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 KỸ THUẬT Y SINH

TRÌNH ĐỘ ĐẠI HỌC

(Kèm theo Quyết định số 033/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

1. Thông tin chung

- Tên ngành đào tạo:
  + Tiếng Việt: Kỹ thuật Y Sinh
  + Tiếng Anh: Biomedical Engineering
- Mã ngành đào tạo: 7520212 (lấy mã số từ Danh mục giáo dục, đào tạo của Nhà nước.Nếu ngành nào chưa có trong Danh mục thì ghi là ngành đào tạo thí điểm).
- Trình độ đào tạo: đại học
- Loại hình đào tạo: chính quy
- Thời gian đào tạo: toàn thời gian
- Tên văn bằng sau khi tốt nghiệp:
  + Tiếng Việt: Kỹ sư Kỹ Thuật Y Sinh
  + Tiếng Anh: Engineer in Biomedical Engineering
- Nơi đào tạo: ĐH Quốc tế - ĐH 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:

Các kỹ sư tốt nghiệp từ chương trình đào tạo ngành KTYS được chuẩn bị để có thể:

- Thành công và hiệu quả khi giải quyết các vấn đề một cách định lượng và hệ thống, dựa trên kiến thức kỹ thuật y sinh và các lĩnh vực đa ngành liên quan;

- Không ngừng học tập mở rộng kiến thức, sáng tạo và đổi mới đóng góp cho sự phát triển của lĩnh vực kỹ thuật y sinh;
- Làm việc một cách có đạo đức và chuyên nghiệp ở cấp độ cao nhất trong các tổ chức công lập và tư nhân.

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**	**Luật giáo dục**
Thành công và hiệu quả khi giải quyết các vấn đề một cách định lượng và hệ thống, dựa trên kiến thức kỹ thuật y sinh và các lĩnh vực đa ngành liên quan.	Trường ĐHQT là trường đại học nghiên cứu thuộc tốp đầu tại châu Á; là cơ sở giáo dục quốc tế, tự chủ, sáng tạo; **là nơi vun đắp và phát triển nguồn nhân lực chất lượng cao chothị trường lao động trong nước và quốc tế.**	Là cơ sở giáo dục quốc tế, mang bản sắc văn hóa Việt Nam. Cơ sở giáo dục đại học đi tiên phong trong đổi mới cơ chế quản trị đại học theo mô hình tự chủ và tiên tiến. **Đào tạo chất lượng cao đa ngành – đa lĩnh vực**. **Đạt chuẩn kiểm định chất lượng giáo dục theo tiêu chuẩn quốc tế/khu vực cho tất cả các chương trình đào tạo.** Giảng dạy và nghiên cứu thực hiện bằng tiếng Anh là điểm khác biệt nâng tầm quốc tế của nhà trường. Người học được đào tạo và rèn luyện để trở thành công dân toàn cầu và có trách nhiệm với xã hội, dẫn dắt xã hội trong tương lai. **Nghiên cứu cơ bản với hàm lượng tri thức lớn song hành với nghiên cứu ứng dụng, đáp ứng yêu cầu đổi mới sáng tạo và phát triển bền vững của doanh nghiệp, địa phương và xã hội; quan tâm, thúc đẩy các hoạt động kết nối và phục vụ cộng đồng.**	Mục tiêu giáo dục nhằm phát triển toàn diện con người Việt Nam có đạo đức, tri thức, văn hóa, sức khỏe, thẩm mỹ và nghề nghiệp; **có phẩm** chất, năng lực **và ý thức công dân**; có lòng yêu nước, tinh thần dân tộc, trung thành với lý tưởng độc lập dân tộc và chủ nghĩa xã hội; **phát huy tiềm năng, khả năng sáng tạo của mỗi cá nhân**; nâng cao dân trí, phát triển nguồn nhân lực, bồi dưỡng nhân tài, đáp ứng yêu cầu của sự nghiệp xây dựng, bảo vệ Tổ quốc và hội nhập quốc tế.
Không ngừng học tập mở rộng kiến thức, sáng tạo và đổi mới đóng góp cho sự phát triển của lĩnh vực kỹ thuật y sinh.	Trường ĐHQT là trường đại học nghiên cứu thuộc tốp đầu tại châu Á; **là cơ sở giáo dục quốc tế, tự chủ, sáng tạo**; là nơi vun đắp và phát triển nguồn nhân lực chất lượng cao cho thị trường lao động trong nước và quốc tế.	Là cơ sở giáo dục quốc tế, mang bản sắc văn hóa Việt Nam. Cơ sở giáo dục đại học đi tiên phong trong đổi mới cơ chế quản trị đại học theo mô hình tự chủ và tiên tiến. Đào tạo chất lượng cao đa ngành – đa lĩnh vực. Đạt chuẩn kiểm định chất lượng giáo dục theo tiêu chuẩn quốc tế/khu vực cho tất cả các chương trình đào tạo. **Giảng dạy và nghiên cứu thực hiện bằng tiếng Anh là điểm khác biệt nâng tầm quốc tế của nhà trường**. Người học được đào tạo và rèn luyện để trở thành công dân toàn cầu và có trách	Mục tiêu giáo dục nhằm phát triển toàn diện con người Việt Nam có đạo đức, tri thức, văn hóa, sức khỏe, thẩm mỹ và nghề nghiệp; có phẩm chất, năng lực và ý thức công dân; có lòng yêu nước, tinh thần dân tộc, trung thành với lý tưởng độc lập dân tộc và chủ nghĩa xã hội**; phát huy tiềm năng, khả năng sáng tạo của mỗi cá nhân**; **nâng cao dân trí, phát triển nguồn nhân lực, bồi dưỡng nhân** tài, đáp ứng yêu cầu của sự nghiệp

