallel Programming in the Cloud – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	Parallel Programming in the Cloud – Part 2	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	2
7	Parallel Programming in the Cloud – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Distributed Storage Systems – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
Midterm					
9	Distributed Storage Systems – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Distributed Storage Systems – Part 3	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Virtualization – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion	1

				, In-class Exercise	
12	Virtualization – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
13	Cloud Security – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1, 2
14	Cloud Security – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
15	Multicore Operating Systems	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
Final					

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz / Assigment (10%)	50%	10%	10%
Labs (20%)	10%	30%	30%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	10%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports			
Student: …… Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		

Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries	Issue/ problem to be considered critically is stated without clarification or description.

			undetermined, and/ or backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/ hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged.	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	within position (perspective, thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the effectiveness of the presentation.

	enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 28, 2023

Ho Chi Minh City, 28/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Security Technology and Implementation

Course Code: IT165IU

1. General information

Course designation	The course will concentrate on security technologies that can be employed to safeguard and maintain a network. The course will also cover risk management, business continuity and recovery planning, operations security, access control systems, and software development security.
Semester(s) in which the course is taught	7,9
Person responsible for the course	Dr. Le Hai Duong
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	This course introduces students to information security principles, cryptography systems (symmetric and public key encryptions), risk management, security architecture and design, business continuity operations security, access control systems, protecting TCP/IP network, firewalls, virtual private network, IPSec, software development security.
Course learning outcomes	CLO 1. Gain understanding of information security and the cryptography concepts including symmetric key encryption, hash function, message authentication code, public key encryption, digital signature and digital envelope;

<table>
<tr><td></td><td>CLO 2. Apply the concepts of authentication and authorization in implementing secure systems and networks;
CLO 3. Analyze and evaluate security risk and security design;
CLO 4. Understand and apply software development security;
CLO 5. Apply security technologies in operations.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1, CLO2, CLO4, CLO5</td></tr>
<tr><td>Skill</td><td>CLO2, CLO3, CLO4, CLO6</td></tr>
<tr><td>Attitude</td><td></td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Information security principles</td><td>1</td><td>T</td></tr>
<tr><td>Governance and risk management;</td><td>1</td><td>T,U</td></tr>
<tr><td>Security architecture and design;</td><td>1</td><td>T</td></tr>
<tr><td>Business continuity and disaster recovery planning;</td><td>1</td><td>T,U</td></tr>
<tr><td>Operation security;</td><td>2</td><td>T,U</td></tr>
<tr><td>Access control systems and methodology;</td><td>1</td><td>T</td></tr>
<tr><td>Cryptography;</td><td>2</td><td>T,U</td></tr>
<tr><td>Overview network and telecommunications security;</td><td>1</td><td>T,U</td></tr>
<tr><td>Basic security infrastructures and routers;</td><td>1</td><td>T</td></tr>
<tr><td>Firewalls</td><td>1</td><td>T,U</td></tr>
<tr><td>Intrusion detection systems and intrusion protection systems</td><td>1</td><td>T</td></tr>
<tr><td>Virtual private network and IPSec;</td><td>1</td><td>T</td></tr>
<tr><td>Software Development security.</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
</table>

Reading list	1. William Stallings and Lawrence Brown, Computer Security - Principles and Practice 4th edition, 2018 2. Mark S. Merkow and Jim Breithaupt, Information Security: Principles and Practices, 2nd edition, 2014.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X		X	X		
2		X				
3	X					
4	X					
5	X					
6	X					

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Information security principles	1	Quiz, Exam	Lecture, Exercises, Lab	[1,2]
2	Governance and risk management;	3	Quiz, Exam	Lecture, Lab	[2]
3	Security architecture and design;	3	Quiz, Exam	Lecture, Lab	[2]
4	Business continuity and disaster recovery planning;	3	Quiz, Exam	Lecture, Lab	[2]
5,6	Operation security;	5	Quiz, Exam	Lecture, Lab	[2]
7	Access control systems and methodology;	2		Lecture, Lab	
	Midterm exam				
8, 9	Cryptography;	1	Quiz, Exam	Lecture	[1]
10	Overview network and telecommunications;	5	Quiz, Exam	Lecture, Lab	[2]
11	Basic security infrastructures and routers;	5	Quiz, Exam	Lecture, Lab	[2]
12	Firewalls	5	Quiz, Exam	Lecture, Exercises,	[1,2]

13	Intrusion detection systems and intrusion protection systems	5	Quiz, Exam	Lecture, Exercises,	[1,2]
14	Virtual private network and IPSec;	5	Quiz, Exam	Lecture, Lab	[1,2]
15	Software Development security.	4	Quiz, Exam	Lecture	[2]
	Final exam				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Midterm examination (30%)	30%	80%	55%		10%
Final examination (40%)	40%			75%	60%
Exercises/ Quiz (30%)	30%	20%	45%	25%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		

Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when

			than one's own (or vice versa).	presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sin

Course Name: Software Quality Verification and Validation

Course Code: IT166IU

1. General information

1. Course designation	
Semester(s) in which the course is taught	7,9
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	Introduction to software verification, validation, and testing. Strategies and techniques are presented for testing software, and also for planning software testing.
Course learning outcomes	CLO 1. Describe and explain how testing activities involve within software development process. CLO 2. Understand and apply best practices for software testing. CLO 3. Create test cases based on system requirement

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1, CLO2
Skill	CLO2, CLO3
Attitude	CLO2

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Software Testing Overview</td><td>3</td><td>I</td></tr>
<tr><td>Software Testing Foundations</td><td>3</td><td>T</td></tr>
<tr><td>Software Testing Activities</td><td>3</td><td>T</td></tr>
<tr><td>Model-Driven Test Design</td><td>3</td><td>T, U</td></tr>
<tr><td>Test Automation</td><td>3</td><td>T, U</td></tr>
<tr><td>Testing First Approach</td><td>3</td><td>T</td></tr>
<tr><td>Criteria-Based Test Design</td><td>3</td><td>T</td></tr>
<tr><td>Input Space Partitioning</td><td>3</td><td>T</td></tr>
<tr><td>Graph Coverage</td><td>3</td><td>T</td></tr>
<tr><td>Logic Coverage</td><td>3</td><td>T</td></tr>
<tr><td>Writing Test Plans</td><td>3</td><td>T, U</td></tr>
<tr><td>Test implementation</td><td>3</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</td></tr>
</table>

	Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	1. Paul Ammann, Jeff Offutt; Introduction to Software Testing, 2nd, 2017 2. James A. Whittaker; Exploratory Software Testing, 2009. 3. Glendford J. Myers, Tom Badgett, Corey Sandler; The art of Software Testing, 2012.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	XX					
2		XXX				
3						X

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Software Testing Overview	1	Quiz	Lecture	
2	Software Testing Foundations	1	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
3	Software Testing Activities	2	Quiz	Lecture, Discussion	[2]
4	Model-Driven Test Design	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
5	Test Automation	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]

6	Test Automation – Tools	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
7	Testing First Approach	2,3	Lab, Quiz, Midterm	Lecture, Discussion	
8	Criteria-Based Test Design	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
9	**Midterm**				
10	Input Space Partitioning – Part 1	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
11	Input Space Partitioning – Part 2	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,2,3]
12	Graph Coverage	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
13	Logic Coverage	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,3]
14	Writing Test Plans	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[2,3]
15	Test implementation	2,3	Lab, Quiz, Final	Lecture, Discussion	[2,3]
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz (5%)	X	X	
Labs (20%)		X	
Midterm examination (30%)	X	X	X
Projects/Presentations/ Report (10%)		X	X
Final examination (40%)	X	X	X

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.

2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and	Thoroughly (systematically and methodically) analyzes own and others'	Identifies own and others' assumptions and several relevant contexts when	Questions some assumptions. Identifies several	Shows an emerging awareness of present assumptions

assumptions	assumptions and carefully evaluates the relevance of contexts when presenting a position.	presenting a position.	relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	(sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 29th, 2023

Ho Chi Minh City, 29/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Game Development

Course Code: IT167IU

1. **General information**

Course designation	This course is an introduction to the theory and practice of the process of designing games and playful experiences.
Semester(s) in which the course is taught	7,9
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 182.5 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Lecture: 37.5 hours + Laboratory: 25 hours. Private study including examination preparation, specified in hours: 120 hours.
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object Oriented Programming
Course objectives	This course is an introduction to the theory and practice of the process of designing games and playful experiences. Students are familiarized with methods, concepts, techniques, and literature used in the design of games. The strategy is process-oriented, focusing on aspects such as: Rapid prototyping, play testing, and design iteration using a player-centered approach.
Course learning outcomes	CLO 1. Understand the emergence of the academic study of design methods and game design. CLO 2. Able to structure and conduct a game design project from conceptualization to playable prototype.

<table>
<tr><td></td><td>CLO 3. Solve a real-world problem using game design knowledge through group collaboration.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>1</td></tr>
<tr><td>Skill</td><td>2, 3</td></tr>
<tr><td>Attitude</td><td>3</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Game Development</td><td>1</td><td>I</td></tr>
<tr><td>Platforms and Publishing</td><td>3</td><td>T</td></tr>
<tr><td>Game Development Cycle</td><td>3</td><td>T, U</td></tr>
<tr><td>Principles of Game Design</td><td>3</td><td>T, U</td></tr>
<tr><td>Trade-Offs in Game Design</td><td>2</td><td>T, U</td></tr>
<tr><td>Game Engines, Game Systems and Elements; Map and Level Editors</td><td>2</td><td>T</td></tr>
<tr><td>Games Marketing and Distribution</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions, Programming exercises</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>4. Nystrom, Robert. Game programming patterns. Genever Benning, 2014.
5. Gregory, Jason. Game engine architecture. crc Press, 2018.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6

1	X					
2		XXX				
3						X

1. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to Game Development	1	Quiz	Lecture	1
2	Platforms and Publishing – Part 1	1	Quiz	Lecture	1
3	Platforms and Publishing – Part 2	1	Quiz	Lecture, Discussion, In-class Exercise	2
4	Platforms and Publishing – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
5	Game Development Cycle – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	Game Development Cycle – Part 2	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	2
7	Game Development Cycle – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Principles of Game Design – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
Midterm					
9	Principles of Game Design – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Principles of Game Design – Part 3	2, 3	Quiz, Lab, Final	Lecture, Discussion	1

				, In-class Exercise	
11	Trade-Offs in Game Design – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
12	Trade-Offs in Game Design – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
13	Game Engines, Game Systems and Elements; Map and Level Editors – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1, 2
14	Game Engines, Game Systems and Elements; Map and Level Editors – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
15	Games Marketing and Distribution	2, 3	Quiz, Lab, Final	Lecture, Discussion , In-class Exercise	1
Final					

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz / Assigment (10%)	50%	10%	10%
Labs (20%)	10%	30%	30%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	10%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.7. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			

Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.8. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.9. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described	Issue/ problem to be considered critically is stated, described, and	Issue/ problem to be considered critically is stated but	Issue/ problem to be considered critically is

	comprehensively, delivering all relevant information necessary for full understanding.	clarified so that understanding is not seriously impeded by omissions.	description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretatio n/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and

	clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	transitions) is clearly and consistently observable within the presentation.	transitions) is intermittently observable within the presentation.	transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics,	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies,

	analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 28, 2023

Ho Chi Minh City, 28/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Blockchain

Course Code: IT150IU

1. **General information**

Course designation	Introduction to Blockchain technology
Semester(s) in which the course is taught	6,7
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This subject introduces the students the foundation of blockchain technology and its applications. Students will study blockchain concepts and principles how it works. This course covers relevant topics blockchain space. The course starts with the basics of blockchain, cryptography, fundamental understanding of bitcoins. Then, the applications of blockchain technology is introduced in different areas of finance, healthcare, supply chain, etc. A complete picture of the ecosystem surrounding blockchain technology and development trends are also discussed.
Course learning outcomes	CLO 1. Understand basic contents of blockchain technology. CLO 2. Explain different types of blockchain development: Ethereum, smart contract security, bitcoin CLO 3. Apply blockchain techniques to setup the development environment to writing and deploying smart contracts, the workhorse of blockchain applications, integrating cryptocurrency micropayments into web apps

<table>
<tr><td></td><td>CLO 4. Work in a team to build a blockchain application project.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1, CLO1</td></tr>
<tr><td>Skill</td><td>CLO3, CLO4</td></tr>
<tr><td>Attitude</td><td>CLO2</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction</td><td>3</td><td>I</td></tr>
<tr><td>Cryptography & cryptocurrencies</td><td>3</td><td>T</td></tr>
<tr><td>How Bitcoin achieve decentralization</td><td>3</td><td>I, T</td></tr>
<tr><td>Mechanics of Bitcoin</td><td>3</td><td>T, U</td></tr>
<tr><td>How to store and use Bitcoin</td><td>3</td><td>T, U</td></tr>
<tr><td>Bitcoin mining</td><td>3</td><td>T</td></tr>
<tr><td>Bitcoin and Anonymity</td><td>3</td><td>T</td></tr>
<tr><td>Ethereum</td><td>3</td><td>I, T</td></tr>
<tr><td>Solidity</td><td>3</td><td>T, U</td></tr>
<tr><td>Token</td><td>3</td><td>I, T</td></tr>
<tr><td>Oracle</td><td>3</td><td>I, T</td></tr>
<tr><td>Decentralized Applications (Dapps)</td><td>3</td><td>T, U</td></tr>
<tr><td>Design pattern for blockchain applications</td><td>3</td><td>T</td></tr>
<tr><td>Real-world applications</td><td>3</td><td>I, T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction. Princeton, 2016
[2] Andreas M. Antonopoulos, and Gavin Wood Ph. D. Mastering Ethereum: Building Smart Contracts and DApps. O'Reilly Media, 2018
[3] Xiwei Xu, Ingo Weber, and Mark Staples. Architecture for Blockchain Applications. Springer, 2019.</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X					
2	X	X				
3		X				X
4						X

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction	1	Quiz	Teaching, Presentation	
2	Cryptography & cryptocurrencies	1	Quiz, In-class exercises	Teaching, Presentation	
3	How Bitcoin achieve decentralization	1, 2	Quiz, In-class exercises	Teaching, Presentation	
4	Mechanics of Bitcoin	1, 2	Quiz, In-class exercises	Teaching, Presentation	
5	How to store and use Bitcoin	1, 2	Quiz, In-class exercises	Teaching, Presentation	
6	Bitcoin mining	1, 2	Quiz, In-class exercises	Teaching, Presentation	
7	Bitcoin and Anonymity	2	Quiz, In-class exercises	Teaching, Presentation	
8	**Midterm**				
9	Ethereum	2,3	Project	Teaching, Presentation	
10	Solidity	2,3	Project	Teaching, Presentation	
11	Token	3,4	Quiz, In-class exercises	Teaching, Presentation	
12	Oracle	2,3	Quiz, In-class exercises	Teaching, Presentation Group discussion	
13	Decentralized Applications (Dapps)	3,4	Quiz, In-class exercises	Teaching, Presentation	

Week	Topic	CLO	Assessments	Learning activities	Resources
14	Design pattern for blockchain applications	3,4	Quiz, In-class exercises	Teaching, Presentation, In-class reading	
15	Real-world applications	3,4	Presentation	Teaching, Presentation Group discussion	
16	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Labs (20%)			x	x
Midterm examination (30%)	x	x		
Final examination (40%)		x	x	
Exercises/ Quiz (10%)	x			

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

1. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		

Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence s and implications) are oversimplifie d.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Development and Operations (DevOps)

Course Code: IT156IU

1. General information

Course designation	This course is an introduction to DevOps to help students understand its principles and practices. Key concepts and terminology will be covered with real-life case studies, examples and practical exercises. Common and popular tools to achieve DevOps models will be introduced as well.
Semester(s) in which the course is taught	7,8
Person responsible for the course	Tran Thanh Tung, PhD.
Language	English
Relation to curriculum	Elective (NE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This course is an introduction to DevOps to help students understand its principles and practices. Key concepts and terminology will be covered with real-life case studies, example and practical exercises. Common and popular tools to achieve DevOps models will be introduced as well.
Course learning outcomes	CLO 1. Define and discuss the key concepts and principles of DevOps CLO 2 Explain the benefit of DevOps and continuous delivery CLO 3 Understand infrastructure automation, build and deployment automation, the transformation to DevOps models CLO 4. Work with common and popular DevOps tools

Competency level	Course learning outcome (CLO)
Knowledge	1,2
Skill	3,4
Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Introduction to DevOps	3	I
Introduction to Cloud Computing	3	I
Linux Basics and Shell Scripting	3	T,U
Versioning and Build Tool	3	T
Automation: Continuous Integration, Continuous Deployment	3	T
Configuration Management	3	I,T
Containers, Container vs Virtual Machine	3	I,T
Deployment pipeline	3	I,T
Post production	3	I,T
Disaster recovery	3	I
Continuous Monitoring for DevOps	3	I,T
Infrastructure and deployment security	3	I

Examination forms

Short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Jeffery D.Smith, Operations Anti-Patterns, DevOps Solutions, Manning Publications 2020

[2] Nicole Forsgren, Accelerate: The Science of Lean Software and DevOps: Building and Scaling High Performing Technology Organizations, IT Revolution Press 2018

[3] Jez Humble and David Farley. Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation, Addison-Wesley Professional, 2010

[4] Paul M. Duvall, Steve Matyas, Andrew Glover. Continuous Integration: Improving Software Quality and Reducing Risk,

	Addison-Wesley Professional, 2007Len Bass and John Klein. Deployment and Operations for Software Engineers, 2019.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6
1	X					
2		XXX				
3						X

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to DevOps				
2,3	Introduction to Cloud Computing				
4,5	Linux Basics and Shell Scripting				
6	Versioning and Build Tool				
7	Automation: Continuous Integration, Continuous Deployment				
8	Configuration Management				
Midterm exam					
9,10	Containers, Container vs Virtual Machine				
11	Deployment pipeline				
12	Post production				
13	Disaster recovery				
14	Continuous Monitoring for DevOps				
15	Infrastructure and deployment security				
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4

Quiz (5%)	10%		20%	20%
Labs (10%)	30%	30%		
Midterm examination (30%)	50%	40%		
Projects/Presentations/ Report (15%)	10%		30%	30%
Final examination (40%)		30%	50%	50%

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.

1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3.

Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes	Conclusion is logically tied to information (because information is chosen to fit the desired	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence

	evaluation and ability to place evidence and perspectives discussed in priority order.	(consequences and implications) are identified clearly.	conclusion); some related outcomes (consequences and implications) are identified clearly.	s and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable,	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

	and strongly supported.)			

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Data Science and Visualization

Course Code: IT138IU

1. **General information**

Course designation	Introduction to Data Visualization
Semester(s) in which the course is taught	4,6
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Prerequisite course of Data Science and Data Visualization
Course objectives	The goal of this course is to introduce students to the key principles, methods, and techniques for effective visual analysis of data. The course begins with aims and key principles of data visualization. The course continues with different aspects of visualization including techniques and method for presenting different data types, and for discussing and analyzing visualizations. Thorough the course, students will be introduced to many visualization systems and visual tools via hand-on exercises.
Course learning outcomes	CLO 1. Understand the principles of data and graphic design. CLO 2. Create well-designed data visualizations with appropriate tools. CLO 3. Evaluate a visualization design.

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO3

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Visualization design principles</td><td>3</td><td>I, T</td></tr>
<tr><td>Perception, Cognition, Color</td><td>3</td><td>T</td></tr>
<tr><td>Data abstraction, data types</td><td>3</td><td>I, T</td></tr>
<tr><td>Visual encoding with marks and channels</td><td>3</td><td>T, U</td></tr>
<tr><td>Tasks and Interactivity</td><td>3</td><td>T</td></tr>
<tr><td>Validation and visualization</td><td>3</td><td>T</td></tr>
<tr><td>Arrange text and sets</td><td>3</td><td>T</td></tr>
<tr><td>Arrange spatial data</td><td>3</td><td>T</td></tr>
<tr><td>Arrange tree and graphs/networks</td><td>3</td><td>T</td></tr>
<tr><td>Facets and views</td><td>3</td><td>T</td></tr>
<tr><td>Focus+Context</td><td>3</td><td>T</td></tr>
<tr><td>Filtering and Aggregation</td><td>3</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Edward R. Tufte, The Visual Display of Quantitative Information 2nd, 2001
[2] Tamara Munzner, Visualization Analysis and Design 1st, 2014
[3] Colin Ware, Visual Thinking for Design 1st, 2004
[4] Scott Murray, Interactive Data Visualization for the Web 1st, 2013
[5] Alberto Cairo, The Functional Art: An introduction to information graphics and visualization 1st, 2012
[6] Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals 1st, 2015</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2		X	X			
3		X				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Visualization design principles	1	Quiz	Teaching, presentation	
2	Perception, Cognition, Color	1,2	Quiz, Project	Teaching, presentation	
3	Data abstraction, data types	2,3	Quiz, Project	Teaching, presentation	
4	Visual encoding with marks and channels	2,3	Quiz, Project	Teaching, presentation	
5	Tasks and Interactivity	2,3	Quiz, Project	Teaching, presentation	
6	**Midterm**				
7	Validation and visualization	1,3	Quiz, in-class exercises, Project	Teaching, Discussion	
8	Arrange text and sets	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
9	Arrange spatial data	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
10	Arrange tree and graphs/networks	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
11	Facets and views	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
12	Focus+Context	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
13	Filtering and Aggregation	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
14	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Labs (20%)		x	x
Midterm examination (30%)	x	x	
Final examination (40%)		x	x
Exercises/ Quiz (10%)	x	x	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.

3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the	Language choices are thoughtful and generally support the effectiveness of the presentation.	Language choices are mundane and commonplace and partially support the effectiveness of the	Language choices are unclear and minimally support the effectiveness of the presentation.

	effectiveness of the presentation. Language in presentation is appropriate to audience.	Language in presentation is appropriate to audience.	presentation. Language in presentation is appropriate to audience.	Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation understandabl e, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandabili ty of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandabl e but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Critical Thinking

Course Code: PE008IU

1. General information

Course designation	*This course provides the nature and techniques of thought as a basis for our claims, beliefs, and attitudes about the world. The course also explores the process in which people develop their claims and support their beliefs.* *Specifically, the course includes the theory and practice of presenting arguments in oral and written forms, making deductive and inductive arguments, evaluating the validity or strength of arguments, detecting fallacies in arguments, and refuting fallacious arguments.* *Resources for the reasoning process include hypothetical and real-life situations in various fields of natural sciences, social sciences, and humanities.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Trần Thanh Tú (Ph.D) Nguyễn Thị Thủy (Ph.D) Phạm Ngọc (Ph.D) Nguyễn Văn Tiếp (Ph.D) Vũ Tiến Thịnh (MA) Đỗ Thị Diệu Ngọc (MA)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lectures, discussions, homework assignments, students' presentations
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 135 Contact hours (lecture, exercise): 45 Private study including examination preparation, specified in hours: 90
Credit points	3
Required and recommended	None

prerequisites for joining the course	
Course objectives	his course will enable students to develop the habits of assessing and defending the reasonableness of their beliefs and values as well as those of others appreciate the importance of looking at an issue from a variety of perspectives apply critical thinking skills in both public and personal settings
Course learning outcomes	Upon the successful completion of this course, students will be able to:

Competency level	Course learning outcome (CLO)
Knowledge	CLO1. Know the general concepts and standards of critical thinking; and comprehend the disadvantages of barriers to critical thinking in various contexts CLO2. Know the elements of an argument and two patterns of reasoning CLO3 Know the fallacies of relevance and insufficient evidence in arguments
Skill	CLO4. Construct and evaluate deductive and inductive arguments in spoken and written forms CLO5. Test the validity of deductive arguments using Venn diagram and truth tables CLO6. Analyze and standardize arguments CLO7. Evaluate truth claims and refute arguments CLO8. Analyze weaknesses in inductive arguments to strengthen them
Attitude	CLO9. Defend personal/group beliefs with good arguments and in appropriate manners (project presentations)

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (2 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Critical thinking</td><td>3</td><td>I, T, U</td></tr>
<tr><td>Recognizing arguments</td><td>3</td><td>T, U</td></tr>
<tr><td>Basic logical concepts</td><td>3</td><td>T, U</td></tr>
<tr><td>A little categorical logic</td><td>3</td><td>T, U</td></tr>
<tr><td>A little propositional logic</td><td>3</td><td>T, U</td></tr>
<tr><td>Logical fallacies I</td><td>3</td><td>T, U</td></tr>
<tr><td>Logical fallacies II</td><td>3</td><td>T, U</td></tr>
<tr><td>Review for Midterm test</td><td>3</td><td>U</td></tr>
<tr><td>Analyzing arguments</td><td>3</td><td>T, U</td></tr>
<tr><td>Evaluating arguments and truth claims</td><td>3</td><td>T, U</td></tr>
<tr><td>Inductive reasoning</td><td>3</td><td>T, U</td></tr>
<tr><td>Project: Group presentation</td><td>9</td><td>U</td></tr>
<tr><td>Review for Final Exam</td><td>3</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>40 multiple-choice questions for the midterm and final exams and group presentations for the final project</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Overall passing score: 50/100</td></tr>
<tr><td>Reading list</td><td>[1] Bassham, Irwin, Nardone, and Wallace, Critical Thinking: A Student's Introduction, 6th edition, McGraw-Hill Education, 2020.
[2] Moore, B.N. et al. (2009). Critical Thinking, 9th ed. McGraw-Hill
[3] Patrick J. Hurley (2012). A Concise Introduction to Logic (11th ed.), Wadsworth, Cengage Learning
+ Relevant web resources</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						
2						
3						

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Critical thinking	1	HW 1/Quiz 1	Lecture, Discussion, Homework, Quiz	[1] Chapter 1
2	Recognizing arguments	2	HW 2/Quiz 2	Lecture, Discussion, Homework, Quiz	[1] Chapter 2
3	Basic logical concepts	2	HW 3/Quiz 3	Lecture, Discussion, Homework, Quiz	[1] Chapter 3
4	A little categorical logic	3	HW 4/Quiz 4	Lecture, Discussion, Homework, Quiz	[1] Chapter 9
5	A little propositional logic	3	HW 5/Quiz 5	Lecture, Discussion, Homework, Quiz	[1] Chapter 10
6	Logical fallacies I	4	HW 6/Quiz 6	Lecture, Discussion, Homework, Quiz	[1] Chapter 5
7	Logical fallacies II	4	HW 7/Quiz 7	Lecture, Discussion, Homework, Quiz	[1] Chapter 6
8	Review for midterm exam + sample test				
9 + 10	**Midterm exam: Chapters 1, 2, 3, 9, 10**				
11	Analyzing arguments	5	HW 8/Quiz 8	Lecture, Discussion, Homework	[1] Chapter 7
12	Evaluating arguments and truth claims	5	HW 9/Quiz 9	Lecture, Discussion, Homework	[1] Chapter 8
13	Inductive reasoning	2	HW 10/Quiz 10	Lecture, Discussion, Homework	[1] Chapter 11

14	Project: Group presentation	6	Group work	Presentation, Discussion	
15	Project: Group presentation	6	Group work	Presentation, Discussion	
16	Project: Group presentation	6	Group work	Presentation, Discussion	
17	**Review for final exam + sample test**				
18	Reserved week				
19+20	**Final exam: Chapters 5, 6, 7, 8, 11**				

4. Assessment plan

Assessment Type	**CLO 1**	**CLO 2**	**CLO 3**	**CLO 4**	**CLO 5**	**CLO 6**	**CLO 7**	**CLO 8**	**CLO 9**
Class participation and Assignments (30%)	80% Pass	80% Pass	80% Pass	80% Pass	80% Pass				80% Pass
Midterm exam (30%)						80% Pass	80% Pass	80% Pass	
Final exam (40%)						80% Pass	80% Pass	80% Pass	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

Course Name: Probability, Statistics and Random Process

Course Code: MA026IU

1. General information

Course designation	*The course is aimed to provide the beginning students in engineering with the simple concepts and techniques of probabilistic and statistics models and stochastic processes.*
Semester(s) in which the course is taught	1, 2, 3
Person responsible for the course	Dr. Ta Quoc Bao Dr. Pham Hai Ha
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 135 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 Private study including examination preparation, specified in hours: 90
Credit points	3
Required and recommended prerequisites for joining the course	Calculus 1 and Calculus 2
Course objectives	Students will be provided with skills of using data from a variety of sources, be introduced to contemporary computing and database environments, such as R/Python, and be exposed to case studies from outside the classroom. Through this unit, students will become acquainted with the challenges of contemporary data science and gain an appreciation of the foundational skills necessary to turn data into information.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course students will be able to:
<table>
<tr><td>Competency level</td><td>Course learning outcome (CLO)</td></tr>
<tr><td>Knowledge</td><td>CLO1. Identify basic concept such as sample space, events, probability, conditional probability, independence; distribution and mean, variance of random variables; important statistics including sample mean, sample proportion, sample variance and sample standard deviation.</td></tr>
<tr><td>Skill</td><td>CLO2. Compute probability of simple and complicated events with probability rules; Evaluate probability, mean and variance of random variables and function of random variables.
CLO3. Conduct estimate parameter(s) and hypothesis testing procedure from sample data.
CLO4. Calculate transition probability, unconditional distribution, classify state and find stationary distribution of a Markov chain.</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Probability</td><td>1</td><td>I, T</td></tr>
<tr><td>Counting techniques</td><td>1</td><td>T, U</td></tr>
<tr><td>Conditional probability and probability rules</td><td>2</td><td>T, U</td></tr>
<tr><td>Random variables and mathematical expectation</td><td>4</td><td>T, U</td></tr>
<tr><td>Markov chain</td><td>2</td><td>T, U</td></tr>
<tr><td>Introduction to Statistics and Statistics Descriptive</td><td>1</td><td>I, T</td></tr>
<tr><td>Parameter estimation</td><td>2</td><td>T, U</td></tr>
<tr><td>Hypothesis testing</td><td>2</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Written examination</td></tr>
</table>

Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	1. R. Walpole et al, *Probability and Statistics for Engineers and Scientists*, 9th edition. 2. S. Ross, *Introduction to Probability Models*, 9th edition. 3. S. Ross, *Introduction Probability and Statistics for Engineers and Scientist*, 3th edition

2. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to probability	1	Quiz1	Lecture, HW	[1].1 [2].2 [3].3
2	Counting techniques	2		Lecture, HW	[1].2
3 - 4	Calculating probability	2	Quiz2	Lecture HW	[1].2 [2].1 [3].3
5-6	Random variables	2	Quiz3	Lecture, HW	[1].3, [2].2, 3 [3].4
7	Mean – Variance – Covariance	2	HW1	Lecture, Discussion, HW	[1].4 [2].2 [3].4
8	Special distributions	2		Lecture, HW	[1].5, 6 [2].2 [3].5
9	Midterm				
10 -11	Markov chain	4	HW2	Lecture, Discussion, HW	[2].4
12	Descriptive statistics	1		Lecture, Discussion, HW	[1]. 1. [3].2
13 - 14	Parameter estimation	3	Quiz4	Lecture, Discussion, HW	[1]. 9 [3].7

15 - 16	Hypothesis testing	3	Quiz5	Lecture, Discussion, HW	[1]. 10 [3]. 8
17	Final exam				

3. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
In-class exercises/quizzes (10%)	Qz1 70%Pass	Qz2, Qz3 70%Pass	Qz3, Qz4 70% Pass	
Homework exercises (10%)	HW1 70%Pass			HW2 70%Pass
Midterm exam (30%)	Part I 70%Pass	Part II 70%Pass		
Final exam (50%)			Part II 70%Pass	Part I 70%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

4. Date revised: January 12, 2022

Course Name: Chủ nghĩa xã hội khoa học
(Scientific socialism)
Course Code: PE017IU

1. Thông tin chung

Tên môn học (tiếng Việt):	Chủ nghĩa xã hội khoa học
Tên môn học (tiếng Anh):	Scientific socialism
Mã số môn học:	PE017IU
Thuộc khối kiến thức:	Cơ sở
Số tín chỉ:	2
Số tiết lý thuyết:	*30 (trên lớp)*
Số tiết thực	
Số tiết tự học:	*60 (về nhà)*
Môn học trước:	l. Kinh tế chính trị Mác - Lênin, 2. Triết học Mác - Lênin
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1. Môn học trang bị cho sinh viên những nội dung cơ bản của chủ nghĩa xã hội khoa học (một trong ba bộ phận cấu thành chủ nghĩa Mác - Lênin).

2.2. Giúp cho sinh viên vận dụng những tri thức cơ bản của chủ nghĩa xã hội khoa học một cách sáng tạo trong hoạt động nhận thức và thực tiễn, nhằm giải quyết những vấn đề mà đời sống xã hội của đất nước, của thời đại đang đặt ra.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về chủ nghĩa xã hội khoa học

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Giáo trình Chủ nghĩa xã hội khoa học,* Nxb. Chính trị quốc gia, Hà Nội.

- Bộ Giáo dục và Đào tạo (2012), *Giáo trình Những Nguyên lý cơ bản của chủ nghãi Mác-Leenin,* Nxb. Chính trị quốc gia, Hà Nội.

- Hội đồng Trung ương (2008), *Giáo trình Chủ nghĩa xã hội khoa học,* Nxb. Chính trị quốc gia, Hà Nội.

5. Chuẩn đầu ra môn học (Course Learning Outcomes)

Chuẩn đầu ra	Mô tả	Tiêu chí đánh giá	Mục tiêu môn học	Chuẩn đầu ra CDIO CTĐT	Mức độ giảng dạy (I/T/U)
5.1. Kiến thức					
LO.1	NHẬP MÔN CHỦ NGHĨA XÃ HỘI KHOA HỌC	LO.1.1 – Khái lược sự ra đời CHủ nghĩa xã hội khoa học, hoàn cảnh lịch sử và vai trò của Các Mác và PH.Ăngghen	2.1	1.1.3	**13**
		LO.1.2 – Nhận biết được các giai đoạn phát triển cơ bản của Chủ nghĩa xã hội khoa học thể hiện qua các tác phẩm			
		LO.1.3 – Nắm rõ được đối tượng, phương pháp và ý nghĩa của việc nghiện cứu Chủ nghĩa xã hội khoa học			
LO.2	SỨ MỆNH LỊCH SỬ CỦA GIAI CẤP CÔNG NHÂN	LO.2.1- Hiểu rõ khái niệm giai cấp coongn hân và đặc điểm của giai cấp công nhan	2.1	1.1.3	T4
		LO.2.2 – Nắm rõ nội dung, đặc điểm sứ mệnh lịch sử của giai cấp công nhân	2.1 2.1		
		LO.2.3 – Giải thích được những điều kiện quy định sứ mệnh lịch sử của giai cấp công nhân	2.1		
		LO.2.4 – Phân tích được những điểm tương đồng và khác biệt của giai cấp công nhân hiện nay và việc thực hiện sứ mệnh của giai cấp công nhân	2.1 2.2 2.1 2.2		

		trên thế giới hiện nay			
		LO.2.5 – Nắm rõ những đặc điểm cơ bản của giai cấp công nhân Việt Nam và nội dung sứ mệnh lịch sử của giai cấp công nhân Việt Nam hiện nay			
		LO.2.6 – Trình bày được phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp công nhân Việt Nam hiện nay			
LO.3	CHỦ NGHĨA XÃ HỘI VÀ THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3.1 – Hiểu rõ Chủ nghĩa xã hội là giai đoạn đầu của hình thái kinh tế - xã hội công sản chủ nghĩa	2.1	1.1.3	I3
		LO.3.2 – Trình bày được những đặc trưng cơ bản của chủ nghĩa xã hội			
		LO.3.3 – Giải thích được tính tất yếu khách quan của thời kỳ quá độ lên chủ nghĩa xã hội và những đặc điểm cơ bản của thời kỳ quá độ lên chủ nghĩa xã hội			
		LO.3.4 – Hiểu rõ đặc trưng của thời kỳ quá độ và chủ nghĩa xã hội ở Việt Nam, trình bày được những phương hướng xây dựng chủ nghĩa xã hội ở Việt Nam hiện nay			
		LO.4.1 – Giải thích được quan niệm về dân chủ và sự ra đời và phát triển dân chủ	2.1		

2.1

2.1

LO.4	DÂN CHỦ XÃ HỘI CHỦ NGHĨA VÀ NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA	trong lịch sử xã hội loài người			
		LO.4.2 – Nắm rõ quá trình ra đời và bản chất của nền dân chủ xã hội chủ nghĩa		1.1.3	T4
		LO.4.3 – Hiểu được sự ra đời, bản chất và chức năng của nhà nước xã hội chủ nghĩa cũng như mối quan hệ giữa dân chủ và nhà nước			
		LO.4.4 - hiểu được sự ra đời phát triển và bản chất của nền dân chủ xã hội chủ nghĩa ở Việt Nam			
		LO.4.5 - trình bày được đặc điểm và các giải pháp cơ bản nhằm xây dựng nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam hiện nay			
LO.5	CƠ CẤU XÃ HỘI GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.5.1 – Trình bày được khái niệm cơ cấu xã hội – khái quát và sự biến đổi của cơ cấu xã hội giai cấp trong thời kì quá độ lên chủ nghĩa xã hội	2.1	1.1.3	I3
		LO.5.2 – giải thích được tính tất yếu của liên minh giai cấp, tầng trong thời kỳ quá độ lên chủ nghĩa xã hội			
		LO.5.3 – Hiểu rõ cơ cấu xã hội – giai cấp ở Việt Nam trong thời kì quá độ và trình bày những giải pháp cơ			

		bản nhằm xây dựng, phát triển lối liên minh giai cấp, tầng lớp xã hội ở Việt Nam			
LO.6	VẤN ĐỀ DÂN TỘC VÀ TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.6.1 – Hiểu rõ khái niệm, đặc trưng cơ bản của dân tộc và quan điểm của chủ nghĩa Mác – Leenin về vấn đề dân tộc	2.1 2.1	1.1.3	T4
		LO.6.2 – Trình bày được những đặc điểm cơ bản của dân tộc ở Việt Nam và quan điểm chính sách dân tộc của Đảnh và Nhà nước Việt Nam	2.1		
		LO.6.3 – Hiểu được bản chất, nguồn gốc, tính chất của tôn giáo và nguyên tắc cơ bản giải quyết vấn đề tôn giáo trong thời kỳ quá độ lên chủ nghĩa xã hội	2.1 2.2 2.1 2.2		
		LO.6.4 – Giải thích được những đặc điểm tôn giáo ở Việt Nam và chính sách của Đảng và Nhà nước Việt Nam đối với tín ngưỡng tôn giáo hiện nay			
		LO.6.5 – Hiểu rõ được đặc điểm quan hệ dân tộc và tôn giáo ở Việt Nam và trình bày được các định hướng cơ bản nhằm giải quyết mối quan hệ giữa dân tộc			

		và tôn giáo ở Việt Nam hiện nay			
LO.7	VẤN ĐỀ GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.7.1 – Khái lược được vị trí, chức năng và vai trò của gia đình trong xã hội	2.1	1.1.3	I3
		LO.7.2 – Nhận biết được các cơ sở xây dựng gia đình trong thời kỳ quá độ lên chủ nghĩa xã hội			
		LO.7.3 – Giải thích được sự biến đổi của gia đình Việt Nam trong thời kỳ quá đội và trình bày được những phương hướng cơ bản xây dựng và phát triển gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội			
5.2. Kỹ năng					
LO.8	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANG LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.8.1 – Có kỹ năng khái quát hóa để rút ra *Từ khóa trí thức* đối với mỗi nội dung và tư duy vó hệ thống	2.1 2.2	2.1.1 2.3.1 2.4.4 2.5 3.1.5	U4
		LO.8.2 – Có kỹ năng trình bày, thuyết minh, phản biện, tranh luận, hùng biện những tri thức lý luận đang học tập, nghiên cứu dựa trên thực tiễn			
		LO.8.3 – Có kỹ năng giao tiếp xã hội, hợp tác và làm việc nhóm, chia sẻ tri thức và kinh nghiệm, khả năng điều			

		hành nhóm làm việc			
LO.9	THỂ HIỆN Ý THỨC NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.9.1 – Có ý thức trách nhiệm bảo vệ tính khoa học, cách mạng trong lý luận của chủ nghĩa Mác – Leenin về CNXH và con đường đi lên CNXH ở Việt Nam	2.1 2.2	3.1	U3
		LO.9.2 – Có ý thức, trách nhiệm cá nhân đối với tập thể, cộng đồng			
		LO.9.3 – Có nhận thức về sự cần thiết học tập, nghiên cứu suốt đời và vận dụng nó trong cuộc sống			

6. Kế hoạch giảng dạy theo buổi học (Course Plan):

TT (tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1 (tiết 1)	Giới thiệu về môn học	LO.1 LO.4	**Dạy:** - Giới thiệu đề cương môn học - Giới thiệu nội dung đề tài thuyết trình nhóm (GHW) **Học ở lớp:** - Chia nhóm (5 SV/nhóm) - Giới thiệu nhóm học tập **Học ngoài lớp:** - Chọn đề tài thuyết trình của nhóm (GHW) - Đọc trước tài liệu chương 1.	
			Dạy: 1.SỰ RA ĐỜI CỦA CHỦ NGHĨA XÃ HỘI KHOA HỌC 1.1. Hoàn cảnh lịch sử sự ra đời của chủ nghĩa xã hội khoa học 1.2. Vai trò của C. Mác và Ăngghen	

2	**Chương 1** NHẬP MÔN CHỦ NGHĨA XÃ HỘI KHOA HỌC		2.CÁC GIAI ĐOẠN PHÁT TRIỂN CƠ BẢN CỦA CHỦ NGHĨA XÃ HỘI KHOA HỌC 2.1. C. Mác và Ph.Ăngghen phát triển chủ nghĩa xã hội khoa học 2.2. V.I.Lênin vận dụng và phát triển sáng tạo chủ nghĩa xã hội khoa học trong điều kiện mới 2.3. Sự vận dụng và phát triển sáng tạo chủ nghĩa xã hội khoa học từ sau khi lênin qua đời đến nay 3. ĐỐI TƯỢNG, PHƯƠNG PHÁP VÀ Ý NGHĨA CỦA VIỆC NGHIÊN CỨU CHỦ NGHĨA XÃ HỘI KHOA HỌC 3.1. Đối tượng nghiên cứu của chủ nghĩa xã hội khoa học 3.2. Phương pháp nghiên cứu của chủ nghĩa xã hội khoa học Ý nghĩa của viêc nghiên cứu chủ nghĩa xã hội khoa học **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** - Phác thảo nội dung thuyết trình nhóm GHW - Đọc trước tài liệu chương 2.	Thi giữa kì (Quiz)
3	**Chương 2** SỨ MỆNH LỊCH SỬ CỦA GIAI CẤP CÔNG NHÂN	LO.2 LO.4 LO.5	**Dạy**: 1.QUAN ĐIỂM CƠ BẢN CỦA CHỦ NGHĨA MÁC - LEENIN VỀ GIAI CÁP CÔNG NHÂN VÀ SỨ MỆNH LỊCH SỬ THẾ GIỚI CỦA GIAI CẤP CÔNG NHÂN 1.1. Khái niệm và đặc điểm của giai cấp công nhân 1.2. Nội dung và đặc điểm sứ mệnh lịch sử của giai cấp công nhân 1.3. Những điều kiện quy định sứ mệnh lịch sử của giai cấp công nhân 2.GIAI CẤP CÔNG NHÂN VÀ VIỆC THỰC HIỆN SỨ MỆNH LỊCH SỬ CỦA GIA1 CẤP CÔNG NHÂN HIỆN NAY 2.1. Giai cấp công nhân hiện nay 2.2. Thực hiện sứ mệnh lịch sử của giai cấp công nhân trên thế giới hiện nay	Thi giữa kỳ (Quiz)

			3.SỨ MỆNH LỊCH SỬ CỦA GIAI CẤP CÔNG NHÂN VIỆT NAM 3.1. Đặc điểm của giai cấp công nhân Việt Nam 3.2. Nội dung sứ mệnh lịch sử của giai cấp công nhân Việt Nam hiện nay 3.3. Phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp công nhân Việt Nam hiện nay **Học ở lớp**: Thảo luận và phát biểu trên lớp **Học ngoài lớp**: Đọc trước tài liệu chương 3	
4	**Chương 3** CHỦ NGHĨA XÃ HỘI VÀ THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3 LO.4 LO.5	**Dạy:** 1. CHỦ NGHĨA XÃ HỘI 1.1. Chủ nghĩa xã hội, giai đoạn đầu của hình thái kinh tế - xã hội công sản chủ nghĩa 1.2. Điều kiện ra dời chủ nghĩa xã hội 1.3. Những đặt trưng cơ bản của chủ nghĩa xã hội 2. THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Tính tất yếu khách quan của thời kỳ quá độ lên chủ nghĩa xã hội 2.2. Đặc điểm của thời kỳ quá độ lên chủ nghĩa xã hội 3. QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI Ở VIỆT NAM 3.1. Quá độ lên chủ nghĩa xã hội bỏ qua chế độ tư bản chủ nghĩa 3.2. Những đặc trưng cơ bản của chủ nghĩa xã hội và phương hướng xây dựng chủ nghĩa xã hội ở Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 4	Thuyết trình nhóm (GHW) Thi giữa kỳ (Quiz)
5	**Chương 4** DÂN CHỦ XÃ HỘI CHỦ NGHĨA VÀ NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA	LO.2 LO.4 LO.5	**Dạy:** 1. DÂN CHỦ VÀ DÂN CHỦ XÃ HỘI CHỦ NGHĨA 1.1. Dân chủ và sự ra đời, phát triển của dân chủ 1.2. Dân chủ xã hội chủ nghĩa	Thuyết trình nhóm (GHW)

			2. NHÀ NƯỚC XÃ HỘI CHỦ NGHĨA 2.1. Sự ra đời, bản chất, chức năng của nhà nước xã hội chủ nghĩa 2.2. Mối quan hệ giữa dân chủ xã hội chủ nghĩa và nhà nước xã hội chủ nghĩa 3. DÂN CHỦ XÃ HỘI CHỦ NGHĨA VÀ NHÀ NƯỚC PHÁP QUYỀN XÃ HỘI CHỦ NGHĨA Ở VIỆT NAM 3.1. Dân chủ xã hội chủ nghĩa ở Việt Nam 3.2. Nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam hiện nay 3.3. Phát huy dân chủ xã hội chủ nghĩa, xây dựng nhà nước pháp quyền xã hội chủ nghĩa ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu **Học ngoài lớp:** Đọc trước tài liệu chương 5 trên lớp	Thi cuối kỳ (FEX)
6	Chương 5 CƠ CẤU XÃ HỘI – GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.3 LO.4 LO.5	**Dạy:** 1. CƠ CẤU XÃ HỘI GIAI CẤP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 1.1. Khái niệm và vị trí của cơ cấu xã hội - giai cấp trong cơ cấu xã hội 1.2. Sự biến đổi có tính quy luật của cơ cấu xã hội - giai cấp trong thời kỳ quá độ lên chủ nghĩa xã hội 2. LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 3. CƠ CẤU XÃ HỘI - GIAI CẤP VÀ LIÊN MINH GIAI CẤP, TẦNG LỚP TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI Ở VIỆT NAM 3.1. Cơ cấu xã hội - giai cấp trong thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam 3.2. Liên minh giai cấp, tầng lớp trong thời kỳ quá độ lên chủ nghĩa xã hội ở Việt Nam **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:**	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)