		nhiệm với xã hội, dẫn dắt xã hội trong tương lai. **Nghiên cứu cơ bản với hàm lượng tri thức lớn song hành với nghiên cứu ứng dụng, đáp ứng yêu cầu đổi mới sáng tạo và phát triển bền vững của doanh nghiệp, địa phương và xã hội;** **quan tâm, thúc đẩy các hoạt động kết nối và phục vụ cộng đồng.**	xây dựng, bảo vệ Tổ quốc và hội nhập quốc tế.
Làm việc một cách có đạo đức và chuyên nghiệp ở cấp độ cao nhất trong các tổ chức công lập và tư nhân.	Trường ĐHQT là trường đại học nghiên cứu thuộc tốp đầu tại châu Á; là cơ sở giáo dục quốc tế, tự chủ, sáng tạo; l**à nơi vun đắp và phát triển nguồn nhân lực chất lượng cao chothị trường lao động trong nước và quốc tế.**	Là cơ sở giáo dục quốc tế, mang bản sắc văn hóa Việt Nam. Cơ sở giáo dục đại học đi tiên phong trong đổi mới cơ chế quản trị đại học theo mô hình tự chủ và tiên tiến. Đào tạo chất lượng cao đa ngành – đa lĩnh vực. Đạt chuẩn kiểm định chất lượng giáo dục theo tiêu chuẩn quốc tế/khu vực cho tất cả các chương trình đào tạo. Giảng dạy và nghiên cứu thực hiện bằng tiếng Anh là điểm khác biệt nâng tầm quốc tế của nhà trường. **Người học được đào tạo và rèn luyện để trở thành công dân toàn cầu và có trách nhiệm với xã hội, dẫn dắt xã hội trong tương lai**. Nghiên cứu cơ bản với hàm lượng tri thức lớn song hành với nghiên cứu ứng dụng, đáp ứng yêu cầu đổi mới sáng tạo và phát triển bền vững của doanh nghiệp, địa phương và xã hội; **quan tâm, thúc đẩy các hoạt động kết nối và phục vụ cộng đồng.**	**Mục tiêu giáo dục nhằm phát triển toàn diện con người Việt Nam có đạo đức, tri thức, văn hóa, sức khỏe, thẩm mỹ và nghề nghiệp;** có phẩm chất, năng lực và ý thức công dân; có lòng yêu nước, tinh thần dân tộc, trung thành với lý tưởng độc lập dân tộc và chủ nghĩa xã hội; phát huy tiềm năng, khả năng sáng tạo của mỗi cá nhân; nâng cao dân trí, phát triển nguồn nhân lực, bồi dưỡng nhân tài, đáp ứng yêu cầu của sự nghiệp xây dựng, bảo vệ Tổ quốc và hội nhập quốc tế.