			Đọc trước tài liệu chương 6	
7	**Chương 6** VẤN ĐỀ DÂN TỘC VÀ TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI	LO.2 LO.4 LO.5	**Dạy:** 1. DÂN TỘC TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 1.1. Chủ nghĩa Mác - Lênin về dân tộc 1.2. Dân tộc và quan hệ dân tộc ở Việt Nam 2. TÔN GIÁO TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Chủ nghĩa Mác - Lênin về tôn giáo 2.2. Tôn giáo ở Việt Nam và chính sách tôn giáo của Đảng, Nhà nước ta hiện nay 3. QUAN HỆ DÂN TỘC VÀ TÔN GIÁO Ở VIỆT NAM 3.1. Đặc điểm quan hệ dân tộc và tôn giáo ở Việt Nam 3.2. Định hướng giải quyết mối quan hệ dân tộc và tôn giáo ở Việt Nam hiện nay 3.3. Phương hướng và một số giải pháp chủ yếu để xây dựng giai cấp công nhân Việt Nam hiện nay **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Đọc trước tài liệu chương 7	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)
8	**Chương 7** VẤN ĐỀ GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI		**Dạy:** 1. KHÁI NIỆM, VỊ TRÍ VÀ CHỨC NĂNG CỦA GIA ĐÌNH 1.1. Khái niệm gia đình 1.2. Vị trí của gia đình trong xã hội 1.3. Chức năng cơ bản của gia đình 2.CƠ SỞ XÂY DỰNG GIA ĐÌNH TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 2.1. Cơ sở kinh tế - xã hội 2.2. Cơ sở chính trị - xã hội 2.3. Cơ sở văn hóa	Thuyết trình nhóm (GHW)

			3.XÂY DỰNG GIA ĐÌNH VIỆT NAM TRONG THỜI KỲ QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI 3.1. Sự biến đổi gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội 3.2. Phương hướng cơ bản xây dựng và phát triển gia đình Việt Nam trong thời kỳ quá độ lên chủ nghĩa xã hội **Học ở lớp:** Thảo luận và phát biểu trên lớp **Học ngoài lớp:** Hoàn thiện bài thuyết trình	Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	15%	Thuyết trình và bản báo cáo nhóm	LO.3 LO.4 LO.5 LO.6 LO.7
2	Quiz	Bài thi	Thi theo đề thi của GV	20%	Tự luận đề mở	LO.1 LO.2 LO.3
3	DIC	Thảo luận, chuyên cần tại lớp (Discussi on in Class)	Điểm thảo luận được tính theo phương pháp tương đối. SV có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính	15%	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	LO.3 LO.4 LO.5 LO.6 LO.7
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Tự luận đề đóng	LO.3 LO.4 LO.5 LO.6 LO.7
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	Nhận biết quá trình ra đời của Chủ nghĩa xã hội khoa học và các giai đoạn phát triển cơ bản	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.2 LO.4	Nắm rõ nội dung: quan điểm cơ bản của chủ nghĩa Mác - Lênin về giai cấp công nhân, nội dung, biểu hiện và ý nghĩa của sứ mệnh đó trong bối cảnh hiện nay	Chương 2	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - lênin về chủ nghĩa xã hội, thời kỳ quá độ lên chủ nghĩa xã hội và sự vận dụng sáng tạo của Đảng Cộng sản Việt Nam vào điều kiện cụ thể của Việt Nam	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi giữa kỳ (Quiz)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của GV
LO.3 LO.4	Nhận biết và nắm được bản chất của nền dân chủ xã hội chủ nghĩa và nhà nước xã hội chủ nghĩa nói chung và ở Việt Nam nói riêng	Chương 4	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của
LO.3 LO.4	Nhận biết và nắm được những kiến thức nền tảng về cơ cấu xã hội - giai cấp và liên minh giai cấp, tầng lớp trong thời kỳ quá độ độ lên chủ nghĩa xã hội	Chương 5	Thảo luận tại lớp (Discussion in Class), Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng dề thi của Khoa

LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - Lênin về dân tộc, tôn giáo, mối quan hệ giữa dân tộc và tôn giáo, tầm quan trọng của vấn đề dân tộc, tôn giáo và nội dung chính sách dân tộc, tôn giáo của Đảng và Nhà nước Việt	Chương 6	Thảo luận tại lớp (Discussion in Class), Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của Khoa
LO.3 LO.4	Nhận biết và nắm được những quan điểm cơ bản của chủ nghĩa Mác - Lênin, tư tưởng Hồ Chí Minh và Đảng Cộng sản Việt Nam về gia đình, xây dựng gia đình trong thời kỳ quá độ lên chủ nghĩa xã hội hiện nay.	Chương 7	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Tiêu chí đánh giá thuyết trình nhóm, thảo luận tại lớp Ngân hàng đề thi của Khoa

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn

- Quy định về Bài thuyết trình nhóm GHW

+ Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2 hoặc trực tiếp nộp cho GV buổi 1.

+ Giảng dạy kết thúc chương 3, các nhóm thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình

+ Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần và nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ họ

Course Name: Principles of Programming Languages

Course Code: IT092

1. General information

Course designation	This course provides students the important principles of programming languages.
Semester(s) in which the course is taught	6
Person responsible for the course	Dr. Ha Viet Uyen Synh
Language	English
Relation to curriculum	Compulsory (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	
Course objectives	This course helps students: Learn important principles of programming languages; Learn basic components of programming languages; Learn programming language paradigms; Improve programming and software engineering skills
Course learning outcomes	CLO 1. Understand a wide range of programming paradigms CLO 2. Understand how different programming languages evolved CLO 3. Understand the differences in problem domains and language suitability CLO 4. Understand the basic features of programming language translation CLO 5. Understand implementation techniques for selected language constructs

Competency level	Course learning outcome (CLO)
Knowledge	1,2,3,4,5
Skill	2

	Attitude
Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (~~3~~ hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Preliminaries	3	I,T
Evolution of the Major Programmin Languages	6	I,T
Functional Programming Languages	6	I,T
Software processes Describing Syntax and Semantics	3	I,T
Lexical and Syntax Analytics	3	I,T
Names, Bindings, Type Checking, and Scopes	3	I,T
Data Types	3	I,T
Expressions and Assignment Statement	3	I,T
Logic Programming Languages	6	I,T
Statement-Level Control Structures	3	I,T
Subprograms	3	I,T
Implement Subprograms	3	I,T

Examination forms	Multiple-choice questions, short-answer questions
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	1. Robert W. Sebesta, Concepts of programming languages 10th, 2012 2. Terrence W.Pratt and Marvin V. Zelkowitz, Programming Languages - Design and Implementation 4th, 2011

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-5) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x					
2		x				
3	x					
4	x					
5	x					

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Preliminaries	1	Quiz,	lecture, exercises	
2	Evolution of the Major Programming Languages	2,3	Quiz,	lecture, exercises	
3	Functional Programming Languages	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
4	Software processes Describing Syntax and Semantics	3,4,5	Quiz, Exam	lecture, exercises	
5	Lexical and Syntax Analytics	4,5	Quiz, Exam	lecture, exercises	
6	**Midterm**				
7	Names, Bindings, Type Checking, and Scopes	4,5	Quiz, Exam	lecture, exercises	
8	Data Types	4,5	Quiz, Exam	lecture, exercises	
9	Expressions and Assignment Statement	4,5	Quiz, Exam	lecture, exercises	
10	Logic Programming Languages	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
11	Statement-Level Control Structures	4,5	Quiz, Exam	lecture, exercises	
12	Subprograms	4,5	Quiz, Exam	lecture, exercises	
13	Implement Subprograms	4,5	Quiz, Exam	lecture, exercises	
14	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
Midterm examination (30%)	50%	50%	50%		
Final examination (40%)				50%	50%

Exercises/ Quiz (10%)	20%	20%	20%	20%	20%
Lab. Assignments (20%)	30%	30%	30%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	3	2	1
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions).

	relevance of contexts when presenting a position.		be more aware of others' assumptions than one's own (or vice versa).	Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Data Mining

Course Code: IT160IU

1. General information

Course designation	This subject introduces the students to the principles and algorithms of data mining, and the requirements of a data mining process.
Semester(s) in which the course is taught	6,8
Person responsible for the course	Dr. Nguyen Thi Thanh Sang
Language	English
Relation to curriculum	Elective (CS, NE, CE) Compulsory (DS)
Teaching methods	Lecture, lesson, project, laboratory.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	Students will study data mining concepts and algorithms to solve problems of knowledge discovery. They will be equipped with skills of using recent data mining software for solving practical problems and gain experience of doing independent study and research.
Course learning outcomes	

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO 1. Understand basic contents of data warehousing and data mining. CLO 2. Explain modern algorithms in the area of data mining and knowledge discovery.
Skill	CLO 3. Apply data mining techniques to some case studies using existing datasets.

	Attitude	CLO 4. Work in a team to build a data mining process.

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to Data Mining	1	I
Know your data	1	T, U
Data preprocessing	1	T, U
Data mining knowledge representation	1	T, U
Evaluating what's been learned	1	T
Data mining algorithms: Classification	2	T, U
Mining Frequent Patterns, Association and Correlations: Basic Concept and Methods	2	T
Data mining algorithms: Clustering	2	T
Classification: Advanced Methods	1	T, I
Semantic data mining	1	I

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Jiawei Han, Micheline Kamber, *Data Mining: Concepts and Techniques*, 3rd Edition, 2011.

[2] Ian H.Witten, Eibe Frank, Mark A. Hall, and Christopher J. Pal, *Data Mining: Practical Machine Learning Tools and Techniques*, Fourth Edition, Morgan Kaufmann, 2016.

[3] A. Lawrynowicz, *Semantic Data Mining: An Ontology-based Approach (Studies on the Semantic Web)*, IOS Press (April 15, 2017), ISBN-10 1614997454.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x					

2	x					
3						x
4					x	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Data Mining	1		Lecture, Discussion	[1, 2]. Chapter 1
2	Know your data	1	Quiz.s2	Lecture, In-class quiz	[1]. Chapter 2
3	Data preprocessing	1,4		Lecture, Discussion	[1]. Chapter 3
4	Data mining knowledge representation	1	Quiz.s4	Lecture, In-class quiz	[2]. Chapter 3; Reading [1]. Chapter 4 – Data Warehousing
5	Evaluating what's been learned	1	Quiz.s5	Lecture, In-class quiz	[2]. Chapter 5
6-7	Data mining algorithms: Classification	2,3	Quiz.s6-7	Lecture, In-class quiz	[1]. Chapter 8; [2]. Chapter 4.3
8	Data mining to code	3		Lecture, Discussion	
9	**Midterm**				
10-11	Mining Frequent Patterns, Association and Correlations: Basic Concept and Methods	2,3,4	Quiz.s10-11	Lecture, In-class quiz	[1]. Chapter 6; [2]. Chapter 4.5
12-13	Data mining algorithms: Clustering	2,3,4	Quiz.s12-13	Lecture, In-class quiz	[1]. Chapter 10; [2]. Chapter 4.8
14	Classification: Advanced Methods	2	Quiz.s14	Lecture, In-class quiz	[1]. Chapter 9
15	Semantic data mining	2		Lecture, Discussion	[3]
16	Revision			Review-test	
17	**Final exam**				

Laboratory

Week	Lab
5	Introduction to Weka
6	Evaluation
7	Simple classifiers
8	Programming - Pre-processing data
9	More classifiers
10	Putting it all together
11	Programming - Clustering
12	Programming - Sequential pattern discovery

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Labs (10%)			100%	
Programming (20%)			70%	30%
Midterm examination (30%)	50%	50%		
Final examination (40%)		40%	60%	

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact,

	Viewpoints of experts are questioned thoroughly.	Viewpoints of experts are subject to questioning.	analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Digital Image Processing

Course Code: IT130IU

1. General information

Course designation	This course provides students fundamental knowledge of digital image processing
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Ha Viet Uyen Synh
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	
Course objectives	This course helps students discuss digital image processing fundamentals; review of Digital Signal Processing algorithms such as Discrete Fourier Transform; intensity transforms, frequency domain filtering; image restoration and reconstruction; color image processing; multiresolution processing; image compression; morphological image processing.
Course learning outcomes	CLO 1. Understand bases of digital image formation. CLO 2. Understand the color image foundations. CLO 3. Apply special-domain image filtering. **Competency level** / **Course learning outcome (CLO)** Knowledge: 1,2 Skill: 3 Attitude:
Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

	Topic	Weight	Level
	Chapter 1: Introduction	3	I, T
	Chapter 2: Digital Image Fundamentals	6	I, T
	Chapter 3: Intensity Transformations and Spatial Filtering (part 1)	3	T, U
	Chapter 3: Intensity Transformations and Spatial Filtering (part 2)	6	T, U
	Chapter 4: Filtering in the frequency domain	6	T, U
	Chapter 5: Image restoration and reconstruction	3	T, U
	Chapter 6: Color Image processing	3	T, U
	Chapter 7: Wavelets and multiresolution processing (part 1)	3	T, U
	Chapter 7: Wavelets and multiresolution processing (part 2)	3	T, U
	Chapter 8: Image compression	3	T, U
	Chapter 9: Morphological image processing	3	T, U
	Chapter 10: Image segmentation	3	T, U
	Chapter 11: Representation and description	3	T, U
	Chapter 12: Object recognition	3	T, U
	Revision Application Design and Development	3	
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	**1.** Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing 3rd, 2008		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x	x				
2	x	x				
3						x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Chapter 1: Introduction	1,2	Quiz, Lab, Exam	lecture, exercises	
2	Chapter 2: Digital Image Fundamentals	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
3	Chapter 3: Intensity Transformations and Spatial Filtering (part 1)	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
4	Chapter 3: Intensity Transformations and Spatial Filtering (part 2)	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
5	Chapter 4: Filtering in the frequency domain	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
6	Chapter 5: Image restoration and reconstruction	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
7	Chapter 6: Color Image processing	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
8	**Midterm**				
9	Chapter 7: Wavelets and multiresolution processing (part 1)	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
10	Chapter 7: Wavelets and multiresolution processing (part 2)	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
11	Chapter 8: Image compression	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
12	Chapter 9: Morphological image processing	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
13	Chapter 10: Image segmentation	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
14	Chapter 11: Representation and description	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
15	Chapter 12: Object recognition	2,3	Quiz, Lab, Exam	lecture, exercises, lab	

16	Revision Application Design and Development	1,2,3			
17	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Labs (20%)	20%	20%	20%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	40%	40%	40%
Exercises/ Quiz (10%)	10%	10%	10%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response

4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation / evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	Milestone		Benchmark
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Software Architecture

Course Code: IT114IU

1. **General information**

Course designation	This course provides student methodogies and techniques in Software Architecture.
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Ha Viet Uyen Synh
Language	English
Relation to curriculum	Elective (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	
Course objectives	Provides the student with a thorough understanding of varying methodologies and techniques in analysis, design and implementation of information system by using UML.
Course learning outcomes	CLO 1. Understand the steps of the System Development Life Cycle and the techniques for each step CLO 2. Using a CASE tool in analysis and design of a system. CLO 3. Apply to a real system

Competency level	**Course learning outcome (CLO)**
Knowledge	1,2
Skill	3
Attitude	

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to systems analysis and design,	3	I

	Requirements.	3	T,U
	Use Case Modeling	6	T,U
	Dynamic Modeling	6	T,U
	State-Dependent Dynamic Interaction Modeling	6	T,U
	Data Modeling	6	T,U
	Normal Forms	6	T,U
	Structural Modeing	6	T,U
	Architectural Design.	3	I,T
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	1. Kenneth E. Kendall, Julie E. Kendall, Systems Analysis and Design 7th, 2006 2. Gary B. Shelly, Thomas J. Cashman, Harry J. Rosenblatt, Systems Analysis and Design 4th, 2001		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1			x			
2			x			
3		x				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to systems analysis and design,	1,2	Quiz	lecture, exercises	
2	Requirements.	1,2,3	Quiz, Lab	lecture, exercises, lab	
3	Use Case Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
4	**Midterm**				
5	Dynamic Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	

6	State-Dependent Dynamic Interaction Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
7	Data Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
8	Normal Forms	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
9	Structural Modeing	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
10	Architectural Design.	1,2	Quiz	lecture, exercises	
11	**Final exam**				

4. Assessment plan

Assessment Type

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	40%	40%	40%
Exercises/ Quiz (10%)	10%	10%	10%
Lab. Assignments (20%)	20%	20%	20%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			

Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence s and implications) are oversimplifie d.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Net-centric Programming

Course Code: IT096IU

1. General information

Course designation	Advanced programming course with focus on developing network application
Semester(s) in which the course is taught	6
Person responsible for the course	MSc. Le Thanh Son
Language	English
Relation to curriculum	Compulsory (NE) Elective (CS)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	Advanced programming with a focus on developing software for networked systems using UNIX as a reference platform. Topics: Programming Tools, Software Design, Programming Techniques, Environment of a UNIX Process, Memory Allocation, Garbage Collection, Process Control, Process Relationships, Signals, Reliable Signals, Threads, I/O Multiplexing, Datagram and Stream Sockets, Multicasting, Device Driver and Kernel Programming, Secure Programming
Course learning outcomes	CLO 1. Understand the structure of network applications CLO 2. Able to develop network applications using TCP and UDP sockets CLO 3. Understand and implement network applications using popular Internet protocols CLO 4. Team working

Competency level	Course learning outcome (CLO)
Knowledge	1, 2, 3

	Skill	2, 3
	Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Network revisions	3	I
Introduction to Client/Server networking and Socket Programming	3	I, T
TCP Socket Programming	3	T, U
UDP Socket Programming	3	T, U
Socket name and DNS	3	T, U
Network Data and Network Errors		
Caches and Message Queues	3	T, U
HTTP Clients	3	T, U
HTTP Server	3	T, U
Web Socket, Web Frame Work	3	T, U
Web Scraping	3	T, U
Building and Parsing Email	3	T, U
FTP	3	T, U
Telnet and SSH	3	T, U
Remote Procedure Call (RPC)	3	T, U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. Michael J.Donahoo, Kenneth L.Calvert, TCP/IP Socket in C: A Practical Guide for Programmers 2nd, 2009
2. W. R. Stevens, B. Fenner, A. M. Rudoff, Unix Network Programming, Vol. 1: The Sockets Networking API 3rd, 2003
3. Brandon Rhodes, Foundations of Python Network Programming 3rd, 2014

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLO	1	2	3	4	5	6
1	x					
2		xx				
3		xxx				
4						x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Network revisions	1	Quiz	Lecture	2
2	Introduction to Client/Server networking and Socket Programming	2	Quiz, Lab, Midterm	Lecture	1
3	TCP Socket Programming	2	Quiz, Lab, Midterm	Lecture, Discussion	1, 2
4	UDP Socket Programming	2	Quiz, Lab, Midterm	Lecture, Discussion	1, 2
5	Socket name and DNS	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
6	Network Data and Network Errors	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
7	Caches and Message Queues	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
8	HTTP Clients	3, 4	Quiz, Lab, Final	Lecture, Discussion	2, 3
Midterm exam					
9	HTTP Server	3, 4	Quiz, Lab, Final	Lecture, Discussion	2, 3
10	Web Socket, Web Frame Work	3, 4	Quiz, Final	Lecture, Discussion	2, 3
11	Web Scraping	3, 4	Quiz, Final	Lecture, Discussion	2, 3
12	Building and Parsing Email	3	Quiz, Final	Lecture, Discussion	2, 3
13	FTP	3	Quiz, Final	Lecture, Discussion	2, 3
14	Telnet and SSH	3	Quiz, Final	Lecture, Discussion	2, 3
15	Remote Procedure Call (RPC)	3	Quiz, Final	Lecture, Discussion	2, 3
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Quiz / Assigment (10%)		10%	10%	100%
Labs (20%)	30%	30%	40%	
Midterm examination (30%)	70%	40%		
Final examination (40%)		20%	50%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**

5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			taken as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Internship

Course Code: IT082IU

1. General information

Course designation	This course helps students to do an internship in industry and prepare a topic for a pre-thesis and thesis
Semester(s) in which the course is taught	7
Person responsible for the course	Lecturer of School of Computer Science and Engineering; Advisor of the Company/Organization (in Industry)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 90 hours Private study including examination preparation, specified in hours: 90
Credit points	Number of credits : 3 Lecture: 0 Laboratory: 3
Required and recommended prerequisites for joining the course	Follows requirements of the academic program
Course objectives	This course requires students to work in IT-related organizations or businesses from June to September. Each student has supervised by a faculty member at the School and an instructor at the organization. The student will join/run a technical project, and/or participate in soft skills courses. The internship lasts minimum 8 weeks and 3 sessions per week. Students have to report progress to instructors after 3 weeks of receiving the project. Depending on the project requirements of the organization or business, students may arrange for longer time. At the end of the internship, students will submit internship reports and assessment reports from the instructor at the organization or business to the School. Instructors read the reports and confirm the internship marks for the students. Students can also register this course in main semesters or take part in internships abroad for a period of 6 months. The registration and evaluation process are similar.
Course learning outcomes	CLO 1. Recognize the roles of an engineer in practical environment.

<table>
<tr><td></td><td>CLO 2. Develop practical products or run product development projects in industry
CLO 3. Follow requirements/regulations and laws
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1, CLO2</td></tr>
<tr><td>Skill</td><td>CLO1, CLO2</td></tr>
<tr><td>Attitude</td><td>CLO3</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: within 3 months
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction of the internship place</td><td>9</td><td>U</td></tr>
<tr><td>Review the existing issues of an assigned project</td><td>9</td><td>U</td></tr>
<tr><td>Study and solve some issues in product development</td><td>9</td><td>U</td></tr>
<tr><td>Implement some new functions or features for the project product</td><td>9</td><td>U</td></tr>
<tr><td>Presentation</td><td>9</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td></td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1		X				X
2		X				X
3				X	X	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources

1	Introduction of the internship place	1,2	Check and Evaluate	Research and working	At company or organization
3	Review the existing issues of an assigned project	1,2	Check and Evaluate	Research and working	At company or organization
4	Study and solve some issues in product development	1,2	Check and Evaluate	Research and working	At company or organization
5	Implement some new functions or features for the project product	1,2	Check and Evaluate	Research and working	At company or organization
6	Presentation	1,2,3	Check and Evaluate	Research and working	At company or organization
7	**Final grade**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Final grade (100%)	30%	40%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		

TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent	Information is taken from source(s) with some interpretation / evaluation, but not enough to	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are

	analysis or synthesis. Viewpoints of experts are questioned thoroughly.	analysis or synthesis. Viewpoints of experts are subject to questioning.	develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective,	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence s and implications) are oversimplifie d.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Software Engineering

Course Code: IT076IU

1. General information

Course designation	This course focuses on the design of software by implementing significant projects in teams
Semester(s) in which the course is taught	5, 7
Person responsible for the course	Assoc. Prof. Dr. Nguyen Thi Thuy Loan
Language	English
Relation to curriculum	Compulsory (CS, CE) Elective (NE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	IT069IU (Object-Oriented Programming)
Course objectives	This course provides students the fundamentals of software engineering concepts, methodologies, and processes. It covers the subjects on software process models, agile development methodologies, requirements engineering and analysis models, software design and implementation methods, test strategies, and software evolution. Students apply contemporary agile requirements analysis, planning, architecture, design, implementation and testing practices to software engineering project work in small teams.
Course learning outcomes	CLO 1. Describe the implement of software development process. CLO 2. Apply the principles and methods of software engineering in practice. CLO3. Practice teamwork skills in a software engineering project.