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

Mục tiêu cụ thể của CTĐT được xác định từ mục tiêu chung, bao gồm 7 mục tiêu, trong đó có 3 mục tiêu về kiến thức, 3 mục tiêu về kỹ năng và 1 mục tiêu về tự chủ và trách nhiệm, được trình bày như sau:

- Kiến thức:
  - PO1: Sử dụng khối kiến thức cơ bản về khoa học và toán học một cách sáng tạo để giải quyết thực tiễn các vấn đề liên quan đến KTYS.
  - PO2: Có kiến thức và tầm nhìn sâu rộng về các nguyên tắc và xu hướng hiện hành của các nhóm ngành thuộc KTYS.
  - PO3: Có kiến thức về đạo đức và môi trường.

- Kỹ năng:
  - PO4: Sử dụng chuyên môn của mình nhằm giải quyết các vấn đề về khoa học và kỹ thuật y dược sinh.
  - PO5: Sử dụng một cách sáng tạo các công cụ phục vụ mô phỏng, phân tích, thiết kế, tính toán và kiểm soát.
  - PO6: Thiết kế và thực hiện thí nghiệm với các hệ thống và thiết bị ở các mức độ phực tạp khác nhau, phân tích hiệu quả các kết quả tìm được và vạch ra đường hướng mới.
- Tự chủ và trách nhiệm
  - PO7: Giao tiếp hiệu quả khi trao đổi với những chuyên gia đa ngành đa lĩnh vực ở cấp độ quốc tế và làm việc có trách nhiệm với xã hội nhờ chuyên môn cao.

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

Chuẩn đầu ra của chương trình đào tạo bậc đại học ngành KTYS được xây dựng theo tiêu chuẩn ABET, bao gồm các tiêu chuẩn sau:

- PLO1: Khả năng xác định và giải quyết các vấn đề kỹ thuật phức tạp bằng cách áp dụng các nguyên kỹ thuật, khoa học, và toán học (*PLO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*);
- PLO2: Khả năng áp dụng thiết kế kỹ thuật để tạo ra các giải pháp đáp ứng các nhu cầu cụ thể, song song với việc nhận thức được các vấn đề trong chăm sóc sức khỏe, an toàn và phúc lợi cộng đồng cũng như các yếu tố toàn cầu, văn hóa, xã hội, môi trường và kinh tế (*PLO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors);*
- PLO3: Khả năng giao tiếp hiệu quả với nhiều đối tượng *(PLO3: An ability to communicate effectively with a range of audiences);*
- PLO4: Khả năng nhận biết trách nhiệm đạo đức và trách nhiệm nghề nghiệp trong các tình huống kỹ thuật và đưa ra những đánh giá sáng suốt về tác động của các giải pháp kỹ thuật một cách toàn diện trong bối cảnh toàn cầu, kinh tế, môi trường và xã hội *(PLO4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts);*
- PLO5: Khả năng hoạt động hiệu quả trong một nhóm mà tất cả thành viên cùng nhau lãnh đạo, tạo ra một môi trường hợp tác và bình đẳng, thiết lập mục tiêu, lập kế hoạch thực hiện và đạt được các mục tiêu đề ra *(PLO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives);*
- PLO6: Khả năng phát triển và tiến hành thử nghiệm thích hợp, phân tích và giải thích dữ liệu và sử dụng phán đoán kỹ thuật để đưa ra kết luận *(PLO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions);*

- PLO7: Khả năng tiếp thu và áp dụng kiến thức mới khi cần thiết, sử dụng các chiến lược học tập phù hợp *(PLO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies).*

Các chuẩn đầu ra được đo lường theo trình độ năng lực như được trình bày ở bảng sau:

STT	Chuẩn đầu ra (PLO)	Trình độ năng lực
1	**Kiến thức**	
1.1	PLO1: Khả năng xác định và giải quyết các vấn đề kỹ thuật phức tạp bằng cách áp dụng các nguyên kỹ thuật, khoa học, và toán học	4.5 → 4.5
1.2	PLO2: Khả năng áp dụng thiết kế kỹ thuật để tạo ra các giải pháp đáp ứng các nhu cầu cụ thể, song song với việc nhận thức được các vấn đề trong chăm sóc sức khỏe, an toàn và phúc lợi cộng đồng cũng như các yếu tố toàn cầu, văn hóa, xã hội, môi trường và kinh tế	4.5 → 5.0
1.3	PLO6: Khả năng phát triển và tiến hành thử nghiệm thích hợp, phân tích và giải thích dữ liệu và sử dụng phán đoán kỹ thuật để đưa ra kết luận	3.5 → 4.0
2	**Kỹ năng**	
2.1	PLO3: Khả năng giao tiếp hiệu quả với nhiều đối tượng	3.5 → 4.0
2.2	PLO5: Khả năng hoạt động hiệu quả trong một nhóm mà tất cả thành viên cùng nhau lãnh đạo, tạo ra một môi trường hợp tác và bình đẳng, thiết lập mục tiêu, lập kế hoạch thực hiện và đạt được các mục tiêu đề ra	4.5 → 4.5
2.3	PLO7: Khả năng tiếp thu và áp dụng kiến thức mới khi cần thiết, sử dụng các chiến lược học tập phù hợp	3.0 → 3.5
3	**Mức tự chủ và trách nhiệm**	
3.1	PLO4: Khả năng nhận biết trách nhiệm đạo đức và trách nhiệm nghề nghiệp trong các tình huống kỹ thuật và đưa ra những đánh giá sáng suốt về tác động của các giải pháp kỹ thuật một cách toàn diện trong bối cảnh toàn cầu, kinh tế, môi trường và xã hội	3.0 → 3.5

Thang trình độ năng lực:

Trình độ năng lực	Mô tả
0.0 -> 2.0	Có biết qua/ Có nghe qua
2.0 -> 3.0	Có hiểu biết/ Có thể tham gia
3.0 -> 3.5	Có khả năng ứng dụng
3.5 -> 4.0	Có khả năng phân tích
4.0 -> 4.5	Có khả năng tổng hợp
4.5 -> 5.0	Có khả năng đánh giá

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

CĐR sẽ gắn kết với mục tiêu cụ thể đã được xác định ở Mục 3, theo Bảng 2.

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

	PLOs	**POs**						
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
Kiến thức	PLO1	X			X			
	PLO2		X			X		
	PLO6	X			X	X	X	
Kỹ năng	PLO3							X
	PLO5	X			X			X
	PLO7		X					
Tự chủ và trách nhiệm	PLO4		X	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: 151 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	49	32,4
II	Khối kiến thức cơ sở ngành	36	23,8
III	Kiến thức chuyên ngành	45	29,8
IV	Kiến thức bổ trợ	3	2,0
V	Thực tập, khóa luận/luận văn tốt nghiệp	18	12,0
	Tổng cộng	151	100

9. Nội dung chương trình đào tạo

Bảng 5.1. Các môn học thuộc CTĐT

STT	Mã MH	Tên môn học (MH)		Loại MH	Tín chỉ			Phòng TN (**)
		Tiếng việt	Tiếng Anh		Tổng cộng	Lý thuyết	Thực hành/Thí nghiệm	
I	**Kiến thức giáo dục đại cương**				***49***	***47***	***2***	
I.I	**Lý luận chính trị**				***17***	***17***	***0***	
1	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	
2	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	
3	PE017IU	Chủ nghĩa Xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	
4	PE018IU	Lịch sử Đảng Cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	
5	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	
6	PE008IU	Tư duy phân tích	Critical Thinking	Bắt buộc	3	3	0	
7	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	
I.II	**Khoa học xã hội - Nhân văn - Nghệ thuật**				***0***	***0***	***0***	
I.III	**Ngoại ngữ**				***8***	***8***	***0***	
8	EN007IU	Tiếng Anh học thuật 1 - Viết	Writing AE1.	Bắt buộc	2	2	0	
9	EN008IU	Tiếng Anh học thuật 1 – Nghe	Listening AE1	Bắt buộc	2	2	0	
10	EN011IU	Tiếng Anh học thuật 2 - Viết	Writing AE2	Bắt buộc	2	2	0	
11	EN012IU	Tiếng Anh học thuật 2 – Nói	Speaking AE2	Bắt buộc	2	2	0	
I.IV	**Toán - Tin học - Khoa học tự nhiên - Công nghệ - Môi trường**				***24***	***22***	***2***	
12	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	-
13	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	-
14	MA023IU	Toán 3	Calculus 3	Bắt buộc	4	4	0	-
15	MA024IU	Phương trình vi phân	Differential Equations	Bắt buộc	4	3	1	-
16	PH013IU	Lý 1	Physics 1	Bắt buộc	2	2	0	-