Competency level	Course learning outcome (CLO)

	Knowledge	CLO1
	Skill	CLO2, CLO3
	Attitude	CLO3

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Software development in practice	3	I
Beginning a project	3	T, U
Requirements	7.5	T, U
The user experience	4.5	T, U
System design	6	T, U
Program development	7.5	T, U
Reliability and testing	6	T, U
The business of software development	4.5	T, U
Review	3	I, U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. Ian Sommerville, Software Engineering 10th, 2019.
2. Hyrum Wright, Titus Winters, and Tom Manshreck. Software Engineering at Google, 2020
3. Hans van Vliet, Software Engineering: Principles and Practice 3rd, 2008

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1						XXX
2			XX			XXX
3			XX		XXX	

3. **Planned learning activities and teaching methods**

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Software development in practice	1	Quiz	Lecture	[1]
2	Beginning a project	1,3	Quiz, Midterm, Project	Lecture, Discussion, In-class, exercise	[1,3]
3	Requirements	2,3	Quiz, Midterm, Project	Lecture, Discussion, In-class, exercise	[1,2]
4	The user experience	2,3	Quiz, Midterm, Project	Lecture, Discussion, In-class, exercise	[1,2]
5	System design	2,3	Quiz, Midterm, Project	Lecture, Discussion, In-class, exercise	[1,2,3]
6	**Midterm**				
7	Program development	2,3	Quiz, Final, Project	Lecture, Discussion, In-class, exercise	[1,2,3]
8	Reliability and testing	2,3	Quiz, Final, Project	Lecture, Discussion, In-class, exercise	[1,2,3]
9	The business of software development	2,3	Quiz, Project	Lecture, Discussion, In-class, exercise	[1,2,3]
10	Review	1,3	Quiz	Discussion, In-class, exercise	[1,2]
11	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Midterm examination (25%)	30%	20%	
Projects/Presentations/ Report (25%)	30%	30%	60%
Final examination (40%)	30%	40%	
Exercises/ Quiz (10%)	10%	10%	40%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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2. **Rubrics (optional)**

5.1. Grading checklist

Grading checklist for Written Reports

Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
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			assumptions than one's own (or vice versa).	presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**	**Benchmark**

	4	3	2	1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Web Application Development

Course Code: IT093IU

1. General information

Course designation	This subject introduces to students the development of web application. How to design and program a web-app in practice based on the tools, techniques and web frameworks
Semester(s) in which the course is taught	6
Person responsible for the course	Assoc. Prof. Nguyen Van Sinh
Language	English
Relation to curriculum	Compulsory (NE, CE, CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming Principles of Database Management
Course objectives	This course provides students the fundamentals of web design and web programming. It provide the concepts and models of HTML, Java Server Page, Java Bean, MVC model, Java utilities and development environments, extended Java frameworks, several new frameworks with different programming languages. To develop skills in understanding and evaluating web-based systems, as well as to develop skills in designing and developing web-based applications.
Course learning outcomes	CLO 1. Understand web design, web programming concepts and models. CLO 2. Apply to design and develop static/dynamic web application with HTML, Java Server Pages, Java Bean, extended Java and other frameworks based on the MVC model. CLO 3. Apply knowledge and ability to manage and use Java, XML utilities and IDE for developing web applications with DBMS. CLO 4: work in group, communication, interaction and responsible within a team.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO4

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (3 teaching hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Week 1: Introduction to the course and HTML	3	I,T

	Week 2: Advanced HTML and CSS	3	I,T,U
	Week 3: Introduction to J2EE and new frameworks in web application	3	I,T
	Week 4 : Servlet	3	I,T,U
	Week 5: Java server page and JDBC	3	I,T,U
	Week 6: Java Bean and MVC	3	I,T,U
	Week 7: Web state, session, cookies & midterm review	3	I,T,U
	Week 8: Java Script, APIs and Libraries	3	I,T,U
	Week 9&10: Node JS Framework	3	I,T,U
	Week 11: Graphical models on the webpage, web multimedia and web 360	3	I,T,U
	Week 12&13: XML & XSLT	3	I,T,U
	Week 14: Ajax framework	3	I,T,U
	Week 15: the existing web frameworks & final review	3	I,T,U
Examination forms	Multiple-choice questions, short-answer questions and programming		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	1. Dave Wolf and A.J. Henley. "Java EE Web Application Primer Building Bullhorn: A Messaging App with JSP, Servlets, JavaScript, Bootstrap and Oracle", 2017. 2. Prem Kumar Karunakaran. "Java Web Application Development", second edition, 2020. 3. Laura Ubelhor and Christian Hur. "Developing Business Application for the Web With HTML, CSS, JSP, PHP, ASP.NET and JavaScript", 2017. 4. *Refer VN book: N.V.Sinh, N.T.T.Sang, T.M.Hà* "Xây dựng ứng dụng Web cho Thương mại điện tử trên Netbeans", Nhà xuất bản Xây dựng 2017		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2		X				
3		X				X
4					X	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to the course and HTML	1	Quiz	Lecture,	[1,2]
2	Advanced HTML and CSS	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion,	[1,2,3]

				In-class exercises	
3	Introduction to J2EE and new frameworks in web application	1	Quiz, Midterm	Lecture, Discussion	[1,2]
4	Servlet	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
5	Java server page and JDBC	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
6	Java Bean and MVC	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
7	Web state, session, cookies & midterm review	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
8	Java Script, APIs and Libraries & midterm review	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
9	Node JS Framework	2,3	Quiz, Lab	Lecture, Discussion, In-class exercises	[1,2,3,4]
10	Node JS Framework (continue)	2,3	Quiz, Lab	Lecture, Discussion, In-class exercises	[1,2,3,4]
11	Graphical models on the webpage, web multimedia and web 360	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
12	XML & XSLT	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
13	XML & XSLT (continue)	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
14	Ajax framework	2,3	Quiz, Lab	Lecture, Discussion, In-class exercises	[1,2,3,4]
15	Existing web frameworks & final review	2,3	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1,2,3,4]
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Labs (20%)		30%	40%	30%
Midterm examination (30%)	40$	60%		
Exercises/Quiz (10%)	30%	40%	30%	
Final examination (40%)		50%	50%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

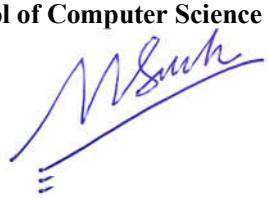
	repeated, memorable, and strongly supported.)			

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Artificial Intelligence

Course Code: IT159IU

1. General information

Course designation	This subject introduces the students to the principles and fundamental algorithms of Artificial Intelligence, the use cases and the related processes in Artificial Intelligence.
Semester(s) in which the course is taught	6,8
Person responsible for the course	Dr. Nguyen Trung Ky
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, laboratory.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 hours (lectures) + 30 hours (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming Algorithms and Data Structures Discrete Mathematics Probability, Statistic & Random Process
Course objectives	This course introduces students to the basic knowledge on Artificial Intelligence. Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously. In this course, student will learn the foundational principles and practice implementing some of these applications including representation, problem solving, and learning methods of artificial intelligence. Accordingly, students should be able to develop intelligent systems by assembling solutions to concrete computational problems; understand the role of knowledge representation, problem solving, and learning in intelligent-system engineering; and appreciate the role of problem solving, vision, and language in understanding human intelligence from a computational perspective.
Course learning outcomes	

Competency level	**Course learning outcome (CLO)**

	Knowledge	CLO 1. Apply knowledge of AI techniques and synthesize solutions to the discipline and ability to develop a range of typical applications using artificial intelligence methods CLO 2. Represent knowledge corresponding to practical problems, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs by properly using classical search algorithms, including breadth-first, depth-first, A*, and heuristic search
	Skill	CLO 3. Produce intelligent applications of machine learning with statistical learning methods (Naive Bayes), supervised and unsupervised learning models: decision tree, neural networks, single-layer (perceptron) and multilayer networks CLO 4. Communicate effectively with a range of audiences, ability to use current techniques, skills, and tools necessary for computing practice, ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices and ability to apply design and development principles in the construction of software systems of varying complexity
	Attitude	

Content

The description of the contents should clearly indicate the weighting of the content and the level.

Weight: lecture session (~~3~~ hours)

Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction and Intelligent Agents	1	I
States and Searching: Uninformed Search	1	T, U
States and Searching: Informed and More Sophisticated Search	1	T, U
Features and Constraints: Constraint Satisfaction Problems	1	T, U
Features and Constraints: Constraint Satisfaction Problems (continue)	1	T, U
Reasoning Under Uncertainty: • Random Variables and Events	1	T, U

	• Joint and Marginal Distributions • Conditional Distribution • Product Rule, Chain Rule, Bayes' Rule • Inference		
	Reasoning Under Uncertainty: Naïve Bayes Classifier (continue)	1	T, U
	Supervised Learning: Neural Networks	1	T, U
	Supervised Learning: Neural Networks (continue)	1	T, U
	Supervised Learning: Support Vector Machine	1	T, U
	Supervised Learning: Support Vector Machine in Mathematics	1	T, U
	Beyond Supervised Learning: Kernels and Clustering	1	T, U
	Beyond Supervised Learning: Kernels and Clustering (continue)	1	T, U
	Gaussian Mixture Model and Expectation-Maximization Algorithm	1	T, U
	Revision	1	
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	[1] Stuart Russell and Peter Norvig, *"Artificial Intelligence: A Modern Approach"*, Fourth Edition, 2020. [2] David L. Poole and Alan K. Mackworth, *"Artificial Intelligence Foundations of Computational Agents"*, Second Edition, 2017.		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x	x				
2		x				x
3		x				x

4	x	x				x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction and Intelligent Agents	1, 2	Quiz	Lecture, Discussion	[1]. Chapter 1, 2 [2]. Chapter 1
2	States and Searching: Graph Searching Techniques	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 3
3	States and Searching: Heuristic Search and More Sophisticated Search	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 3
4	Features and Constraints: Constraint Satisfaction Problems	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 6
5	Features and Constraints: Constraint Satisfaction Problems (continue)	1, 2	Quiz	Lecture, In-class quiz	[1]. Chapter 6
6	Reasoning Under Uncertainty	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 12
7	Reasoning Under Uncertainty (continue)	3, 4	Quiz	Lecture, In-class quiz	1]. Chapter 12
8	**Midterm**				
9	Supervised Learning: Neural Networks	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 19 [2]. Chapter 20
10	Supervised Learning: Neural Networks (continue)	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 19 [2]. Chapter 20
11	Supervised Learning: Support Vector Machine	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 19 [2]. Chapter 15
12	Supervised Learning: Support Vector Machine in Mathematics (continue)	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 19 [2]. Chapter 15
13	Beyond Supervised Learning: Kernels and Clustering	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 21

					[2]. Chapter 16, 22
14	Beyond Supervised Learning: Kernels and Clustering (continue)	3, 4	Quiz	Lecture, In-class quiz	[1]. Chapter 21 [2]. Chapter 16, 22
15	Gaussian Mixture Model and Expectation-Maximization Algorithm	3, 4	Quiz	Lecture, Discussion	[1]. Chapter 20 [2]. Chapter 24
16	Revision			Review-test	
17	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Labs (20%)		50%	50%
Midterm examination (30%)	50%	50%	
Final examination (40%)		100%	
Exercises/ Quiz (10%)	50%	50%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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1. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		

Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or	Issue/ problem to be considered critically is stated without clarification or description.

			backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others'	Specific position (perspective, thesis/ hypothesis) acknowledges different	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	points of view are acknowledged within position (perspective, thesis/ hypothesis).	sides of an issue.	
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequence s and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence s and implications) are oversimplifie d.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

	is skillful and makes the content of the presentation cohesive.	within the presentation.	within the presentation.	
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or

	appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: General Law

Course Code: PE021IU

1. General information

Department	Office of Academic Affairs
Course classification	Foundation course
Course designation	Face to face
Semester(s) in which the course is taught	All semesters in each academic year
Person responsible for the course	Dr. Vo Tuong Huan LLM. Bui Doan Danh Thao
Language	English
Relation to curriculum	Compulsory
Teaching methods	Student-centred approach
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 127.5 hours) Contact hours (lecture, in class discussions): 37.5 hours (=45 periods) Private study including examination preparation, specified in hours[7]: 90 hours
Credit points	3
Required and recommended prerequisites for joining the course	N/A

[7] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Course objectives	The overarching aims of this course are to: • Provide essential knowledge of Vietnamese legal system through integrated technology and real cases for social and cultural sustainability. • Raise awareness of responsibility toward others and how to stand for ending all types of legal violations, **especially corruption in various social contexts**. • Practice necessary skills to act as an ambassador to ensure social fairness and global equitable rights. • Use integrated online legal resources and communication tools to help the community to identify issues and develop countermeasures.

<table>
<tr><td>Course learning outcomes</td><td>Upon the successful completion of this course, students will be able to:
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>CLO1. Apply appropriate legal knowledge in the Vietnamese legal system to solve legal issues in various social contexts for a fair sustainable lifelong being.
CLO1.1. Apply general knowledge on state and law to solve legal issues in various social contexts for a fair sustainable lifelong being.
CLO1.2. Apply principle legal norms in some law branches such as constitution, civil, criminal, labor and administrative law to solve legal issues in various social contexts for a fair sustainable lifelong being.</td></tr>
<tr><td>Skill</td><td>CLO2. Communicate knowledge in the Vietnamese legal system to encourage people to raise their legal rights aiming for fair social/cultural moves.
CLO3. Integrate ICTs to solve legal issues in various social contexts.</td></tr>
<tr><td>Attitude</td><td>CLO4. Detect the responsibility to ensure social and cultural fairness, including ending corruption, in various social contexts through understanding importance of law in social contexts.
CLO5. Respond to the base for coexistence in various social contexts.</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The course will introduce students to Vietnamese legal systems. In particular, students will understand their rights and obligations in the Constitution, Criminal law, administrative law, civil law, labor law and enterprise law of Vietnam. From this, students will raise awareness towards their responsibility to ensure justice, including ending corruption, in society.</td></tr>
<tr><td>Examination forms</td><td>Multiple choice questions
Case-based exams
Essay exams
Oral exams</td></tr>
</table>

Study and examination requirements

To pass this course, the students must:

- Achieve a composite mark of at least 50; and
- Make a satisfactory attempt at all assessment tasks (see below).

GRADING POLICY

Grades can be based on the following:

Assignment	20%
Midterm examination	30%
Final examination	50%
Total	100%

COURSE POLICIES

Attendance

Regular and punctual attendance at lectures and seminars is expected in this course. University regulations indicate that if students attend less than eighty percent of scheduled classes they may be refused final assessment. Exemptions may only be made on eligible medical grounds.

Workload

It is expected that the students will spend at least *six* hours per week studying this course. This time should be made up of reading, research, working on exercises and problems, and attending classes. In periods where they need to complete assignments or prepare for examinations, the workload may be greater.

Over-commitment has been a cause of failure for many students. They should take the required workload into account when planning how to balance study with part-time jobs and other activities.

General Conduct and Behaviour

The students are expected to conduct themselves with consideration and respect for the needs of fellow students and teaching staff. Conduct which unduly disrupts or interferes with a class, such as ringing or talking on mobile phones, is not acceptable and students will be asked to leave the class. The use of laptops is also encouraged during law lessons only to search for materials online. More information on student conduct is available on the university webpage.

Keeping informed

The students should take note of all announcements made in lectures or on the course's Blackboard, and another announced mean of communications. From time to time, the university will

	send important announcements to their university e-mail addresses without providing a paper copy. The students will be deemed to have received this information. **Academic honesty and plagiarism** Plagiarism is the presentation of the thoughts or work of another as one's own. Students are also reminded that careful time management is an important part of the study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items. The university regards plagiarism as a form of academic misconduct and has very strict rules regarding plagiarism. **Special consideration** Requests for special consideration (for final examination only) must be made to the Office of Academic Affairs within one week after the examination. General policy and information on special consideration can be found at the Office of Academic Affairs. Absence on the Mid-term is not allowed, or in special cases approved by Lecturer can be replaced with relevant Assignment. **Meeting up with the lecturers after classes** Students must make an appointment via emails if they want to meet up with the lecturer after classes and be on time. If there are any changes to the scheduled time, students must inform the lecturer immediately.
Reading list	Please note that it is very important to gain familiarity with the subject matter in the readings and cases available on Blackboard and the internet *before* attendance in classes. **Required Course Texts and Materials** Legal Texts: 1. Constitution of Vietnam - 2013 2. Civil Code of Vietnam - 2015 3. Criminal Code of Vietnam – 2015 (amended in 2017) 4. Law on Law on Handling of Administrative Violations 2012 5. Law on Enterprises – 2020 6. Labour Code 2019 7. Law on anti-corruption 2018 Available at https://luatvietnam.vn/ or Blackboard Books: • PGS.TS. Phan Trung Hien, *Giáo trình Pháp Luật Đại cương*, NXB Chính Trị Quốc Gia Sự Thật 2022. • Mai Hong Quy (Chief Editor) (2nd 2017), *Introduction to Vietnamese Law,* Hong Duc Publishing House.

	Additional materials provided in Blackboard The lecturer will attempt to make lecture notes and additional reading available on Blackboard. However, this is not an automatic entitlement for students doing this subject. Note that this is not a distance learning course, and you are expected to attend lectures and take notes. This way, you will get the added benefit of class interaction and demonstration. **Optional Course Texts and Materials** Recommended Internet sites UNCTAD (United Nations Conference on Trade and Development) WTO (World Trade Organization) MOIT - Vietnam (Official website of Ministry of Industry and Trade) MPI - Vietnam (Official website of Ministry of Planning and Investment) Other Resources, Support and Information Additional learning assistance is available for students in this course and will be made available on Blackboard. Academic journal articles are available through connections via the VNU - Central Library. Recommended articles will be duly informed to the students. Books: • Nguyen Phu Trong, *Kiên quyết, kiên trì đấu tranh phòng, chống tham nhũng, tiêu cực, góp phần xây dựng đảng và nhà nước ta ngày càng trong sạch, vững mạnh*, NXB Chính Trị Quốc Gia Sự Thật 2023. • University of Law Ho Chi Minh City, *Giáo trình luật Hiến pháp Việt nam*, NXB Hồng Đức 2023. • University of Law Ho Chi Minh City, *Giáo trình Luật hành chính*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật hình sự Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật dân sự Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình Luật lao động Việt Nam*, NXB Hồng Đức 2022. • University of Law Ho Chi Minh City, *Giáo trình pháp luật về chủ thể kinh doanh*, NXB Hồng Đức 2022.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (SLO) (1-5) and Program/Student Learning Outcomes (PLO/SLO) (1 - 10) is shown in the following table:

	PLO/SLO									
SLO	**1**	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	R,M					R,M	R,M	R,M	R,M	R,M
2			R,M							
3			R,M							
4				R,M						
5					R,M					

R: Reinforced
M: Mastery

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	**Introduction to State** • What is State? • Nature of state • Forms of state • Functions of state • Introduction to structure of Vietnamese state	1-5 (level I - introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT - Introduction to Vietnamese legal system available on Blackboard
2	**Introduction to law?** • What is law? • Nature of law • Forms of law • Structure of law • Categorization of legal system. • Enforcement • Breach of law and liabilities for breach of law • Introduction to structure of Vietnamese legal system	1-5 (level I - introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT - Introduction to Vietnamese legal system available on Blackboard
3	**Constitutional Law** • General introduction on Vietnamese Constitution and its	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPTs – Constitutional law available on Blackboard

	nature and basic principles. • Political, economic and other regimes of Vietnam • Basic rights and responsibilities of citizens. Relationship between citizens and the State. • Structure, functions and duties of Vietnamese state, especially in prevention of corruption				Constitution 2013 available on Blackboard
4	**Constitutional Law (Cont)** • Structure and functions and duties of Vietnamese state • Duties of the state in prevention of corruption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPTs – Constitutional law available on Blackboard Constitution 2013 available on Blackboard
5	**Administrative Law** • Definition and nature of administrative law • Administrative law violations • Liabilities for breach of administrative law, exemption from the liability	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies and law on anti-corruption	PPT– Administrative law available on Blackboard Law on handling administrative violations 2012, and Law on anti-corruption 2018 available

					on Blackboard
6	**Criminal Law** • Definition and nature of criminal law • Crimes • Punishments	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies, especially cases related to corruption	PPT– Criminal law available on Blackboard Criminal code 2015 available on Blackboard
7	**Criminal Law (Cont)** • Crimes related to corruption • Punishments for corruption	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies, especially cases related to corruption	PPT– Criminal law available on Blackboard Criminal code 2015 available on Blackboard
8	**Revision for mid-term exam**		Quizzes Projects		
9	**Civil Law (Part I)** • Definition and nature Civil law relationship • Subject of civil law • Property and ownership • Civil transactions	1-5 (Level R - reinforced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015 available on Blackboard
10	**Civil Law (Part II)** • Contracts - Definitions - Formation of contracts - Validity of contracts - Liability for breach of contracts	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015

					available on Blackboard
11	**Civil Law (Part III)** • Inheritance - Testamentary inheritance - Intestacy	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Civil law available on Blackboard Civil code 2015 available on Blackboard
12	**Law on Enterprises** • Introduction to law on enterprises • Introduction to forms, features, establishment, reorganization and dissolution of an enterprise	1-5 (Level I - Introduced)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Law on enterprises available on Blackboard Law on enterprises 2020 available on Blackboard
13	**Labor Law** • Definition, and nature of labour law • Employees and employers • Working time, and resting time • Salary (including salary for overtime working hours)	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Labor law available on Blackboard Labor code 2019 available on Blackboard
14	**Labour Law** (Cont.) • Employment contracts • Labor disciplines • Dispute settlements	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Labor law available on Blackboard Labor code 2019 available

					on Blackboard
15	**Revision/ Tutoring classes**		Quizzes Projects		

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5
In class evaluation (20%)	70% pass	80% pass	100% pass	100% pass	100% pass
Midterm examination (30%)	70% pass	80% pass	100% pass	100% pass	100% pass
Final examination (50%)	70% pass	80% pass	100% pass	100% pass	100% pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics

No.	CLOs	Criteria	COMPLETELY FAIL Below 30%	INADEQUATE 30% – 49%	ADEQUATE 50% - 69%	ABOVE AVERAGE 70% - 89%	EXEMPLARY ≥ 90%
1	CLO 1	**Organisation and clarification**	No evidence of organization and coherence	Does not organise ideas logically and with clarification Limited evidence of coherence Ideas lack consistence	Generally organised logically, with evidence of progression Occasionally, there may be a lack of focus or ideas may be tangential	Clear organization and progression. Responds appropriately and relevantly, although some ideas are underdeveloped	Response is focused, detailed and non-tangential. Shows a high degree of attention to logic and reasoning of points. Clearly leads the reader

							to the conclusion and stirs thought regarding the topic
2		**Originality and usefulness of the analysis**	Shows no ability to identify legal issues or a clear inability to gather the facts	Demonstrates an incomplete grasp of the task. There is no overall sense of creative coherence. Arguments are addressed incompletely.	Shows ability to identify legal issues, gather the facts and develop claims. Argument are addressed well but no links with evidence	Shows strong ability to identify legal issues, gather the fact and develop claims as well as link claims with evidence. Overall, an acceptable solution is offered and explained	Shows strong ability to identify legal issues, gather the facts and develop claims as well as link claims with evidence. Satisfactory solutions are offered and supported
3		**Use of data/information**	Shows no effort to incorporate information from primary and secondary sources	Shows little information from sources. Poor handling of sources	Shows moderate amount of source information incorporated. Some key points supported by sources.	Draws upon sources to support most points. Some evidence may not support arguments or may	Draws upon primary and secondary source information in useful and illuminating

					Quotations may be poorly integrated into paragraphs. Some possible problems with source citations	appear where inappropriate. Quotations integrated well into paragraphs. Sources cited correctly	ways to support key points. Excellent integration of quoted material into paragraphs. Source cited correctly
4	CLO2	**Use of frameworks**	Shows no effort to structure problems in correspondence to theoretical frameworks	Shows limited ability to structure problems in correspondence to theoretical frameworks	Shows effort to link problems with the theoretical frameworks. There are still some mistakes	Shows ability to structure problems in correspondence to theoretical frameworks correctly. Minor mistakes in resolving problems	Shows ability to structure problems in correspondence to theoretical frameworks correctly. The problems are well resolved
5		**Quality of arguments**	Shows no effort to construct logical arguments.	Shows little attempt to offer support for key claims or to relate	Shows argument of poor quality. Weak, undeveloped reasons	Shows clear, relevant and logical arguments.	Shows identifiable, reasonable and sound

			Fails to support analysis	evidence to analysis. Reasons offered are irrelevant.	are offered to support key claims		argume nts. Clear reasons are offered to support key claims.