17	PH014IU	Lý 2	Physics 2	Bắt buộc	2	2	0	-
18	CH011IU	Hóa học cho kỹ sư	Chemistry for Engineers	Bắt buộc	3	3	0	-
19	CH012IU	Thực hành hóa học	Chemistry Laboratory	Bắt buộc	1	0	1	BT
I.V	**Kinh tế - Quản lý**				**0**	**0**	**0**	
I.VI	**Giáo dục thể chất**				***6(0)****	***0***	***0***	
20	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3(0)*	0	3	-
21	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3(0)*	0	3	-
I.VII	**Giáo dục quốc phòng**				Cấp chứng chỉ			
II	**Kiến thức cơ sở ngành**				***36***	***28***	***8***	
22	BM007IU	Kỹ thuật Y sinh đại cương	Introduction to Biomedical Engineering	Bắt buộc	4	3	1	LA1.408
23	CH014IU	Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME	Bắt buộc	3	3	0	-
24	BM098IU	Thực hành Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME Laboratory	Bắt buộc	1	0	1	LA1.407
25	BM090IU	Sinh học cho Kỹ Thuật Y Sinh	Biology for BME	Bắt buộc	4	3	1	LA1.406
26	BM053IU	Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering	Bắt buộc	3	3	0	-
27	BM054IU	Thực hành Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering Lab	Bắt buộc	1	0	1	LA2.201
28	BM030IU	Thiết kế máy cơ khí	Machine Design	Bắt buộc	3	3	0	
29	BM064IU	Tin học ứng dụng	Applied Informatics	Bắt buộc	4	3	1	IT
30	BM096IU	Trí tuệ nhân tạo trong y tế	AI for Healthcare	Bắt buộc	3	3	0	LA1.513
31	BM101IU	Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering	Bắt buộc	2	2	0	-
32	BM102IU	Thực hành thiết kế và chế tạo cơ khí	Mechanical design and manufacturing processes in	Bắt buộc	2	0	2	LA1.404

		trong kỹ thuật y sinh	biomedical engineering Lab					
33	BM005IU	Thống kê trong khoa học sức khỏe	Statistics for Health Science	Bắt buộc	3	2	1	-
34	BM091IU	Giải phẫu và sinh lý người	Human Anatomy and Physiology	Bắt buộc	3	3	0	-
III	**Kiến thức chuyên ngành**				***45***	***36***	***9***	
35	BM008IU	Y đức	Bioethics	Bắt buộc	3	3	0	
36	BM082IU	Vật liệu sinh học	Biomaterials	Bắt buộc	4	3	1	LA1.406
37	BM009IU	Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh	BME Capstone Design	Bắt buộc	4	3	1	LA1.408
38	BM011IU	Thách thức kỹ thuật trong Y khoa 1	Engineering Challenges in Medicine I	Bắt buộc	3	3	0	-
39	BM013IU	Kinh thầu trong Kỹ thuật Y Sinh	Entrepreneurship in Biomedical Engineering	Bắt buộc	3	3	0	-
40	BM068IU	Đồ án 1	Project 1	Bắt buộc	1	0	1	-
41	BM003IU	Đồ án chuẩn bị Luận văn tốt nghiệp	Pre-Thesis	Bắt buộc	1	0	1	-
42	BMIU	Môn tự chọn chuyên ngành 1	Technical Electives 1 (**)	Tự chọn	4	3	1	-
43	BM___IU	Môn tự chọn chuyên ngành 2	Technical Electives 2 (**)	Tự chọn	4	3	1	-
44	BM___IU	Môn tự chọn chuyên ngành 3	Technical Electives 3 (**)	Tự chọn	4	3	1	-
45	BM___IU	Môn tự chọn chuyên ngành 4	Technical Electives 4 (**)	Tự chọn	4	3	1	-
46	BM___IU	Môn tự chọn chuyên ngành 5	Technical Electives 5 (**)	Tự chọn	4	3	1	-
47	BM___IU	Môn tự chọn chuyên ngành 6	Technical Electives 6 (**)	Tự chọn	3	3	0	-
48	BM___IU	Môn tự chọn chuyên ngành 7	Technical Electives 7 (**)	Tự chọn	3	3	0	-

IV	**Kiến thức bổ trợ**				***3***	***3***	***0***	
49	_____IU	Môn tự chọn	Free Electives (***)		3	3	0	
V	**Thực tập, khóa luận/luận văn tốt nghiệp**				***18***	***0***	***18***	
50	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	Bắt buộc	1	0	1	-
51	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	Bắt buộc	1	0	1	-
52	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	Bắt buộc	1	0	1	-
53	BM017IU	Thiết kế y tế	Medical Design	Bắt buộc	1	0	1	-
54	BM069IU	Đồ án 2	Project 2	Bắt buộc	1	0	1	-
55	BM020IU	Thực tập	Internship	Bắt buộc	3	0	3	-
56	BM004IU	Luận văn tốt nghiệp	Thesis (#)	Bắt buộc	10	0	10	
	Tổng số (tín chỉ)				**151**	**-**	**-**	

Ghi chú:

- (*): môn giáo dục thể chất là 6 tín chỉ (2 môn x 3 tín chỉ), tuy nhiên số tín chỉ này không được tính vào tổng số tín chỉ tích lũy của chương trình đào tạo.

- (**) Xem danh sách các môn tự chọn chuyên ngành (Bảng 5.2).

- (***) Môn học bất kì có tín chỉ trong chương trình đào tạo của trường ĐH Quốc Tế.

- (#) Sinh viên cần đạt chuẩn đầu ra trình độ tiếng Anh mới được đăng kí Thesis.

- Số tín chỉ các môn toán-khoa học cơ bản là 35, môn kỹ thuật là 90, môn khác là 26 (theo yêu cầu của ABET, số tín chỉ tối thiểu của các môn toán-khoa học cơ bản và kỹ thuật lần lượt là 30 và 45).

Bảng 5.2. Danh sách môn học tự chọn chuyên ngành (Technical Electives)

STT	Mã MH	Tên môn học		Số tín chỉ		
		Tiếng việt	Tiếng Anh	Tổng cộng	Lý thuyết	Thực hành/ Thí nghiệm
1	BM060IU	Hệ thống số	Digital Systems	3	3	0
2	BM061IU	Thực hành Hệ thống số	Digital Systems Lab	1	0	1
3	BM062IU	Thiết bị vi điện tử	Micro-electronic Devices	3	3	0
4	BM063IU	Thực hành thiết bị vi điện tử	Micro-electronic Devices Laboratory	1	0	1
5	BM089IU	Thiết bị điện tử cho Kỹ thuật Y Sinh	Electronic Devices for Biomedical Design	4	3	1
6	BM033IU	Công nghệ thông tin trong hệ thống chăm sóc sức khỏe	Information Technology in the Health Care System	3	3	0
7	BM070IU	Thực hành công nghệ thông tin trong hệ thống chăm sóc sức khỏe	Information Technology in the Health Care System lab	1	0	1
8	BM075IU	Quang học Y Sinh	Biomedical Photonics	3	3	0
9	BM076IU	Thực hành Quang học Y Sinh	Biomedical Photonics Laboratory	1	0	1
10	BM058IU	Xử lý hình ảnh Y Sinh	Biomedical Image Processing	4	3	1
11	BM072IU	Mô hình tính toán trong Y Khoa	Computational Model in Medicine	4	3	1
12	BM073IU	Hình ảnh y khoa	Medical Imaging	4	3	1
13	BM074IU	Giao diện não – máy	Brain - Computer Interface	4	3	1
14	BM071IU	Chẩn đoán hỗ trợ bằng máy tính	Computer Aided Diagnosis	4	3	1
15	BM077IU	Kỹ thuật dược 1	Pharmaceutical Engineering 1	4	3	1
16	BM078IU	Kỹ thuật dược 2	Pharmaceutical Engineering 2	4	3	1
17	BM079IU	Nguyên lý dược động học	Principle of Pharmacokinetics	4	3	1
18	BM080IU	Công nghệ nano cho hệ vận chuyển thuốc	Nanotechnology for Drug Delivery Systems	4	3	1
19	BM081IU	Hệ vận chuyển thuốc	Drug Delivery Systems	4	3	1
20	BM010IU	Xử lý tín hiệu Y Sinh	Biosignal Processing	4	3	1
21	BM083IU	Ứng dụng vật liệu sinh học trong y học tái tạo	Applications of Biomaterials in Regenerative Medicine	4	3	1