Course Name: Lịch sử Đảng Cộng sản Việt Nam
(History of Vietnamese communist party)

Course Code: PE018IU

1 Thông tin chung

Tên môn học (tiếng Việt); Tên môn học (tiếng Anh):	Lịch sử Đảng Cộng sản Việt Nam History of Vietnamese communist party
Mã số môn học:	PE018IU
Thuộc khối kiến thức: Số tín chỉ:	CƠ SỞ 2
Số tiết lý thuyết:	*20 (trên lớp)*
Số tiết thực hành: *Số tiết tự học:*	*10 (trên lớp)* *90 (về nhà)*
Môn học trước:	1. Triết học Mác - Lênin, 2. Kinh tế chính trị Mác - Lênin, 3. Chủ nghĩa xã hội khoa học
Giảng viên phụ trách	Khoa Chính trị - Hành chính, ĐHQG-HCM

2. Mục đích/mục tiêu môn học (Course Purposes/Aims)

2.1 Về nội dung: cung cấp những tri thức có tính hệ thống, cơ bản về sự ra đời của Đảng Cộng sản Việt Nam (1920-1930), sự lãnh đạo của Đảng đối với cách mạng Việt Nam trong thời kỳ đấu tranh giành chính quyền (1930-1945), trong hai cuộc kháng chiến chống thực dân Pháp và đế quốc Mỹ xâm lược (1945-1975), trong sự nghiệp xây dựng, bảo vệ tổ quốc thời kỳ cả nước quá độ lên chủ nghĩa xã hội, tiến hành công cuộc đổi mới (1975-2018).

2.2 Về tư tưởng: Thông qua các sự kiện lịch sử và các kinh nghiệm về sự lãnh đạo của Đảng để xây dựng ý thức tôn trọng sự thật khách quan, nâng cao lòng tự hào, niềm tin đốivới sự nghiệp lãnh đạo của Đảng.

2.3 Về kỹ năng: Trang bị phương pháp tư duy khoa học về lịch sử, kỹ năng lựa chọn tài liệu nghiên cứu, học tập môn học và khả năng vận dụng nhận thức lịch sử vào công tác

thực tiễn, phê phán quan niệm sai trái về lịch sử của Đảng.

3. Mô tả môn học (Course Outlines)

Môn học trang bị cho sinh viên những kiến thức cơ bản về Lịch sử Đảng Cộng sản Việt Nam

4. Tài liệu phục vụ học tập:

- Bộ Giáo dục và Đào tạo (2019), *Chương trình môn học Lịch sử Đảng Cộng sản Việt Nam,* ban hành 2019.
- Hội đồng Trung ương chỉ đạo biên soạn giáo trình quốc gia các môn khoa học Mác — Lênin, Tư tưởng Hồ Chí Minh (2018), *Giáo trình Lịch sử Đảng Cộng sản Việt Nam (tái bản có sửa chữa, bổ sung),* Nxb. Chính trị quốc gia, Hà Nội.

Chuẩn đầu ra	**Mô tả**	**Tiêu chí đánh giá**	**Mục tiêu môn học**	**Chuẩn đầu ra CDIO CTĐT**	**Mức độ giảng dạy (I/T/U)**
5.7. ***Kiến thức***					
LO.1	NHẬP MÔN ĐỐI TƯỢNG, CHỨC NĂNG, NHIỆM VỤ, NỘI DUNG VÀPHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM	LO. 1.1 - Nắm rõ được đối tượng, mục đích học tập, nghiên cứu và một số yêu cầu cơ bản về phương pháp học tập, nghiên cứu Lịch sử Đảng Cộng sản Việt Nam	2.1	1.1.3	13
LO.2	ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ	LO.2.1 - Nắm được bối cảnh lịch sử tác động đến sự ra đời của Đảng Cộng sản Việt Nam	2.1	1.1.3	T4

	LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945)	LO.2.2 - Nắm được quá trình chuẩn bị các điều kiện để thành lập Đảng của Nguyễn Ái Quốc	2.1		
		LO.2.3- Nắm được nội dung hội nghị thành lập Đảng và Cương lĩnh chính trị đầu tiên của Đảng	2.1		
		LO.2.4 - Hiểu được ý nghĩa lịch sử của việc thành lập Đảng Cộng sản Việt Nam	2.1		
		LO.2.5 - Nắm rõ các phong trào cách mạng 1930-1935 và các chủ trương khôi phục phong trào năm 1932-1935	2.1		
		LO.2.6 - Nắm rõ phong trào dân chủ năm 1936-1939	2.1		
		LO.2.7 - Nắm rõ phong trào giải phóng dân tộc 1939--1945			
		LO.2.8 - Hiểu rõ tính chất, ý nghĩa và kinh nghiệm của Cách mạng Tháng Tám năm 1945	2.1		

LO.3	ĐẢNG LÃNH ĐẠO HAI CUỘC KHÁNG CHIẾN, HOÀN THÀNH GIẢI PHÓNG DÂN TỘC, THỐNG NHẤT ĐẤT NƯỚC (1945-1975)	LO.3.1 - Hiểu được chủ trương xây dựng và bảo vệ chính quyền cách mạng 1945-1946	2.1	1.1.3	T4
		LO.3.2 - Hiểu rõ Đường lối kháng chiến toàn quốc chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm 1946-1950			

		LO.3.3 - Hiểu rõ chủ trương Đẩy mạnh cuộc kháng chiến chống thực dân Pháp xâm lược và quá trình tổ chức thực hiện từ năm 1946 đến năm 1950	2.1	1.1.3	T4
		LO.3.4 - Hiểu rõ được Ý nghĩa lịch sử và kinh nghiệm của Đảng trong lãnh đạo kháng chiến chống thực dân Pháp và can thiệp Mỹ			
		LO.3.5 - Nắm được quá trình lãnh đạo cách mạng hai miền giai đoạn 1954-1965 của Đảng	2.1		
		LO.3.6 - Nắm vững sự lãnh đạo cách mạng cả nước giai đoạn 1965-1975 của Đảng			
		LO.3.7 - Hiểu rõ Ý nghĩa và kinh nghiệm lãnh đạo của Đảng trong cuộc kháng chiến chống Mỹ, cứu nước 1954-1975			

LO.4	ĐẢNG LÃNH ĐẠO CẢ NƯỚC QUÁ ĐỘ LÊN CHỦ NGHĨA XÃ HỘI VÀ TIẾN HÀNH CÔNG CUỘC ĐỔI MỚI (1975-2018)	LO.4.1 - Hiểu rõ chủ trương xây dựng chủ nghĩa xã hội và bảo vệ Tổ quốc 1975-1981	2.1 2.2	1.1.3	T4
		LO.4.2 - Nắm rõ nội dung Đại hội đại biểu toàn quốc lần thứ V của Đảng và các bước đột phá tiếp tục đổi mới kinh tế 1982-1986			
		LO.4.3 – Nắm rõ quan điểm Đổi mới toàn diện, đưa đất nước ra khỏi khủng hoảng kinh tế - xã hội 1986-1996 của Đảng			
		LO.4.4 - Nắm rõ thành tựu, kinh nghiệm của công cuộc đổi mới			
		LO.4.5 - Hiểu rõ những thắng lợi vĩ đại của cách mạng Việt Nam dưới sự lãnh đạo của Đảng từ năm 1930 đến 2018	2.1 2.2		

		LO.4.6 - Hiểu rõ những bài học lớn về sự lãnh đạo của Đảng từ năm 1930 đến 2018			

5.2. Kỹ năng

LO.5	THỂ HIỆN KHẢ NĂNG KHÁI QUÁT HÓA, TƯ DUY, TRANH LUẬN, PHẢN BIỆN, LÀM VIỆC NHÓM	LO.5.1. Rèn luyện năng lực tư duy độc lập trong nghiên cứu đường lối, chiến lược, sách lược cách mạng của Đảng. LO.5.2. Có tư duy phê phán, kỹ năng phân tích, tổng hợp và đánh giá những vấn đề liên quan đến môn học. Từ đó, vận dụng kiến thức đã học để chủ động, tích cực nhận thức những vấn đề chính trị, kinh tế, văn hoá, xã hội theo đường lối, chính sách, pháp luật của Đảng	2.1 2.2 2.3	2.1.1 2.3.1 2.4.4 2.5 3.1.5	U4
5.3. Thái độ					
LO.6	THỂ HIỆN Ý THỨC, NHẬN THỨC TRONG VÀ SAU KHI HỌC TẬP	LO.6.1. Tin tưởng vào sự lãnh đạo của Đảng đối với cách mạng Việt Nam. LO.6.2. Quyết tâm phấn đấu thực hiện đường lối cách mạng của Đảng. LO.6.3. Có thái độ nghiêm túc trong học tập, nghiên cứu khoa học, trong nhận thức về cuộc sống, xã hội, tự rèn luyện bản thân trở thành người có phẩm chất, bản lĩnh chính trị vững vàng, có đạo đức, trình độ chuyên	2.1 2.2 2.3	3.1	U3

6. Kế hoạch giảng dạy môn học (Course Plan):

Buổi (3 tiết)	Nội dung giảng dạy	LO	Hoạt động dạy và học	Đánh giá
1	**Giới thiệu về môn học**	LO.l, LO.5;	**Dạy:** - Giới thiệu đề cương môn học - Giới thiệu nội dung đề tài thuyết trình nhóm GHW) **Học ở lớp:** - Chia nhóm (5 SV/nhóm)	
2	**Chương nhập môn** ĐỐI TƯỢNG, CHỨC NĂNG, NHIỆM VỤ, NỘI DUNG VÀ PHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM	LO.l;	**Dạy:** I. ĐỐI TƯỢNG NGHIÊN CỨU CỦA MÔN HỌC LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM 1. Đối tượng nghiên cứu 2. Phạm vi nghiên cứu II.CHỨC NĂNG, NHIỆM VỤ CỦA MÔN HỌC LỊCH SỬ ĐẢNG CỘNG SẢN VIỆT NAM 1. Chức năng của khoa học Lịch sử Đảng 2. Nhiệm vụ của môn học II.PHƯƠNG PHÁP NGHIÊN CỨU, HỌC TẬP MÔN LỊCH SỬ	Thi giữa kỳ (Quiz)
3	**Chương 1** ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945)	LO.2	**Dạy:** I. ĐẢNG CỘNG SẢN VIỆT NAM RA ĐỜI VÀ CƯƠNG LĨNH CHÍNH TRỊ ĐẦU TIÊN CỦA ĐẢNG (THÁNG 2-1930) 1. Bối cảnh lịch sử 2. Nguyễn Ái Quốc chuẩn bị các điều kiện để thành lập Đảng 3. Thành lập Đảng Cộng sản Việt Nam và Cương lĩnh chính trị đầu tiên của Đảng 4. Ý nghĩa lịch sử của việc thành lập Đảng Cộng sản Việt Nam II. ĐẢNG LÃNH ĐẠO ĐẤU TRANH GIÀNH CHÍNH QUYỀN (1930-1945)	Thi giữa kỳ (Quiz) Thi cuối kỳ (FEX)

7. Đánh giá môn học

STT	Mã	Tên	Mô tả	Tỷ trọng	Hình thức	LO
1	GHW	Thuyết trình nhóm	Thuyết trình nhóm về đề tài đã phân công	20%	Thuyết trình và bản báo cáo nhóm	LO.3 LO.4 LO.5
2	Quiz	Bài thi giữa kỳ	Thi theo đề thi chung	30%	Tự luận	LO.l LO.2;
3	DIC	Thảo luận tại lớp (Discussion in Class)	Điểm thảo luận được tính theo phương pháp tương đối. SV có số lần thảo luận tại lớp nhiều nhất sẽ được điểm tối đa, điểm của các bạn khác được tính dựa theo bạn có số lần thảo luận cao nhất.	Cộng tối đa 1 điểm vào bài thi cuối kỳ	Phát biểu/đặt câu hỏi trên lớp hoặc phiếu trả lời trong các nghiên cứu tình huống tại lớp	
4	FEX	Thi cuối kỳ	Đề thi bao quát toàn bộ nội dung môn học	50%	Trắc nghiệm	LO.2; LO.3, LO.4;
			Tổng cộng	**100%**		

8. Tiêu chí đánh giá chuẩn đầu ra môn học

TT	Chuẩn đầu ra	Nội dung	Phương pháp	Tiêu chí đánh giá
LO.l	Nắm được đối tượng, mục đích học tập, nghiên cứu và một số yêu cầu cơ bản về phương pháp học tập, nghiên cứu	Chương nhập môn	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV

LO.2	Hiểu rõ quá trình ra đời của Đảng Cộng sản Việt Nam (1920-1930), nội dung cơ bản, giá trị lịch sử của Cương lĩnh chính trị đầu tiên của Đảng và quá trình Đảng lãnh đạo cuộc đấu tranh giành độc lập, giành chính quyền (1930-1945)	Chương 1	Thi giữa kỳ (Quiz)	Ngân hàng đề thi của GV
LO.3 LO.5	Nắm rõ quá trình lãnh đạo của Đảng đối với hai cuộc kháng chiến chống thực dân Pháp và đế quốc Mỹ xâm lược, hoàn thành giải phóng dân tộc, thống nhất đất nước thời kỳ 1945-1975	Chương 2	Thuyết trình nhóm (GHW) Thi cuối kỳ (FEX)	Tiêu chí đanh giá thuyết trình nhóm Ngân hàng đề thi của GV
LO.4 LO.5	Hiểu được quá trình phát triển đường lối và sự lãnh đạo của Đảng đưa cả nước quá độ lên chủ nghĩa xã hội và tiến hành công cuộc đổi mới từ sau ngày thống nhất đất nước năm 1975 đến nay. Từ đó rút ra được những thắng lợi và những bài học kinh nghiệm trong quá trình lãnh đạo cách mạng của Đảng.	Chương 3	Thảo luận tại lớp (Discussion in Class) Thi cuối kỳ (FEX)	Ngân hàng đề của GV .

9. Một số lưu ý khác:

- Khi có các thắc mắc liên quan môn học, sinh viên có thể liên lạc với quản lý Bộ môn Hồ Chí Minh học & Lịch sử Đảng và Khoa Chính trị - Hành chính qua email: daotao.spas@vnuhcm.edu.vn
- Quy định về Bài thuyết trình nhóm GH
- Thành lập nhóm: 5 sinh viên/nhóm. Hạn chót đăng ký đề tài nhóm Quản lý trên forum là Buổi 2.

Tuần 4 thuyết trình theo thứ tự. Lưu ý các nhóm cần có mặt đủ và mang theo tất cả các tài liệu liên quan đến GHW khi đi thuyết trình.

Hình thức nộp bài: Nộp file và biên bản làm việc nhóm qua mail cho GV

- Quy định về giờ giấc, chuyên cần, kỷ luật trong khóa học: Lên lớp đúng giờ, dự tối thiểu 80% thời gian học trên lớp (chỉ được phép vắng mặt tối đa 20% số tiết học). Nếu vắng quá số tiết quy định sẽ bị cấm thi theo quy chế. Có đầy đủ điểm kiểm tra, điểm thi kết thúc học phần & nhiệt tình thảo luận, phát biểu xây dựng bài, nghiêm túc trong giờ học.

Course Name: Entrepreneurship

Course Code: IT120IU

1. General information

Course designation	An introduction to the creative and innovative managerial practices of successful entrepreneurship.
Semester(s) in which the course is taught	7
Person responsible for the course	MSc. Dao Tran Hoang Chau
Language	English
Relation to curriculum	Compulsory (CS, NE, CE) Elective (DS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) Private study including examination preparation, specified in hours: 90
Credit points	Number of credits : 3 Lecture: 3 Laboratory: 0
Required and recommended prerequisites for joining the course	
Course objectives	This course reviews the significant economic and social contributions entrepreneurs provide to society, the intense lifestyle commitment, and the skills necessary for entrepreneurial success. It explores how to identify and develop solutions to the most common leadership and personal challenges faced by entrepreneurs when starting new ventures or launching new products. It also promotes a deeper understanding of what is required to be a successful entrepreneur, highlights the skills and tools necessary to start a new business and explores alternatives to common pitfalls.This course applies entrepreneurial marketing approaches used by successful entrepreneurs. These include utilizing industry sector trends, identifying emerging customer niches, developing new products/services, using guerilla marketing strategies, and Internet and social marketing strategies. It emphasizes the importance of managing cash flows, ratio analysis, pro forma development, and the basics of deal structure and harvesting a business venture. Students will identify and

<table>
<tr><td></td><td>interpret sources of information from company financial reports, financial publications, industry benchmarks, the media, and web sites.An introduction to the process of researching, writing, and presenting a business plan. Students identify and screen ideas using a business feasibility study that describes the product features, market opportunity, customer profile, sales forecast, competitive advantage, and profit potential. Following a successful feasibility study, students may use business plan software as each develops their own complete business plan.</td></tr>
<tr><td>Course learning outcomes</td><td>CLO 1. Understand entrepreneurial processes;
CLO 2. Apply new technology to boost business performance;
CLO 3. Manage marketing strategy and financial statements in a enterprise;
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>1, 2, 3</td></tr>
<tr><td>Skill</td><td>1, 3</td></tr>
<tr><td>Attitude</td><td>3</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Entrepreneurship, Creativity and Innovation;</td><td>3</td><td>I, T</td></tr>
<tr><td>Creative Problem Solving Model;</td><td>3</td><td>T, U</td></tr>
<tr><td>Develop a Product. Generate Ideas and Protect Inventions;</td><td>2</td><td>T</td></tr>
<tr><td>Marketing Strategies;</td><td>3</td><td>T, U</td></tr>
<tr><td>Finance and Accounting</td><td>4</td><td>T, U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>1. Duening & Hisrich & Lechter, Technology Entrepreneurship 2nd, 2014</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6

1			x			
2		x				
3				x		

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Entrepreneurship, Creativity and Innovation;	1	Midterm exam	Lecture, In-class activities, Quiz	
2	Creative Problem Solving Model;	1	Midterm exam	Lecture, In-class activities, Quiz	
3	Develop a Product. Generate Ideas and Protect Inventions;	2	Midterm exam, Assignment	Lecture, In-class activities, Project	
4	Midterm				
5	Marketing Strategies;	3	Final exam, Assignment	Lecture, Project	
6	Finance and Accounting	3	Final exam, Assignment	Lecture, Project	
7	**Final exam**				

4. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Assessment Type	CLO1	CLO2	CLO3
Midterm examination (25%)	50%	50%	
Projects/Presentations/ Report (25%)			60%
Final examination (40%)			40%
Exercises/ Quiz (10%)	50%	50%	

Rubrics (optional)

1. Grading checklist

Grading checklist for Written Reports	
Student: ……..	HW/Assignment:
Date: ……	…….

	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described	Issue/ problem to be considered critically is stated, described, and	Issue/ problem to be considered critically is	Issue/ problem to be considered critically is stated without

	comprehensively, delivering all relevant information necessary for full understanding.	clarified so that understanding is not seriously impeded by omissions.	stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction	Organizational pattern (specific introduction	Organizational pattern (specific introduction	Organizational pattern (specific introduction and conclusion,

	and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples,	Supporting materials (explanations, examples, illustrations, statistics,	Supporting materials (explanations, examples, illustrations, statistics,	Insufficient supporting materials (explanations, examples, illustrations,

	illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Special Study of the Field

Course Code: IT083IU

1. **General information**

Course designation	This course helps students to do a research topic and prepare for a thesis
Semester(s) in which the course is taught	7
Person responsible for the course	Lecturers (thesis advisor)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Total workload: 90 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: 90
Credit points	Number of credits : 3 Lecture: 0 Laboratory: 3
Required and recommended prerequisites for joining the course	Required number of credits, Internship
Course objectives	Students are advised to select a subject under the guidance of a faculty member. Project content might be a research topic or building a new application that underlies the graduation thesis. Research topics include fields of academic program that are academic or practical.
Course learning outcomes	CLO 1. Research a specific topic in the field. CLO 2. Design the model or system architecture of the application product CLO 3. Have a good preparation to develop and improve the product in the thesis.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO1, CLO2
Attitude	CLO3

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: in the whole semester.
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Find out/define a topic of the subject</td><td>3</td><td>U</td></tr>
<tr><td>Review and evaluate existing issues/problems</td><td>8</td><td>U</td></tr>
<tr><td>Research and propose some solutions</td><td>8</td><td>U</td></tr>
<tr><td>Deploy some main functions or new features for the product project</td><td>8</td><td>U</td></tr>
<tr><td>Testing and evaluating solutions or products</td><td>8</td><td>U</td></tr>
<tr><td>Write a report</td><td>10</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the appointments with lecturer. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Tasks: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>Related works and books</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1		X				
2		X				X
3			X			

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Find out the topic of the subject	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
2	Review and evaluate existing issues	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
4	Research and propose some solutions	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers

5	Deploy some main functions or new features for the product project	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
6	Testing and evaluating solutions or products	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
7	Write a report	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
8	**Final grade**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Final grade (100%)	30%	40%	30%

Note: %Pass: Target that % of students having scores greater than 60 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact,

	Viewpoints of experts are questioned thoroughly.	Viewpoints of experts are subject to questioning.	analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in	Language choices are mundane and commonplace and partially support the effectiveness of the presentation.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is

	of the presentation. Language in presentation is appropriate to audience.	presentation is appropriate to audience.	Language in presentation is appropriate to audience.	not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling	Central message is clear and	Central message is basically	Central message can be deduced but is not

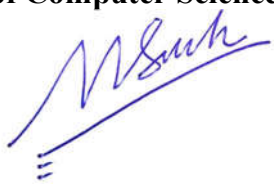
	(precisely stated, appropriately repeated, memorable, and strongly supported.)	consistent with the supporting material.	understandable but is not often repeated and is not memorable.	explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Thesis

Course Code: IT058IU

1. **General information**

Course designation	This course evaluates students obtained knowledges to complete the academic program.
Semester(s) in which the course is taught	8
Person responsible for the course	Lecturers (thesis advisor)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Contact hours: 300 hours Private study including examination preparation, specified in hours: 300
Credit points	Number of credits : 10 Lecture: 0 Laboratory: 10
Required and recommended prerequisites for joining the course	Required number of credits Special Study of the Field
Course objectives	Dissertations are industrial projects designed to ensure that students have mastered their subjects in the program. All projects are based on "real projects" provided by the industry to students to develop skills and apply knowledge gained from all courses throughout the program. Students will work independently to develop requirements, design, implement and provide solutions to business problems. Students can follow any appropriate process model, must self-manage the project, follow all appropriate project management techniques. The success of the project is largely determined by whether the student adequately solves the client's problem. Students will provide the final product with all artifacts that match the process model being used (e.g. project plan, technical requirements, system architecture, design documentation, test plan, source code and installed software products).
Course learning outcomes	CLO 1. Research a specific topic in the field. CLO 2. Design the model or system architecture of the application product

<table>
<tr><td></td><td>CLO 3. Hard work to develop and finish the product of the thesis.

<table><tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr><tr><td>Knowledge</td><td>CLO1</td></tr><tr><td>Skill</td><td>CLO1, CLO2</td></tr><tr><td>Attitude</td><td>CLO3</td></tr></table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: in the whole last semester
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table><tr><th>Topic</th><th>Weight</th><th>Level</th></tr><tr><td>Find out the thesis topic</td><td>4</td><td>U</td></tr><tr><td>Review and evaluate existing issues</td><td>20</td><td>U</td></tr><tr><td>Research and propose some solutions</td><td>30</td><td>U</td></tr><tr><td>Deploy the thesis product</td><td>40</td><td>U</td></tr><tr><td>Testing and evaluating solutions or products</td><td>40</td><td>U</td></tr><tr><td>Thesis defense</td><td>1</td><td>U</td></tr></table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td></td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2	X	X				X
3			X			

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources

1	Find out the thesis topic	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
2	Review and evaluate existing issues	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
4	Research and propose some solutions	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
5	Deploy the thesis product	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
6	Testing and evaluating solutions or products	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
7	Thesis defense	1,2,3	By committee	presentation	
8	**Final grade**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3
Final grade (100%)	30%	40%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		

Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Special Study of the Field 2

Course Code: IT168IU

1. **General information**

Course designation	This advanced course builds upon the concepts learned in the "Special Study of the Field" course and guides students in conducting more advanced research. The course is designed to develop students' research, analysis, and presentation skills.
Semester(s) in which the course is taught	8
Person responsible for the course	Lecturers (thesis advisor)
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Total workload: 90 hours Contact hours (laboratory session): 5 Private study including examination preparation, specified in hours: 85
Credit points	Number of credits: 3 Lecture: 0 Laboratory: 3
Required and recommended prerequisites for joining the course	Special Study of the Field
Course objectives	This course allows students to select a subject under faculty guidance. Projects allow students to delve into advanced research and practical applications within their field of study, offering an alternative to the traditional thesis. Students will develop in-depth knowledge and skills while focusing on a specific topic of their choice.
Course learning outcomes	CLO 1. Analyze and synthesize advanced topics within the field. CLO 2. Design and implement complex system architectures for application products. CLO 3. Develop a comprehensive strategy to enhance and optimize the product in the project. **Competency level** | **Course learning outcome (CLO)**

		Knowledge	CLO1
		Skill	CLO1, CLO2
		Attitude	CLO3
Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: in the whole semester. Teaching levels: I (Introduce); T (Teach); U (Utilize)		
Examination forms	Short/long-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the appointments with lecturer. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Tasks: Students must have more than 50/100 points overall to pass this course.		
Reading list	Related works and books Advanced research papers, academic journals, and industry publications.		

Topic	**Weight**	**Level**
Advanced research methodologies and techniques	5	U
In-depth problem analysis and solution proposal	10	U
Advanced system design and implementation	15	U
Integration of cutting-edge technologies	10	U
Performance optimization and testing	10	U
Comprehensive project development	20	U
Write a report and Project presentation	30	U

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-3) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X					
2		X				X
3			X			

3. **Planned learning activities and teaching methods**

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Advanced research methodologies and techniques	1	Check and Evaluate	Discuss and Research	Related work, books and research papers
2	In-depth problem analysis and solution proposal	1,2	Check and Evaluate	Discuss and Research	Related work, books and research papers
4	Advanced system design and implementation	2	Check and Evaluate	Discuss and Research	Related work, books and research papers
5	Integration of cutting-edge technologies	2	Check and Evaluate	Discuss and Research	Related work, books and research papers
6	Performance optimization and testing	2	Check and Evaluate	Discuss and Research	Related work, books and research papers
7	Comprehensive project development	3	Check and Evaluate	Discuss and Research	Related work, books and research papers
8	Project presentation	3	Check and Evaluate	Discuss and Research	Related work, books and research papers

4. **Assessment plan**

Assessment Type	CLO1	CLO2	CLO3
Final grade (100%)	30%	40%	30%

Note: %Pass: Target that % of students having scores greater than 60 out of 100.

5. **Rubrics (optional)**

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		

Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	(perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the

	enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandabilit y of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Data Mining

Course Code: IT160IU

1. General information

Course designation	This subject introduces the students to the principles and algorithms of data mining, and the requirements of a data mining process.
Semester(s) in which the course is taught	6,8
Person responsible for the course	Dr. Nguyen Thi Thanh Sang
Language	English
Relation to curriculum	Elective (CS, NE, CE) Compulsory (DS)
Teaching methods	Lecture, lesson, project, laboratory.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	Students will study data mining concepts and algorithms to solve problems of knowledge discovery. They will be equipped with skills of using recent data mining software for solving practical problems and gain experience of doing independent study and research.
Course learning outcomes	

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO 1. Understand basic contents of data warehousing and data mining. CLO 2. Explain modern algorithms in the area of data mining and knowledge discovery.
Skill	CLO 3. Apply data mining techniques to some case studies using existing datasets.

	Attitude	CLO 4. Work in a team to build a data mining process.

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to Data Mining	1	I
Know your data	1	T, U
Data preprocessing	1	T, U
Data mining knowledge representation	1	T, U
Evaluating what's been learned	1	T
Data mining algorithms: Classification	2	T, U
Mining Frequent Patterns, Association and Correlations: Basic Concept and Methods	2	T
Data mining algorithms: Clustering	2	T
Classification: Advanced Methods	1	T, I
Semantic data mining	1	I

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Jiawei Han, Micheline Kamber, *Data Mining: Concepts and Techniques*, 3rd Edition, 2011.

[2] Ian H.Witten, Eibe Frank, Mark A. Hall, and Christopher J. Pal, *Data Mining: Practical Machine Learning Tools and Techniques*, Fourth Edition, Morgan Kaufmann, 2016.

[3] A. Lawrynowicz, *Semantic Data Mining: An Ontology-based Approach (Studies on the Semantic Web)*, IOS Press (April 15, 2017), ISBN-10 1614997454.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x					

2	x					
3						x
4					x	

3. **Planned learning activities and teaching methods**

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Data Mining	1		Lecture, Discussion	[1, 2]. Chapter 1
2	Know your data	1	Quiz.s2	Lecture, In-class quiz	[1]. Chapter 2
3	Data preprocessing	1,4		Lecture, Discussion	[1]. Chapter 3
4	Data mining knowledge representation	1	Quiz.s4	Lecture, In-class quiz	[2]. Chapter 3; Reading [1]. Chapter 4 – Data Warehousing
5	Evaluating what's been learned	1	Quiz.s5	Lecture, In-class quiz	[2]. Chapter 5
6-7	Data mining algorithms: Classification	2,3	Quiz.s6-7	Lecture, In-class quiz	[1]. Chapter 8; [2]. Chapter 4.3
8	Data mining to code	3		Lecture, Discussion	
9	**Midterm**				
10-11	Mining Frequent Patterns, Association and Correlations: Basic Concept and Methods	2,3,4	Quiz.s10-11	Lecture, In-class quiz	[1]. Chapter 6; [2]. Chapter 4.5
12-13	Data mining algorithms: Clustering	2,3,4	Quiz.s12-13	Lecture, In-class quiz	[1]. Chapter 10; [2]. Chapter 4.8
14	Classification: Advanced Methods	2	Quiz.s14	Lecture, In-class quiz	[1]. Chapter 9
15	Semantic data mining	2		Lecture, Discussion	[3]
16	Revision			Review-test	
17	**Final exam**				

Laboratory

Week	Lab
5	Introduction to Weka
6	Evaluation
7	Simple classifiers
8	Programming - Pre-processing data
9	More classifiers
10	Putting it all together
11	Programming - Clustering
12	Programming - Sequential pattern discovery

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Labs (10%)			100%	
Programming (20%)			70%	30%
Midterm examination (30%)	50%	50%		
Final examination (40%)		40%	60%	

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.4. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.5. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact,

	Viewpoints of experts are questioned thoroughly.	Viewpoints of experts are subject to questioning.	analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Digital Image Processing

Course Code: IT130IU

1. General information

Course designation	This course provides students fundamental knowledge of digital image processing
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Ha Viet Uyen Synh
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	
Course objectives	This course helps students discuss digital image processing fundamentals; review of Digital Signal Processing algorithms such as Discrete Fourier Transform; intensity transforms, frequency domain filtering; image restoration and reconstruction; color image processing; multiresolution processing; image compression; morphological image processing.
Course learning outcomes	CLO 1. Understand bases of digital image formation. CLO 2. Understand the color image foundations. CLO 3. Apply special-domain image filtering. **Competency level** / **Course learning outcome (CLO)** Knowledge: 1,2 Skill: 3 Attitude:
Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

	Topic	Weight	Level
	Chapter 1: Introduction	3	I, T
	Chapter 2: Digital Image Fundamentals	6	I, T
	Chapter 3: Intensity Transformations and Spatial Filtering (part 1)	3	T, U
	Chapter 3: Intensity Transformations and Spatial Filtering (part 2)	6	T, U
	Chapter 4: Filtering in the frequency domain	6	T, U
	Chapter 5: Image restoration and reconstruction	3	T, U
	Chapter 6: Color Image processing	3	T, U
	Chapter 7: Wavelets and multiresolution processing (part 1)	3	T, U
	Chapter 7: Wavelets and multiresolution processing (part 2)	3	T, U
	Chapter 8: Image compression	3	T, U
	Chapter 9: Morphological image processing	3	T, U
	Chapter 10: Image segmentation	3	T, U
	Chapter 11: Representation and description	3	T, U
	Chapter 12: Object recognition	3	T, U
	Revision Application Design and Development	3	
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	**6.** Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing 3rd, 2008		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	x	x				
2	x	x				
3						x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Chapter 1: Introduction	1,2	Quiz, Lab, Exam	lecture, exercises	
2	Chapter 2: Digital Image Fundamentals	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
3	Chapter 3: Intensity Transformations and Spatial Filtering (part 1)	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
4	Chapter 3: Intensity Transformations and Spatial Filtering (part 2)	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
5	Chapter 4: Filtering in the frequency domain	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
6	Chapter 5: Image restoration and reconstruction	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
7	Chapter 6: Color Image processing	1,2	Quiz, Lab, Exam	lecture, exercises, lab	
8	**Midterm**				
9	Chapter 7: Wavelets and multiresolution processing (part 1)	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
10	Chapter 7: Wavelets and multiresolution processing (part 2)	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
11	Chapter 8: Image compression	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
12	Chapter 9: Morphological image processing	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
13	Chapter 10: Image segmentation	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
14	Chapter 11: Representation and description	2,3	Quiz, Lab, Exam	lecture, exercises, lab	
15	Chapter 12: Object recognition	2,3	Quiz, Lab, Exam	lecture, exercises, lab	

16	Revision Application Design and Development	1,2,3			
17	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Labs (20%)	20%	20%	20%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	40%	40%	40%
Exercises/ Quiz (10%)	10%	10%	10%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**

5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			taken as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	presentation is appropriate to audience.		appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Software Architecture

Course Code: IT114IU

1. General information

Course designation	This course provides student methodogies and techniques in Software Architecture.
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Ha Viet Uyen Synh
Language	English
Relation to curriculum	Elective (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours: 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	
Course objectives	Provides the student with a thorough understanding of varying methodologies and techniques in analysis, design and implementation of information system by using UML.
Course learning outcomes	CLO 1. Understand the steps of the System Development Life Cycle and the techniques for each step CLO 2. Using a CASE tool in analysis and design of a system. CLO 3. Apply to a real system

Competency level	Course learning outcome (CLO)
Knowledge	1,2
Skill	3
Attitude	

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (~~3~~ hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Introduction to systems analysis and design,	3	I

	Requirements.	3	T,U
	Use Case Modeling	6	T,U
	Dynamic Modeling	6	T,U
	State-Dependent Dynamic Interaction Modeling	6	T,U
	Data Modeling	6	T,U
	Normal Forms	6	T,U
	Structural Modeing	6	T,U
	Architectural Design.	3	I,T
Examination forms	Multiple-choice questions, short-answer questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	3. Kenneth E. Kendall, Julie E. Kendall, Systems Analysis and Design 7th, 2006 4. Gary B. Shelly, Thomas J. Cashman, Harry J. Rosenblatt, Systems Analysis and Design 4th, 2001		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1			x			
2			x			
3		x				

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to systems analysis and design,	1,2	Quiz	lecture, exercises	
2	Requirements.	1,2,3	Quiz, Lab	lecture, exercises, lab	
3	Use Case Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
4	**Midterm**				
5	Dynamic Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	

6	State-Dependent Dynamic Interaction Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
7	Data Modeling	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
8	Normal Forms	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
9	Structural Modeing	1,2,3	Quiz, Lab, Exam	lecture, exercises, lab	
10	Architectural Design.	1,2	Quiz	lecture, exercises	
11	**Final exam**				

4. Assessment plan

Assessment Type

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	40%	40%	40%
Exercises/ Quiz (10%)	10%	10%	10%
Lab. Assignments (20%)	20%	20%	20%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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5. Rubrics (optional)

5.2. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			

Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.3. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.4. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Net-centric Programming

Course Code: IT096IU

1. General information

Course designation	Advanced programming course with focus on developing network application
Semester(s) in which the course is taught	6
Person responsible for the course	MSc. Le Thanh Son
Language	English
Relation to curriculum	Compulsory (NE) Elective (CS)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	Advanced programming with a focus on developing software for networked systems using UNIX as a reference platform. Topics: Programming Tools, Software Design, Programming Techniques, Environment of a UNIX Process, Memory Allocation, Garbage Collection, Process Control, Process Relationships, Signals, Reliable Signals, Threads, I/O Multiplexing, Datagram and Stream Sockets, Multicasting, Device Driver and Kernel Programming, Secure Programming
Course learning outcomes	CLO 1. Understand the structure of network applications CLO 2. Able to develop network applications using TCP and UDP sockets CLO 3. Understand and implement network applications using popular Internet protocols CLO 4. Team working

Competency level	Course learning outcome (CLO)
Knowledge	1, 2, 3

	Skill	2, 3
	Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Network revisions	3	I
Introduction to Client/Server networking and Socket Programming	3	I, T
TCP Socket Programming	3	T, U
UDP Socket Programming	3	T, U
Socket name and DNS	3	T, U
Network Data and Network Errors		
Caches and Message Queues	3	T, U
HTTP Clients	3	T, U
HTTP Server	3	T, U
Web Socket, Web Frame Work	3	T, U
Web Scraping	3	T, U
Building and Parsing Email	3	T, U
FTP	3	T, U
Telnet and SSH	3	T, U
Remote Procedure Call (RPC)	3	T, U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

4. Michael J.Donahoo, Kenneth L.Calvert, TCP/IP Socket in C: A Practical Guide for Programmers 2nd, 2009
5. W. R. Stevens, B. Fenner, A. M. Rudoff, Unix Network Programming, Vol. 1: The Sockets Networking API 3rd, 2003
6. Brandon Rhodes, Foundations of Python Network Programming 3rd, 2014

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLO	1	2	3	4	5	6
1	x					
2		xx				
3		xxx				
4						x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Network revisions	1	Quiz	Lecture	2
2	Introduction to Client/Server networking and Socket Programming	2	Quiz, Lab, Midterm	Lecture	1
3	TCP Socket Programming	2	Quiz, Lab, Midterm	Lecture, Discussion	1, 2
4	UDP Socket Programming	2	Quiz, Lab, Midterm	Lecture, Discussion	1, 2
5	Socket name and DNS	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
6	Network Data and Network Errors	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
7	Caches and Message Queues	2	Quiz, Lab, Midterm	Lecture, Discussion	2, 3
8	HTTP Clients	3, 4	Quiz, Lab, Final	Lecture, Discussion	2, 3
Midterm exam					
9	HTTP Server	3, 4	Quiz, Lab, Final	Lecture, Discussion	2, 3
10	Web Socket, Web Frame Work	3, 4	Quiz, Final	Lecture, Discussion	2, 3
11	Web Scraping	3, 4	Quiz, Final	Lecture, Discussion	2, 3
12	Building and Parsing Email	3	Quiz, Final	Lecture, Discussion	2, 3
13	FTP	3	Quiz, Final	Lecture, Discussion	2, 3
14	Telnet and SSH	3	Quiz, Final	Lecture, Discussion	2, 3
15	Remote Procedure Call (RPC)	3	Quiz, Final	Lecture, Discussion	2, 3
Final exam					

4. **Assessment plan**

Assessment Type	CLO1	CLO2	CLO3	CLO4
Quiz / Assigment (10%)		10%	10%	100%
Labs (20%)	30%	30%	40%	
Midterm examination (30%)	70%	40%		
Final examination (40%)		20%	50%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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2. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.2. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**

5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			taken as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in	Language choices are mundane and commonplace and partially support the effectiveness of the presentation.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is

	of the presentation. Language in presentation is appropriate to audience.	presentation is appropriate to audience.	Language in presentation is appropriate to audience.	not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling	Central message is clear and	Central message is basically	Central message can be deduced but is not

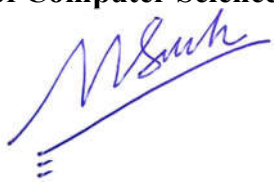
	(precisely stated, appropriately repeated, memorable, and strongly supported.)	consistent with the supporting material.	understandable but is not often repeated and is not memorable.	explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Information System Management

Course Code: IT094IU

1. General information

Course designation	This course covers the concepts of information systems and their applications to business processes
Semester(s) in which the course is taught	6
Person responsible for the course	Dr. Tran Thanh Tung
Language	English
Relation to curriculum	Elective course (CS, DS) Specialization (required) (NE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Principles of Database Management
Course objectives	This course will aim to provide students with:The concepts of information systems and their applications to business processes.Use of computer-based information systems in functional areas of business. Understanding of computer and information technology, resources, management and end-user decision making, and system development.
Course learning outcomes	CLO 1. understand basic information system concepts as applied to business operations and management. CLO 2. identify the major components of a computer system, including hardware, software, operating systems and operating environments as they apply to information systems. CLO 3. develop basic MIS applications such as spreadsheet, database, and web development. **Competency level** | **Course learning outcome (CLO)** Knowledge | 1, 2

	Skill	3
	Attitude	

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Information Systems in Global Business;	1	I
Global E-Business and Collaboration;	1	I
Information Systems, Organizations and Strategy	2	T
Ethical and Social Issues in Information Systems;	1	T
Telecommunications, the Internet, and Wireless Technology;	1	T
Foundations of Business Intelligence: Databases and Information Management	1	T,U
E-Commerce: Digital Markets, Digital Goods;	2	T,U
Achieving Operational Excellence and Customer Intimacy: Enterprise Applications;	2	T,U
Building Information Systems;	2	T,U
Managing Knowledge;	1	T
Enhancing Decision Making.	1	T

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. Kenneth C. Laudon, Jane P. Laudon, Management Information Systems: Managing the Digital Firm 14th, 2016
2. Kenneth C. Laudon and Jane Laudon, Essentials of Management Information Systems 11th, 2015

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6

1		x		x		
2		x		x		
3		x				

3. Planned learning activities *and teaching methods*

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Information Systems in Global Business;	1	Midterm exam	In-class activities	
2	Global E-Business and Collaboration;	1	Midterm exam	In-class activities	
3	Information Systems, Organizations and Strategy	1,2	Midterm exam, Quiz	In-class activities, Lab	
4	Ethical and Social Issues in Information Systems;	1	Midterm exam		
5	Telecommunications, the Internet, and Wireless Technology;	2	Midterm exam	In-class activities, Lab	
6	**Midterm**				
7	Foundations of Business Intelligence: Databases and Information Management	2,3	Final exam	In-class activities, Lab	
8	E-Commerce: Digital Markets, Digital Goods;	1	Final exam	In-class activities, Lab	
9	Achieving Operational Excellence and Customer Intimacy: Enterprise Applications;	1	Final exam	In-class activities, Lab	
10	Building Information Systems;	2,3	Final exam	In-class activities, Lab	
11	Managing Knowledge;	1	Final exam		
12	Enhancing Decision Making.	1	Final exam		
13	**Final exam**				

4. Assessment plan

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

Assessment Type	CLO1	CLO2	CLO3
Midterm examination (30%)	40%	30%	20%

Projects/Presentations/ Report (20%)		40%	60%
Final examination (40%)	30%	20%	20%
Exercises/ Quiz (20%)	30%	10%	

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response

4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact,

	synthesis. Viewpoints of experts are questioned thoroughly.	synthesis. Viewpoints of experts are subject to questioning.	coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is

	presentation. Language in presentation is appropriate to audience.	appropriate to audience.	presentation is appropriate to audience.	not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely	Central message is clear and consistent with	Central message is basically understandable	Central message can be deduced but is not explicitly stated

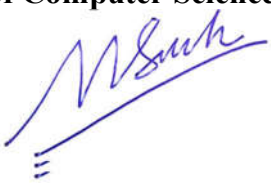
	stated, appropriately repeated, memorable, and strongly supported.)	the supporting material.	but is not often repeated and is not memorable.	in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: IT Project Management

Course Code: IT056IU

1. General information

Course designation	This subject introduces to students the process of IT project management; the area of knowledge required and techniques appropriate for successful IT project management.
Semester(s) in which the course is taught	7
Person responsible for the course	Assoc. Prof. Nguyen Van Sinh
Language	English
Relation to curriculum	All programs: Elective course
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	This course provides students the fundamental IT project management knowledge, with particular emphasis on software products, project management and contemporary issues in the delivery of software solutions to business. It considers plan-driven and agile methodologies, estimating techniques, change management, risk management, and the role of project management in business. And it identifies the managerial control and reporting aspects necessary from inception to implementation of a software development project.
Course learning outcomes	CLO 1. Explain the IT project management process; CLO 2. Identify the areas of knowledge required for successful IT project management; CLO 3. Apply techniques appropriate for successful software project management;

CLO 4. Communicate effectively to the team and stakeholders; construct project related documentation.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 teaching hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Week 1: Orientation & Introduction to the course	3	I,T
Week 2: Introduction to IT project management	3	I,T
Week 3: Software project planning	3	I,T,U
Week 4: Estimation (cost, time, scope)	3	I,T,U
Week 5: Project Schedules	3	I,T,U
Week 6: Review process	3	I,T,U
Week 7: Software Requirement	3	I,T,U
Week 8: Design & Programming	3	I,T,U
Week 9: Review for midterm examination	3	U
Week 10: Design and Programming	3	I,T,U
Week 11: Software Testing	3	I,T,U
Week 12: Understanding Change	3	I,T,U
Week 13: Management and Leadership	3	I,T,U
Week 14: Managing an Outsourced Project	3	I,T,U
Week 15: Process Improvement.	3	I,T,U

Examination forms

Multiple-choice questions, short-answer questions and essay writing

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

1. Kathy Schwalbe, IT Project Management - 9th Edition, 2019
2. Stellman and Greene, *Applied Software Project Management*, O'Reilly Media, 2006.

	3. Marchewka, J.T., Information Technology Project Management Providing Measureable Organizational Value 5th, 2016

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1		X				
2		X	X			
3		X				X
4			X		X	

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Orientation & Introduction to the course	1	Question and answer	Lecture,	[1, 2, 3]
2	Introduction to IT project management	1	Question and answer	Lecture, Discussion, In-class exercises	[1, 2, 3]
3	Software project planning	2,3	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
4	Estimation (cost, time, scope)	2,3	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
5	Project Schedules	2,3	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
6	Review process	2,3	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]

7	Software Requirement	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
8	Design & Programming	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
9	Review for midterm examination	1,2,3		Discussion, In-class exercises	
10	Design and Programming	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
11	Software Testing	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
12	Understanding Change	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
13	Management and Leadership	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
14	Managing an Outsourced Project	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
15	Process Improvement.	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
16	**Final examination**	2,3,4			

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Midterm examination (30%)	40%	50%		
Projects/Presentations/ Report (20%)		40%	30%	30%
Final examination (40%)			70%	30%
Exercises/ Quiz (10%)	25%	25%	25%	25%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions).

	relevance of contexts when presenting a position.		be more aware of others' assumptions than one's own (or vice versa).	Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified .

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Computer Graphics

Course Code: IT024IU

1. General information

Course designation	This subject introduces the students to principles and algorithms of computer graphics and requirements of creating graphical applications.
Semester(s) in which the course is taught	6
Person responsible for the course	Assoc.Prof. Nguyen Van Sinh
Language	English
Relation to curriculum	Elective course (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	This course provides students the fundamentals of computer graphics concepts, methodologies, and processes. It develop an understanding of the algorithms and fundamental techniques for generating and modifying pictures/objects with a digital computer, including the handling of color, and the generation of visible-surface projections of three dimensional scenes, for applications in science, engineering, and the entertainment world (i.e. connect to the VR & AR application; Games industry and Images processing).
Course learning outcomes	CLO 1. Understand and apply the algorithms and fundamental techniques for generating and modifying pictures, 2D/3D objects with a digital computer. CLO 2. Understand and apply the handling of color, and the generation of visible-surface projections of 3D scenes, for applications in science, engineering and the entertainment world.