22	BM084IU	Tương thích sinh học và phân hủy sinh học của vật liệu sinh học	Biocompatibility and Biodegradation of Biomaterials	4	3	1
23	BM085IU	Đặc tính và tính chất của vật liệu sinh học	Characterization and Properties of Biomaterials	4	3	1
24	BM086IU	Phương pháp và qui trình xây dựng scaffold	Methods and Process in Fabrication of Scaffold	4	3	1
25	BM092IU	Tương tác sinh học mô/tế bào	Cell/Tissue – Biomaterial interaction	4	3	1
26	BM093IU	Kỹ thuật mô 1	Tissue engineering I	4	3	1
27	BM094IU	Nguyên lý và thiết bị xét nghiệm lâm sàng	Principle of clinical tests and instrumentation	4	3	1
28	BM012IU	Thách thức kỹ thuật trong Y khoa 2	Engineering Challenges in Medicine II	3	3	0
29	PE014IU	Environmental Science	Environmental Science	3	3	0
30	BM095IU	Thiết bị Y tế	Medical Instrumentation	4	3	1
31	BM100IU	Nguyên Lý Kỹ Thuật Thần Kinh	Principles of Neuroengineering	4	3	1
32	BM099IU	Công Nghệ Tế Bào Gốc	Stem Cell Technology	4	3	1
33	BM103IU	Trí tuệ nhân tạo nâng cao trong y tế	Advanced Artificial Intelligence for Healthcare	4	3	1
34	BM104IU	Vi lưu	Microfluidics	4	3	1

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

Tùy vào trình độ tiếng Anh của người học đạt trình độ AE1, IE2, IE1 và IE0, kế hoạch giảng dạy các môn học được cụ thể tương ứng được trình bày trong các Bảng 6, Bảng 7, Bảng 8 và Bảng 9.

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**			**Tín chỉ**			
		Tiếng việt	**Tiếng Anh**	**Loại MH**	**Tổng cộng**	**Lý thuyết**	**Thực hành**	**Môn học tiên quyết (TQ)/ Môn học học trước (HT)/ Môn học song hành (SH)**
Học kỳ 1	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	PH013IU	Lý 1	Physics 1	Bắt buộc	2	2	0	Không

	PH014IU	Lý 2	Physics 2	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh học thuật 1 - Viết	Writing AE1.	Bắt buộc	2	2	0	Không
	EN008IU	Tiếng Anh học thuật 1 – Nghe	Listening AE1	Bắt buộc	2	2	0	Không
	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	Bắt buộc	1	0	1	Không
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	Không
	PE008IU	Tư duy phân tích	Critical Thinking	Bắt buộc	3	3	0	Không
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3(0)*	0	3	Không
Học kỳ 2 Tổng số tín chỉ: 18(21)*	CH011IU	Hóa học cho kỹ sư	Chemistry for Engineers	Bắt buộc	3	3	0	Môn song hành CH012IU - Chemistry Laboratory
	CH012IU	Thực hành hóa học	Chemistry Laboratory	Bắt buộc	1	0	1	Môn song hành CH011IU - Chemistry for Engineers
	BM090IU	Sinh học cho Kỹ Thuật Y Sinh	Biology for BME	Bắt buộc	4	3	1	Không
	BM053IU	Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering	Bắt buộc	3	3	0	Môn học trước MA001IU - Calculus 1
	BM054IU	Thực hành Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering Lab	Bắt buộc	1	0	1	Môn học trước MA001IU - Calculus 1
	EN011IU	Tiếng Anh học thuật 2 - Viết	Writing AE2	Bắt buộc	2	2	0	Không
	EN012IU	Tiếng Anh học thuật 2 – Nói	Speaking AE2	Bắt buộc	2	2	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	Môn học song song PE015IU - Philosophy of Marxism and Leninism
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3(0)1	0	3	Không
Hè năm nhất Tổng số tín chỉ: 02	PE017IU	Chủ nghĩa Xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	Không