CLO 3. Apply knowledge of mathematics and ability in graphical programming to develop games, construct and reconstruct 2D/3D objects, process images, VR & AR, etc.
CLO 4. Work in a team to ready build a computer graphics application

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 teaching hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Week 1: Introduction to Computer Graphics, Mathematics Foundation	3	I,T
Week 2: Bessenham algorithms	3	I,T,U
Week 3: Line clipping	3	I,T,U
Week 4: Polygon clipping	3	I,T,U
Week 5: Transformation and Perspective	3	I,T
Week 6: Transformation (cont.)	3	I,T,U
Week 7: Introduction to OpenGL programing	3	I,T,U
Week 8: View Transformation + Midterm	3	I,T,U
Week 9: 3D clipping	3	I,T,U
Week 10: Visual Surface Determination	3	I,T,U
Week 11: Color Models	3	I,T,U
Week 12: Image Rendering and Generation	3	I,T,U
Week 13: Ray Tracing & Texture Mapping	3	I,T,U
Week 14: Bezier Curve and Surface processing	3	I,T,U
Week 15: Building graphics application; final review	3	I,T,U

Examination forms

Multiple-choice questions, short-answer questions (computing and programing)

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list	1. Steve Marschner and Peter Shirley, Fundamentals of Computer Graphics 5th, by A K Peters/CRC Press ISBN: 9780367505035, 2021. 2. Frank Klawonn , Introduction to Computer Graphics Using Java 2D and 3D, 2nd Edition, Springer 2012. 3. Sumanta Guha, Computer Graphics Through OpenGL From Theory to Experiments Third Edition (AIT), CRC Press, 2019. 4. John Vince, Mathematics for Computer Graphics, 5th Edition, Springer 2017.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2	X	X				
3		X				X
4					X	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Computer Graphics, Mathematics Foundation	1	Quiz	Lecture,	[1, 4]
2	Bessenham algorithms	1, 2	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
3	Line clipping	1, 2	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
4	Polygon clipping	1, 2	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
5	Transformation and Perspective	2, 3	Quiz, Lab, Midterm exam	Lecture, Discussion,	[1, 2, 3]

				In-class exercises	
6	Transformation (cont.)	2, 3	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
7	Introduction to OpenGL	2,3,4	Quiz, Lab, Midterm exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
8	**Midterm**				
9	View Transformation	2, 3	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
10	3D clipping	2, 3	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
11	Visual Surface Determination	2, 3	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
12	Color Models	2, 3	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
13	Image Rendering and Generation	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
14	Ray Tracing & Texture Mapping	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
15	Bezier Curve and Surface processing	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, In-class exercises	[1, 2, 3]
16	Building graphics application; final review	2,3,4	Quiz, Lab, Final exam	Lecture, Discussion, Homework	[1, 2, 3]
17	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Labs (20%)		30%	30%	40%
Midterm examination (30%)	40%	60%		
Final examination (40%)		50%	50%	
Exercises/ Quiz (10%)	30%	40%	30%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response

4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a*	Information is taken from source(s) with enough interpretation/ evaluation to	Information is taken from source(s) with enough interpretation/ evaluation to	Information is taken from source(s) with some interpretation / evaluation,	Information is taken from source(s) without any interpretation/ evaluation.

point of view or conclusion	develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	(perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the

	compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

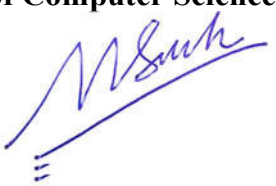
	authority on the topic.			
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



Assoc.Prof. Nguyen Van Sinh

Course Name: Deep Learning

Course Code: IT157IU

1. **General information**

Course designation	This course helps students understand the capabilities, challenges, and consequences of deep learning and prepare students to participate in the development of leading-edge AI technology
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Mai Hoang Bao An
Language	English
Relation to curriculum	Elective (CS, DS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	none
Course objectives	This course helps students understand the capabilities, challenges, and consequences of deep learning and prepare students to participate in the development of leading-edge AI technology. In this course, students will build and train neural network architectures such as Convolutional Neural Networks, Recurrent Neural Networks, Transformers, and learn how to make them better with strategies such as Dropout, BatchNorm, and more. Get ready to master theoretical concepts and their industry applications using Python and PyTorch and tackle real-world cases.
Course learning outcomes	CLO 1. Understand fundamental concepts of Deep Learning. Get familiar with some popular algorithms used in deep learning models. Understand and be able to use of popular libraries such as NumPy, PyTorch. CLO 2. Neural Networks for regression and classification. The concept of Multilayer Perceptrons. The essential networks:

Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN).
CLO 3. Build, train, and deploy different types of Deep Architectures from traditional to modern Architectures.
CLO 4. Understand and be able to apply deep learning techniques to real-world scenarios: Computer Vision, Natural Language Processing.

Competency level	Course learning outcome (CLO)
Knowledge	CLO 1, CLO 2, CLO 3, CLO 4
Skill	CLO 3, CLO 4
Attitude	CLO 3, CLO 4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Introduction to Deep Learning Some demos on the applications of Deep Learning	1	I, U
Linear Classifiers, Optimization and Gradient Descent Backpropagation Algorithm Introduction to PyTorch library	1	I, T
Linear Neural Networks for Regression Linear Neural Networks for Classification	1	T, U
Multilayer Perceptrons	1	T, U
Advances in PyTorch library	1	T, U
Convolutional Neural Networks (CNN)	1	T, U
Recurrent Neural Networks (RNN)	1	T, U
Modern CNN: • Networks Using Blocks (VGG) • Multi-Branch Networks (GoogLeNet) • Residual Neural Network (Resnet) • MobileNet	2	T, U
Modern RNN: • Gated Recurrent Units (GRU) • Long Short-Term Memory (LSTM) • Bidirectional RNN • Encoder-Decoder Architecture	2	T, U
Optimization Algorithms used in Deep Learning	1	I, T

	Generative Adversarial Network (GAN) & Deep Convolution GAN	1	T, U
	Deep Learning in Computer Vision	1	T, U
	Deep Learning in Natural Language Processing	1	T, U
Examination forms	Short-answer questions, Long-answer questions, programming questions		
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.		
Reading list	[1] Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, The MIT Press 2021, ISBN: 978-0262035613. [2] Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola., Dive Into Deep Learning.		

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	1	2	3	4	5	6
1	x					
2		x	x			
3			x	x		x
4				x		x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to Deep Learning Some demos on the applications of Deep Learning	1		Lecture, Discussion	[1, 2] Chapter 1
2	Linear Classifiers, Optimization and Gradient Descent Backpropagation Algorithm Introduction to PyTorch library	1	Exercises	Lecture, In-class exercises	[1, 2] Chapter 2

3	Linear Neural Networks for Regression Linear Neural Networks for Classification	1, 2	Exercises	Lecture, In-class exercises	[2] Chapter 3, 4
4	Multilayer Perceptrons	2	Exercises	Lecture, In-class exercises	[2] Chapter 5
5	Advances in PyTorch library	1, 2	Exercises	Lecture, In-class exercises	[2] Chapter 6
6	Convolutional Neural Networks (CNN)	2	Exercises	Lecture, In-class exercises	[2] Chapter 7
7	Recurrent Neural Networks (RNN)	2	Quiz	Lecture, In-class quiz	[2] Chapter 9
8-9	Modern CNN: • Networks Using Blocks (VGG) • Multi-Branch Networks (GoogLeNet) • Residual Neural Network (Resnet) • MobileNet	2, 3	Exercises	Lecture, In-class exercises	[2] Chapter 8
10	**Midterm**				
11-12	Modern RNN: • Gated Recurrent Units (GRU) • Long Short-Term Memory (LSTM) • Bidirectional RNN • Encoder-Decoder Architecture	2, 3	Exercises	Lecture, In-class exercises	[2] Chapter 10
13	Optimization Algorithms used in Deep Learning	1, 4	Seminar	Lecture, Discussion	[2] Chapter 12
14	Generative Adversarial Network (GAN) & Deep Convolution GAN	3, 4	Seminar	Lecture, Discussion	[2] Chapter 18
15	Deep Learning in Computer Vision	4	Seminar	Lecture, Student presentaion	[2] Chapter 14
16	Deep Learning in Natural Language Processing	4	Seminar	Lecture, Student presentaion	[2] Chapter 15
17	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Quiz (5%)	10%		20%	20%
Labs (10%)	30%	30%		
Midterm examination (30%)	50%	40%		
Projects/Presentations/ Report (15%)	10%		30%	30%
Final examination (40%)		30%	50%	50%

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.

3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes	Conclusion is logically tied to information (because information is chosen to fit the desired	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence

	evaluation and ability to place evidence and perspectives discussed in priority order.	(consequences and implications) are identified clearly.	conclusion); some related outcomes (consequences and implications) are identified clearly.	s and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable,	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

	and strongly supported.)			

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Internet of Things

Course Code: IT134IU

1. General information

Course designation	The course explains the architecture, components of Internet of Thing networks.
Semester(s) in which the course is taught	
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	The students will study the communication techniques between the components from short range to long range such as Bluetooth, Zigbee, Wi-fi, Lora, NB-IoT,… Moreover, the data storage, organization and analytics are also studied in this course.
Course learning outcomes	CLO 1. The ability of designing and implementing some Internet of Thing systems; CLO 2. The ability of collecting data then applying some data mining techniques to analyze the data in some IoT applications.

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO 1
Skill	CLO 1 and CLO 2
Attitude	CLO 1

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours)

<table>
<tr><td></td><td>Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Week 1: Introduction to Internet of Things</td><td>1</td><td>I</td></tr>
<tr><td>Week 2 : IoT applications (1st presentation from industry)</td><td>1</td><td>U</td></tr>
<tr><td>Week 3: Sensors and actuators in IoTs</td><td>1</td><td>T</td></tr>
<tr><td>Week 4-8: Communication technologies in IoTs: PAN (Bluetooth, Zigbee), LAN (IEEE 802.11), WAN (LoRa, LTE)</td><td>5</td><td>T</td></tr>
<tr><td>Week 9: Data collection in IoT</td><td>1</td><td>T, U</td></tr>
<tr><td>Week 10: IoT applications (cont.) (2nd presentation from industry)</td><td>1</td><td>U</td></tr>
<tr><td>Week 11-14: Data analytics</td><td>4</td><td>T, U</td></tr>
<tr><td>Week 15: Review</td><td>1</td><td>U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Raj Kamal, Internet of Things
Architecture and Design Principles, Mc Graw Hill India, 2017
[2] Hanes, David, et al. IoT fundamentals: Networking technologies, protocols, and use cases for the internet of things. Cisco Press, 2017.
[3] Singh, Rajesh, et al. Internet of things with Raspberry Pi and Arduino. CRC Press, 2019.
[4] Dow, Colin. Internet of things programming projects: build modern IoT solutions with the Raspberry Pi 3 and Python. Packt Publishing Ltd, 2018.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1		✓✓✓			✓✓	
2						✓

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources

1	Introduction to Internet of Things	1, 2	Homework	Lecture, Discussion, Inclass-Quiz	[1]
2	IoT applications (1st presentation from industry)	1	Homework	Lecture, Group work	[2]
3	Sensors and actuators in IoTs	1	Homework	Lecture, Discussion, Inclass-Quiz	[1]
4	**Midterm**		**Written exam**		
5 - 9	Communication technologies in IoTs: PAN (Bluetooth, Zigbee), LAN (IEEE 802.11), WAN (LoRa, LTE)	1	Homework	Lecture, Discussion, Inclass-Quiz	[1] [2]
10	Data collection in IoT	2	Homework	Lecture, Discussion, Inclass-Quiz	[1]
11	IoT applications (cont.) (2nd presentation from industry)	1, 2	Homework	Lecture, Group work	[2]
12 - 14	Data analytics	2	Homework	Lecture, Discussion, Inclass-Quiz, Presentation	[1]
15	Week 15: Review		Homework	Review-Test	
	Final exam		**Written exam**		

4. **Assessment plan**

Assessment Type	**CLO1**	**CLO2**
Quiz (5%)		10%
Labs (20%)	20%	20%
Midterm examination (30%)	30%	20%
Projects/Presentations/ Report (5%)	25%	
Final examination (40%)	25%	50%

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports	
Student: ……..	HW/Assignment:
Date: ……	…….

	Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is	Issue/ problem to be considered critically is stated but description	Issue/ problem to be considered critically is stated without clarification

	relevant information necessary for full understanding.	not seriously impeded by omissions.	leaves some terms undefined, ambiguities unexplored, boundaries undetermine d, and/ or backgrounds unknown.	or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and

	appears polished and confident.	appears comfortable.	appears tentative.	speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Mobile Application Development

Course Code: IT133IU

1. General information

Course designation	Advanced programming course with focus on mobile environment
Semester(s) in which the course is taught	7
Person responsible for the course	MSc. Le Thanh Son
Language	English
Relation to curriculum	Elective (All programs)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-oriented analysis and design
Course objectives	This course is designed to introduce and familiarize students with programming in the mobile environment: Android platform will be used throughout the course. The course starts with introductions to basic components, concepts, structures of Android applications then move on with common user interface elements, persistent storage, database for mobile etc. Introduction to most common tools and techniques for writing Android application is also included with hands on experience in form of lab exercise programming project.
Course learning outcomes	CLO 1. Understand the structure of mobile application, especially Android application CLO 2. Understand most common mobile platform user interface, database, services CLO 3. Able to develop mobile application CLO 4. Team working

Competency level	Course learning outcome (CLO)

	Knowledge	1
	Skill	2, 3
	Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to mobile programming	3	I
Android and Modal View Controller	3	I, T
Activity Lifecycle	3	I, T
Adroid SDK Versions and Compatbility	3	I, T
Creating UI: Layout and Widgets	3	T, U
ListFragment	3	
ViewPager	3	T, U
Dialogs	3	T, U
MediaPlayer	3	T, U
Action Bar	3	T, U
Saving and Loading Local Files	3	T, U
Context Menu and Contextual Action Mode	3	T, U
Taking Pictures and Handling Images	3	T, U
Intents	3	T, U
Browsing the Web & WebView	3	T, U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

3. C. Stewart, K. Marscicano, Android Programming: The Big Nerd Ranch Guide 3rd, 2017
4. D. Griffiths, Head First Android Development: A Brain-Friendly Guide 1st, 2015

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLO	1	2	3	4	5	6

1	x					
2	x					
3		xx				xxx
4			x			xxx

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to mobile programming	1	Quiz	Lecture	2
2	Android and Modal View Controller	1	Quiz	Lecture	2
3	Activity Lifecycle	1	Quiz	Lecture	2
4	Adroid SDK Versions and Compatbility	1	Quiz, Lab, Midterm	Lecture, Discussion	2
5	Creating UI: Layout and Widgets	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	ListFragment	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
7	ViewPager	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Dialogs	2, 3, 4	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
	Midterm				
9	MediaPlayer	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Action Bar	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Saving and Loading Local Files	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
12	Context Menu and Contextual Action Mode	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1

13	Taking Pictures and Handling Images	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
14	Intents	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
15	Browsing the Web & WebView	2, 3, 4	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
	Final exam				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**
Quiz / Assigment (10%)	50%	10%	10%	70%
Labs (20%)	10%	30%	30%	30%
Midterm examination (30%)	30%	30%	30%	
Final examination (40%)	10%	30%	30%	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact,

	synthesis. Viewpoints of experts are questioned thoroughly.	synthesis. Viewpoints of experts are subject to questioning.	coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in	Language choices are mundane and commonplace and partially support the effectiveness of the presentation.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is

	of the presentation. Language in presentation is appropriate to audience.	presentation is appropriate to audience.	Language in presentation is appropriate to audience.	not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling	Central message is clear and	Central message is basically	Central message can be deduced but is not

	(precisely stated, appropriately repeated, memorable, and strongly supported.)	consistent with the supporting material.	understandable but is not often repeated and is not memorable.	explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Human-Computer Interaction

Course Code: IT044IU

1. **General information**

Course designation	This course provides students with fundamental interaction principles between human and computers.
Semester(s) in which the course is taught	7,8
Person responsible for the course	Dr. Vi Chi Thanh
Language	English
Relation to curriculum	Elective (CS)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This course provides students with fundamental interaction principles between human and computers.
Course learning outcomes	CLO 1. Know how to gather requirements. CLO 2 Apply human-computer interaction principles in user interface design process CLO 3 Choose the appropriate interface evaluation method CLO 4. Understand different design principles for mobile applications, the Web, and emerging technologies. **Competency level** / **Course learning outcome (CLO)** Knowledge: 2, 3, 4 Skill: 1 Attitude: 1
Content	*The description of the contents should clearly indicate the weighting of the content and the level.*

<table>
<tr><td></td><td>Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Human factors</td><td>1</td><td>I</td></tr>
<tr><td>Human perception and cognition principles</td><td>2</td><td>T</td></tr>
<tr><td>User-centered design</td><td>2</td><td>T,U</td></tr>
<tr><td>Requirements gathering techniques</td><td>1</td><td>T,U</td></tr>
<tr><td>Interface design process</td><td>2</td><td>T,U</td></tr>
<tr><td>Prototyping techniques</td><td>2</td><td>T,U</td></tr>
<tr><td>Interface evaluation methodology</td><td>1</td><td>T,U</td></tr>
<tr><td>Interaction styles and techniques</td><td>1</td><td>T</td></tr>
<tr><td>HCI for mobile applications, the Web, and emerging technologies</td><td>2</td><td>T,U</td></tr>
<tr><td>Data analysis</td><td>1</td><td>T,U</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Sharp, H., Preece, J., Rogers, Y. (2019). Interaction Design: Beyond Human-Computer Interaction. United Kingdom: Wiley.

[2] Dix, A. (2003). Human-computer Interaction. Germany: Pearson/Prentice-Hall.

[3] MacKenzie, I. S. (2012). Human-Computer Interaction: An Empirical Research Perspective. Netherlands: Elsevier Science.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	1	2	3	4	5	6
1			x			
2	x				x	
3		x			x	
4		x				

3. **Planned learning activities and teaching methods**

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Human factors	1	Midterm exam	In-class activities	
2,3	Human perception and cognition principles	2	Midterm exam	In-class activities	
4,5	User-centered design	2	Midterm exam, Project, Lab quiz	In-class activities	
6	Requirements gathering techniques	1	Midterm exam, Project	In-class activities	
7,8	Interface design process	2	Midterm exam, Project	In-class activities	
Midterm exam					
9,10	Prototyping techniques	2	Project	In-class activities	
11	Interface evaluation methodology	3	Final exam, Project	In-class activities	
12	Interaction styles and techniques	3	Final exam	In-class activities	
13,14	HCI for mobile applications, the Web, and emerging technologies	4	Lab quiz	In-class activities	
15	Data analysis	2, 4	Final exam, Project	In-class activities	
Final exam					

4. **Assessment plan**

Assessment Type	CLO 1	CLO 2	CLO 3	CLO4
Quiz (5%)	10%		20%	20%
Labs (10%)	30%	30%		
Midterm examination (30%)	50%	40%		
Projects/Presentations/ Report (15%)	10%		30%	30%
Final examination (40%)		30%	50%	50%

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	Milestone		Benchmark
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others'	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when

			assumptions than one's own (or vice versa).	presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately	Central message is clear and consistent with	Central message is basically understandable but is not often	Central message can be deduced but is not explicitly stated in the presentation.

	repeated, memorable, and strongly supported.)	the supporting material.	repeated and is not memorable.	

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Cloud Computing

Course Code: IT164IU

1. **General information**

Course designation	The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure.
Semester(s) in which the course is taught	7
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Elective (CS, NE, CE)
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 182.5 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Lecture: 37.5 hours + Laboratory: 25 hours. Private study including examination preparation, specified in hours: 120 hours.
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	This course concentrates on parallel programming techniques for cloud computing and large-scale distributed systems which form the cloud infrastructure. The topics include overview of cloud computing, cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft, Yahoo, VMWare, etc. Students will also apply what they learn in one programming assignment and one project executed over Amazon Web Services.
Course learning outcomes	CLO 1. Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure. CLO 2. Able to deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.

<table>
<tr><td></td><td>CLO 3. Solve a real-world problem using cloud computing through group collaboration.
<table>
<tr><th>Competency level</th><th>Course learning outcome (CLO)</th></tr>
<tr><td>Knowledge</td><td>1</td></tr>
<tr><td>Skill</td><td>2, 3</td></tr>
<tr><td>Attitude</td><td>3</td></tr>
</table></td></tr>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (3 hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Introduction to Cloud Computing</td><td>1</td><td>I</td></tr>
<tr><td>Cloud Computing Platforms</td><td>3</td><td>T</td></tr>
<tr><td>Parallel Programming in the Cloud</td><td>3</td><td>T, U</td></tr>
<tr><td>Distributed Storage Systems</td><td>3</td><td>T, U</td></tr>
<tr><td>Virtualization</td><td>2</td><td>T, U</td></tr>
<tr><td>Cloud Security</td><td>2</td><td>T</td></tr>
<tr><td>Multicore Operating Systems</td><td>1</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Short-answer questions, Programming exercises</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>6. Rountree, Derrick, and Ileana Castrillo. The basics of cloud computing: Understanding the fundamentals of cloud computing in theory and practice. Newnes, 2013.
7. Patterson, Scott. Learn AWS Serverless Computing: A Beginner's Guide to Using AWS Lambda, Amazon API Gateway, and Services from Amazon Web Services. Packt Publishing Ltd, 2019.</td></tr>
</table>

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6
1	X					
2		XX				

3						X

3. **Planned learning activities and teaching methods**

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to Cloud Computing	1	Quiz	Lecture	1
2	Cloud Computing Platforms – Part 1	1	Quiz	Lecture	1
3	Cloud Computing Platforms – Part 2	1	Quiz	Lecture, Discussion, In-class Exercise	2
4	Cloud Computing Platforms – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
5	Parallel Programming in the Cloud – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	Parallel Programming in the Cloud – Part 2	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	2
7	Parallel Programming in the Cloud – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Distributed Storage Systems – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
Midterm					
9	Distributed Storage Systems – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Distributed Storage Systems – Part 3	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Virtualization – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1

12	Virtualization – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
13	Cloud Security – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1, 2
14	Cloud Security – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
15	Multicore Operating Systems	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
Final					

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz / Assigment (10%)	50%	10%	10%
Labs (20%)	10%	30%	30%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	10%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …… Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		

Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries	Issue/ problem to be considered critically is stated without clarification or description.

			undetermined, and/ or backgrounds unknown.	
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/ hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	view are synthesized within position (perspective, thesis/ hypothesis).	(perspective, thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the effectiveness of the presentation.

	enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 28, 2023

Ho Chi Minh City, 28/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Security Technology and Implementation

Course Code: IT165IU

1. General information

Course designation	The course will concentrate on security technologies that can be employed to safeguard and maintain a network. The course will also cover risk management, business continuity and recovery planning, operations security, access control systems, and software development security.
Semester(s) in which the course is taught	7,9
Person responsible for the course	Dr. Le Hai Duong
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Computer Networks
Course objectives	This course introduces students to information security principles, cryptography systems (symmetric and public key encryptions), risk management, security architecture and design, business continuity operations security, access control systems, protecting TCP/IP network, firewalls, virtual private network, IPSec, software development security.
Course learning outcomes	CLO 1. Gain understanding of information security and the cryptography concepts including symmetric key encryption, hash

function, message authentication code, public key encryption, digital signature and digital envelope;
CLO 2. Apply the concepts of authentication and authorization in implementing secure systems and networks;
CLO 3. Analyze and evaluate security risk and security design;
CLO 4. Understand and apply software development security;
CLO 5. Apply security technologies in operations.

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1, CLO2, CLO4, CLO5
Skill	CLO2, CLO3, CLO4, CLO6
Attitude	

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Information security principles	1	T
Governance and risk management;	1	T,U
Security architecture and design;	1	T
Business continuity and disaster recovery planning;	1	T,U
Operation security;	2	T,U
Access control systems and methodology;	1	T
Cryptography;	2	T,U
Overview network and telecommunications security;	1	T,U
Basic security infrastructures and routers;	1	T
Firewalls	1	T,U
Intrusion detection systems and intrusion protection systems	1	T
Virtual private network and IPSec;	1	T
Software Development security.	1	T,U

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list	3. William Stallings and Lawrence Brown, Computer Security - Principles and Practice 4th edition, 2018 4. Mark S. Merkow and Jim Breithaupt, Information Security: Principles and Practices, 2nd edition, 2014.

3. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-6) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X		X	X		
2		X				
3	X					
4	X					
5	X					
6	X					

4. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Information security principles	1	Quiz, Exam	Lecture, Exercises, Lab	[1,2]
2	Governance and risk management;	3	Quiz, Exam	Lecture, Lab	[2]
3	Security architecture and design;	3	Quiz, Exam	Lecture, Lab	[2]
4	Business continuity and disaster recovery planning;	3	Quiz, Exam	Lecture, Lab	[2]
5,6	Operation security;	5	Quiz, Exam	Lecture, Lab	[2]
7	Access control systems and methodology;	2		Lecture, Lab	
	Midterm exam				
8, 9	Cryptography;	1	Quiz, Exam	Lecture	[1]
10	Overview network and telecommunications;	5	Quiz, Exam	Lecture, Lab	[2]
11	Basic security infrastructures and routers;	5	Quiz, Exam	Lecture, Lab	[2]
12	Firewalls	5	Quiz, Exam	Lecture, Exercises,	[1,2]

13	Intrusion detection systems and intrusion protection systems	5	Quiz, Exam	Lecture, Exercises,	[1,2]
14	Virtual private network and IPSec;	5	Quiz, Exam	Lecture, Lab	[1,2]
15	Software Development security.	4	Quiz, Exam	Lecture	[2]
	Final exam				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**
Midterm examination (30%)	30%	80%	55%		10%
Final examination (40%)	40%			75%	60%
Exercises/ Quiz (30%)	30%	20%	45%	25%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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2. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		

Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

	appropriate to audience.	appropriate to audience.	appropriate to audience.	
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately	Central message is clear and consistent with	Central message is basically understandable but is not often	Central message can be deduced but is not explicitly stated

	repeated, memorable, and strongly supported.)	the supporting material.	repeated and is not memorable.	in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Software Quality Verification and Validation

Course Code: IT166IU

1. General information

2. Course designation	
Semester(s) in which the course is taught	7,9
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object-Oriented Programming
Course objectives	Introduction to software verification, validation, and testing. Strategies and techniques are presented for testing software, and also for planning software testing.
Course learning outcomes	CLO 1. Describe and explain how testing activities involve within software development process. CLO 2. Understand and apply best practices for software testing. CLO 3. Create test cases based on system requirement

Competency level	**Course learning outcome (CLO)**
Knowledge	CLO1, CLO2

<table>
<tr><td></td><td>
<table>
<tr><td>Skill</td><td>CLO2, CLO3</td></tr>
<tr><td>Attitude</td><td>CLO2</td></tr>
</table>
</td></tr>
<tr><td>Content</td><td>
The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Software Testing Overview</td><td>3</td><td>I</td></tr>
<tr><td>Software Testing Foundations</td><td>3</td><td>T</td></tr>
<tr><td>Software Testing Activities</td><td>3</td><td>T</td></tr>
<tr><td>Model-Driven Test Design</td><td>3</td><td>T, U</td></tr>
<tr><td>Test Automation</td><td>3</td><td>T, U</td></tr>
<tr><td>Testing First Approach</td><td>3</td><td>T</td></tr>
<tr><td>Criteria-Based Test Design</td><td>3</td><td>T</td></tr>
<tr><td>Input Space Partitioning</td><td>3</td><td>T</td></tr>
<tr><td>Graph Coverage</td><td>3</td><td>T</td></tr>
<tr><td>Logic Coverage</td><td>3</td><td>T</td></tr>
<tr><td>Writing Test Plans</td><td>3</td><td>T, U</td></tr>
<tr><td>Test implementation</td><td>3</td><td>T, U</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>Short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class</td></tr>
</table>

	participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	4. Paul Ammann, Jeff Offutt; Introduction to Software Testing, 2nd, 2017 5. James A. Whittaker; Exploratory Software Testing, 2009. 6. Glendford J. Myers, Tom Badgett, Corey Sandler; The art of Software Testing, 2012.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	XX					
2		XXX				
3						X

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Software Testing Overview	1	Quiz	Lecture	
2	Software Testing Foundations	1	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
3	Software Testing Activities	2	Quiz	Lecture, Discussion	[2]
4	Model-Driven Test Design	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
5	Test Automation	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]

6	Test Automation – Tools	1,2	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
7	Testing First Approach	2,3	Lab, Quiz, Midterm	Lecture, Discussion	
8	Criteria-Based Test Design	2,3	Lab, Quiz, Midterm	Lecture, Discussion, In class exercises	[1,3]
9	**Midterm**				
10	Input Space Partitioning – Part 1	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
11	Input Space Partitioning – Part 2	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,2,3]
12	Graph Coverage	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[1,3]
13	Logic Coverage	2,3	Lab, Quiz, Final	Lecture, Discussion	[1,3]
14	Writing Test Plans	1,2	Lab, Quiz, Final	Lecture, Discussion, In class exercises	[2,3]
15	Test implementation	2,3	Lab, Quiz, Final	Lecture, Discussion	[2,3]
16	**Final exam**				

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz (5%)	X	X	
Labs (20%)		X	
Midterm examination (30%)	X	X	X
Projects/Presentations/ Report (10%)		X	X
Final examination (40%)	X	X	X

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

2. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.

1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and	Identifies own and others' assumptions and several relevant contexts when	Questions some assumptions. Identifies several relevant	Shows an emerging awareness of present assumptions (sometimes

	carefully evaluates the relevance of contexts when presenting a position.	presenting a position.	contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**

Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.

Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 29th, 2023

Ho Chi Minh City, 29/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Game Development

Course Code: IT167IU

1. **General information**

Course designation	This course is an introduction to the theory and practice of the process of designing games and playful experiences.
Semester(s) in which the course is taught	7,9
Person responsible for the course	Dr. Le Duy Tan
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Total workload: 182.5 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Lecture: 37.5 hours + Laboratory: 25 hours. Private study including examination preparation, specified in hours: 120 hours.
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Object Oriented Programming
Course objectives	This course is an introduction to the theory and practice of the process of designing games and playful experiences. Students are familiarized with methods, concepts, techniques, and literature used in the design of games. The strategy is process-oriented, focusing on aspects such as: Rapid prototyping, play testing, and design iteration using a player-centered approach.
Course learning outcomes	CLO 1. Understand the emergence of the academic study of design methods and game design. CLO 2. Able to structure and conduct a game design project from conceptualization to playable prototype. CLO 3. Solve a real-world problem using game design knowledge through group collaboration.

Competency level	**Course learning outcome (CLO)**

		Knowledge	1
		Skill	2, 3
		Attitude	3

Content	*The description of the contents should clearly indicate the weighting of the content and the level.* Weight: lecture session (3 hours) Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	**Weight**	**Level**
Introduction to Game Development	1	I
Platforms and Publishing	3	T
Game Development Cycle	3	T, U
Principles of Game Design	3	T, U
Trade-Offs in Game Design	2	T, U
Game Engines, Game Systems and Elements; Map and Level Editors	2	T
Games Marketing and Distribution	1	T

Examination forms	Short-answer questions, Programming exercises
Study and examination requirements	Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged. Assignments/Examination: Students must have more than 50/100 points overall to pass this course.
Reading list	8. Nystrom, Robert. Game programming patterns. Genever Benning, 2014. 9. Gregory, Jason. Game engine architecture. crc Press, 2018.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

CLO\SLOT	1	2	3	4	5	6
1	X					
2		XXX				
3						X

3. Planned learning activities and teaching methods

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Introduction to Game Development	1	Quiz	Lecture	1

2	Platforms and Publishing – Part 1	1	Quiz	Lecture	1
3	Platforms and Publishing – Part 2	1	Quiz	Lecture, Discussion, In-class Exercise	2
4	Platforms and Publishing – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
5	Game Development Cycle – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
6	Game Development Cycle – Part 2	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	2
7	Game Development Cycle – Part 3	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
8	Principles of Game Design – Part 1	2, 3	Quiz, Lab, Midterm	Lecture, Discussion, In-class Exercise	1
Midterm					
9	Principles of Game Design – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
10	Principles of Game Design – Part 3	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
11	Trade-Offs in Game Design – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
12	Trade-Offs in Game Design – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
13	Game Engines, Game Systems and Elements; Map and Level Editors – Part 1	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1, 2

14	Game Engines, Game Systems and Elements; Map and Level Editors – Part 2	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
15	Games Marketing and Distribution	2, 3	Quiz, Lab, Final	Lecture, Discussion, In-class Exercise	1
Final					

4. Assessment plan

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Quiz / Assigment (10%)	50%	10%	10%
Labs (20%)	10%	30%	30%
Midterm examination (30%)	30%	30%	30%
Final examination (40%)	10%	30%	30%

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		

Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.3. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretatio n/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypot hesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position	Specific position (perspective, thesis/hypothesi s) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	(perspective, thesis/ hypothesis).			
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and	Language choices are thoughtful and generally support the	Language choices are mundane and commonplace and partially	Language choices are unclear and minimally support the

	enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is appropriate to audience.	support the effectiveness of the presentation. Language in presentation is appropriate to audience.	effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: August 28, 2023

Ho Chi Minh City, 28/08/2023

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Blockchain

Course Code: IT150IU

1. **General information**

Course designation	Introduction to Blockchain technology
Semester(s) in which the course is taught	6,7
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This subject introduces the students the foundation of blockchain technology and its applications. Students will study blockchain concepts and principles how it works. This course covers relevant topics blockchain space. The course starts with the basics of blockchain, cryptography, fundamental understanding of bitcoins. Then, the applications of blockchain technology is introduced in different areas of finance, healthcare, supply chain, etc. A complete picture of the ecosystem surrounding blockchain technology and development trends are also discussed.
Course learning outcomes	CLO 1. Understand basic contents of blockchain technology. CLO 2. Explain different types of blockchain development: Ethereum, smart contract security, bitcoin CLO 3. Apply blockchain techniques to setup the development environment to writing and deploying smart contracts, the workhorse of blockchain applications, integrating cryptocurrency micropayments into web apps CLO 4. Work in a team to build a blockchain application project.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1, CLO1
Skill	CLO3, CLO4
Attitude	CLO2

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Introduction	3	I
Cryptography & cryptocurrencies	3	T
How Bitcoin achieve decentralization	3	I, T
Mechanics of Bitcoin	3	T, U
How to store and use Bitcoin	3	T, U
Bitcoin mining	3	T
Bitcoin and Anonymity	3	T
Ethereum	3	I, T
Solidity	3	T, U
Token	3	I, T
Oracle	3	I, T
Decentralized Applications (Dapps)	3	T, U
Design pattern for blockchain applications	3	T
Real-world applications	3	I, T

Examination forms

Multiple-choice questions, short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction. Princeton, 2016
[2] Andreas M. Antonopoulos, and Gavin Wood Ph. D. Mastering Ethereum: Building Smart Contracts and DApps. O'Reilly Media, 2018
[3] Xiwei Xu, Ingo Weber, and Mark Staples. Architecture for Blockchain Applications. Springer, 2019.

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X					
2	X	X				
3		X				X
4						X

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction	1	Quiz	Teaching, Presentation	
2	Cryptography & cryptocurrencies	1	Quiz, In-class exercises	Teaching, Presentation	
3	How Bitcoin achieve decentralization	1, 2	Quiz, In-class exercises	Teaching, Presentation	
4	Mechanics of Bitcoin	1, 2	Quiz, In-class exercises	Teaching, Presentation	
5	How to store and use Bitcoin	1, 2	Quiz, In-class exercises	Teaching, Presentation	
6	Bitcoin mining	1, 2	Quiz, In-class exercises	Teaching, Presentation	
7	Bitcoin and Anonymity	2	Quiz, In-class exercises	Teaching, Presentation	
8	**Midterm**				
9	Ethereum	2,3	Project	Teaching, Presentation	
10	Solidity	2,3	Project	Teaching, Presentation	
11	Token	3,4	Quiz, In-class exercises	Teaching, Presentation	
12	Oracle	2,3	Quiz, In-class exercises	Teaching, Presentation Group discussion	
13	Decentralized Applications (Dapps)	3,4	Quiz, In-class exercises	Teaching, Presentation	

Week	Topic	CLO	Assessments	Learning activities	Resources
14	Design pattern for blockchain applications	3,4	Quiz, In-class exercises	Teaching, Presentation, In-class reading	
15	Real-world applications	3,4	Presentation	Teaching, Presentation Group discussion	
16	**Final exam**				

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4
Labs (20%)			x	x
Midterm examination (30%)	x	x		
Final examination (40%)		x	x	
Exercises/ Quiz (10%)	x			

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

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2. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.2. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		

Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.3. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.4. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.

Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective,	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

	hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	thesis/ hypothesis).		
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.

Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's

	presentation or establishes the presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	presenter's credibility/ authority on the topic.	credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Development and Operations (DevOps)

Course Code: IT156IU

1. **General information**

Course designation	This course is an introduction to DevOps to help students understand its principles and practices. Key concepts and terminology will be covered with real-life case studies, examples and practical exercises. Common and popular tools to achieve DevOps models will be introduced as well.
Semester(s) in which the course is taught	7,8
Person responsible for the course	Tran Thanh Tung, PhD.
Language	English
Relation to curriculum	Elective (NE)
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	Total workload: 195 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 (lecture) + 30 (laboratory) Private study including examination preparation, specified in hours: 120
Credit points	Number of credits: 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	None
Course objectives	This course is an introduction to DevOps to help students understand its principles and practices. Key concepts and terminology will be covered with real-life case studies, example and practical exercises. Common and popular tools to achieve DevOps models will be introduced as well.
Course learning outcomes	CLO 1. Define and discuss the key concepts and principles of DevOps CLO 2 Explain the benefit of DevOps and continuous delivery CLO 3 Understand infrastructure automation, build and deployment automation, the transformation to DevOps models CLO 4. Work with common and popular DevOps tools

Competency level	Course learning outcome (CLO)
Knowledge	1,2
Skill	3,4
Attitude	4

Content

The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)

Topic	Weight	Level
Introduction to DevOps	3	I
Introduction to Cloud Computing	3	I
Linux Basics and Shell Scripting	3	T,U
Versioning and Build Tool	3	T
Automation: Continuous Integration, Continuous Deployment	3	T
Configuration Management	3	I,T
Containers, Container vs Virtual Machine	3	I,T
Deployment pipeline	3	I,T
Post production	3	I,T
Disaster recovery	3	I
Continuous Monitoring for DevOps	3	I,T
Infrastructure and deployment security	3	I

Examination forms

Short-answer questions

Study and examination requirements

Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.

Reading list

[1] Jeffery D.Smith, Operations Anti-Patterns, DevOps Solutions, Manning Publications 2020

[2] Nicole Forsgren, Accelerate: The Science of Lean Software and DevOps: Building and Scaling High Performing Technology Organizations, IT Revolution Press 2018

[3] Jez Humble and David Farley. Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation, Addison-Wesley Professional, 2010

[4] Paul M. Duvall, Steve Matyas, Andrew Glover. Continuous Integration: Improving Software Quality and Reducing Risk,

	Addison-Wesley Professional, 2007Len Bass and John Klein. Deployment and Operations for Software Engineers, 2019.

2. Learning Outcomes Matrix

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	1	2	3	4	5	6
1	x					
2	x					
3		x				
4						x

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1	Introduction to DevOps				
2,3	Introduction to Cloud Computing				
4,5	Linux Basics and Shell Scripting				
6	Versioning and Build Tool				
7	Automation: Continuous Integration, Continuous Deployment				
8	Configuration Management				
Midterm exam					
9,10	Containers, Container vs Virtual Machine				
11	Deployment pipeline				
12	Post production				
13	Disaster recovery				
14	Continuous Monitoring for DevOps				
15	Infrastructure and deployment security				
Final exam					

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4

Quiz (5%)	10%		20%	20%
Labs (10%)	30%	30%		
Midterm examination (30%)	50%	40%		
Projects/Presentations/ Report (15%)	10%		30%	30%
Final examination (40%)		30%	50%	50%

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports			
Student: …….. Date: ……	HW/Assignment: ……. Evaluator: ……		
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.
3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.

1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6.

Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes	Conclusion is logically tied to information (because information is chosen to fit the desired	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequence

	evaluation and ability to place evidence and perspectives discussed in priority order.	(consequences and implications) are identified clearly.	conclusion); some related outcomes (consequences and implications) are identified clearly.	s and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are thoughtful and generally support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are mundane and commonplace and partially support the effectiveness of the presentation. Language in presentation is appropriate to audience.	Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.

Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable,	Central message is clear and consistent with the supporting material.	Central message is basically understandable but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

	and strongly supported.)			

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering

Assoc.Prof. Nguyen Van Sinh

Course Name: Data Science and Visualization

Course Code: IT138IU

1. **General information**

Course designation	Introduction to Data Visualization
Semester(s) in which the course is taught	4,6
Person responsible for the course	Tran Thanh Tung, Dr.
Language	English
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared
Teaching methods	Lecture, lesson, project, seminar.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: Contact hours (please specify whether lecture, exercise, laboratory session, etc.): Private study including examination preparation, specified in hours: Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
Credit points	Number of credits : 4 Lecture: 3 Laboratory: 1
Required and recommended prerequisites for joining the course	Prerequisite course of Data Science and Data Visualization
Course objectives	The goal of this course is to introduce students to the key principles, methods, and techniques for effective visual analysis of data. The course begins with aims and key principles of data visualization. The course continues with different aspects of visualization including techniques and method for presenting different data types, and for discussing and analyzing visualizations. Thorough the course, students will be introduced to many visualization systems and visual tools via hand-on exercises.
Course learning outcomes	CLO 1. Understand the principles of data and graphic design. CLO 2. Create well-designed data visualizations with appropriate tools. CLO 3. Evaluate a visualization design.

Competency level	Course learning outcome (CLO)
Knowledge	CLO1
Skill	CLO2, CLO3
Attitude	CLO3

<table>
<tr><td>Content</td><td>The description of the contents should clearly indicate the weighting of the content and the level.
Weight: lecture session (~~3~~ hours)
Teaching levels: I (Introduce); T (Teach); U (Utilize)
<table>
<tr><th>Topic</th><th>Weight</th><th>Level</th></tr>
<tr><td>Visualization design principles</td><td>3</td><td>I, T</td></tr>
<tr><td>Perception, Cognition, Color</td><td>3</td><td>T</td></tr>
<tr><td>Data abstraction, data types</td><td>3</td><td>I, T</td></tr>
<tr><td>Visual encoding with marks and channels</td><td>3</td><td>T, U</td></tr>
<tr><td>Tasks and Interactivity</td><td>3</td><td>T</td></tr>
<tr><td>Validation and visualization</td><td>3</td><td>T</td></tr>
<tr><td>Arrange text and sets</td><td>3</td><td>T</td></tr>
<tr><td>Arrange spatial data</td><td>3</td><td>T</td></tr>
<tr><td>Arrange tree and graphs/networks</td><td>3</td><td>T</td></tr>
<tr><td>Facets and views</td><td>3</td><td>T</td></tr>
<tr><td>Focus+Context</td><td>3</td><td>T</td></tr>
<tr><td>Filtering and Aggregation</td><td>3</td><td>T</td></tr>
</table></td></tr>
<tr><td>Examination forms</td><td>Multiple-choice questions, short-answer questions</td></tr>
<tr><td>Study and examination requirements</td><td>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.
Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</td></tr>
<tr><td>Reading list</td><td>[1] Edward R. Tufte, The Visual Display of Quantitative Information 2nd, 2001
[2] Tamara Munzner, Visualization Analysis and Design 1st, 2014
[3] Colin Ware, Visual Thinking for Design 1st, 2004
[4] Scott Murray, Interactive Data Visualization for the Web 1st, 2013
[5] Alberto Cairo, The Functional Art: An introduction to information graphics and visualization 1st, 2012
[6] Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals 1st, 2015</td></tr>
</table>

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-4) and Program/Student Learning Outcomes (SLO) (1-6) is shown in the following table:

	SLO					
CLO	1	2	3	4	5	6
1	X	X				
2		X	X			
3		X				

3. **Planned learning activities and teaching methods**

Week	**Topic**	**CLO**	**Assessments**	**Learning activities**	**Resources**
1	Visualization design principles	1	Quiz	Teaching, presentation	
2	Perception, Cognition, Color	1,2	Quiz, Project	Teaching, presentation	
3	Data abstraction, data types	2,3	Quiz, Project	Teaching, presentation	
4	Visual encoding with marks and channels	2,3	Quiz, Project	Teaching, presentation	
5	Tasks and Interactivity	2,3	Quiz, Project	Teaching, presentation	
6	**Midterm**				
7	Validation and visualization	1,3	Quiz, in-class exercises, Project	Teaching, Discussion	
8	Arrange text and sets	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
9	Arrange spatial data	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
10	Arrange tree and graphs/networks	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
11	Facets and views	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
12	Focus+Context	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
13	Filtering and Aggregation	2,3	Quiz, in-class exercises, Project	Teaching, Discussion	
14	**Final exam**				

4. **Assessment plan**

Assessment Type	**CLO1**	**CLO2**	**CLO3**
Labs (20%)		x	x
Midterm examination (30%)	x	x	
Final examination (40%)		x	x
Exercises/ Quiz (10%)	x	x	

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

2. When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.↩

5. Rubrics (optional)

5.4. Grading checklist

Grading checklist for Written Reports			
Student: …… HW/Assignment: ……. Date: …… Evaluator: ……			
	Max.	**Score**	**Comments**
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.5. Holistic rubric

Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW	
Score	**Description**
5	Demonstrates complete understanding of the problem. All requirements of task are included in response
4	Demonstrates considerable understanding of the problem. All requirements of task are included.

3	Demonstrates partial understanding of the problem. Most requirements of task are included.
2	Demonstrates little understanding of the problem. Many requirements of task are missing.
1	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

5.6. Analytic rubric

Critical thinking value rubric for evaluating questions in exams:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation / evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

			mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

Source: Association of American Colleges and Universities

Oral communication value rubric for evaluating presentation tasks:

	Capstone	**Milestone**		**Benchmark**
	4	**3**	**2**	**1**
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the	Language choices are thoughtful and generally support the effectiveness of the presentation.	Language choices are mundane and commonplace and partially support the effectiveness of the	Language choices are unclear and minimally support the effectiveness of the presentation.

	effectiveness of the presentation. Language in presentation is appropriate to audience.	Language in presentation is appropriate to audience.	presentation. Language in presentation is appropriate to audience.	Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressivenes s) make the presentation understandabl e, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandabili ty of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports the presentation or establishes the presenter's credibility/ authority on the topic.	Supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that partially supports the presentation or establishes the presenter's credibility/ authority on the topic.	Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.

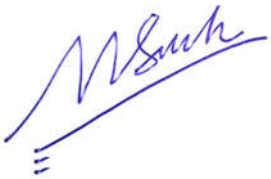
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)	Central message is clear and consistent with the supporting material.	Central message is basically understandabl e but is not often repeated and is not memorable.	Central message can be deduced but is not explicitly stated in the presentation.

Source: Association of American Colleges and Universities

Date revised: February 15, 2022

Ho Chi Minh City, 15/02/2022

Dean of School of Computer Science and Engineering



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