Học kỳ 3 Tổng số tín chỉ: 18	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Không
	CH014IU	Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME	Bắt buộc	3	3	0	Không
	BM098IU	Thực hành Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME Laboratory	Bắt buộc	1	0	1	Không
	BM091IU	Giải phẫu và sinh lý người	Human Anatomy and Physiology	Bắt buộc	3	3	0	Môn tiên quyết BM090IU - Biology for BME
	BM007IU	Kỹ thuật Y sinh đại cương	Introduction to Biomedical Engineering	Bắt buộc	4	3	1	Không
	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	Bắt buộc	1	0	1	Môn học trước BM050IU - Lab 1A- Biomedical Instrumentations
	PE018IU	Lịch sử Đảng Cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Không
Học kỳ 4 Tổng số tín chỉ: 19	MA023IU	Toán 3	Calculus 3	Bắt buộc	4	4	0	Không
	BM064IU	Tin học ứng dụng	Applied Informatics	Bắt buộc	4	3	1	Không
	BM082IU	Vật liệu sinh học	Biomaterials	Bắt buộc	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 1	Technical Electives 1	Tự chọn	4	3	1	Không
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	Không
	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	Bắt buộc	1	0	1	Môn học trước BM067IU - Lab 1B- Invitro Studies
Hè năm hai Tổng số tín chỉ:		Quân sự	Military training	Bắt buộc				Không
	BM102IU	Thực hành thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering Lab	Bắt buộc	2	0	2	Không
Học kỳ 5 Tổng số tín chỉ: 17	MA024IU	Phương trình vi phân.	Differential Equations	Bắt buộc	4	3	1	Không
	BM101IU	Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering	Bắt buộc	2	2	0	Không
	BM011IU	Thách thức kỹ thuật trong Y khoa 1	Engineering Challenges in Medicine I	Bắt buộc	3	3	0	Không

	BM017IU	Thiết kế y tế	Medical Design	Bắt buộc	1	0	1	Môn học trước BM052IU - Design 2A-Electronic Design
	BM___IU	Môn tự chọn chuyên ngành 2	Technical Electives 2	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 6	Technical Electives 6	Tự chọn	3	3	0	Không
Học kỳ 6 Tổng số tín chỉ: 17	BM005IU	Thống kê trong khoa học sức khỏe	Statistics for Health Science	Bắt buộc	3	2	1	Không
	BM030IU	Thiết kế máy cơ khí	Machine Design	Bắt buộc	3	3	0	Không
	BM096IU	Trí tuệ nhân tạo trong y tế	AI for Healthcare	Bắt buộc	3	3	0	Không
	BM068IU	Đồ án 1	Project 1	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 3	Technical Electives 3	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 7	Technical Electives 7	Tự chọn	3	3	0	Không
Hè năm ba Tổng số tín chỉ: 03	BM020IU	Thực tập	Internship	Bắt buộc	3	0	3	Không
Học kỳ 7 Tổng số tín chỉ: 14	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	Không
	BM008IU	Y đức	Bioethics	Bắt buộc	3	3	0	Không
	BM013IU	Kinh thầu trong Kỹ thuật Y Sinh	Entrepreneurship in Biomedical Engineering	Bắt buộc	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 4	Technical Electives 4	Tự chọn	4	3	1	Không
	BM069IU	Đồ án 2	Project 2	Bắt buộc	1	0	1	Không
Học kỳ 8 Tổng số tín chỉ: 12	_____IU	Môn tự chọn	Free elective	Tự chọn	3	3	0	Không
	BM009IU	Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh	BME Capstone Design	Bắt buộc	4	3	1	Không
	BM003IU	Đồ án chuẩn bị Luận văn tốt nghiệp	Pre-Thesis	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 5	Technical Electives 5	Tự chọn	4	3	1	Không

Học kỳ 9 Tổng số tín chỉ: 10	BM004IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Không
	Tổng cộng			**-**	**151**	**114**	**43**	

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**	**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**	
Học kỳ 1 Tổng số tín chỉ:	ENTP02	Tiếng anh tăng cường IE2	IE2	-	13	-	-	
	MA001IU	Calculus 1	Calculus 1	Bắt buộc	4	4	0	Không
	PT001IU	Physical Training 1	Physical Training 1	Bắt buộc	3(0)1	0	3	Không
	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	Bắt buộc	1	0	1	Không
Học kỳ 2 Tổng số tín chỉ: 16(19)*	PH013IU	Lý 1	Physics 1	Bắt buộc	2	2	0	Không
	PH014IU	Lý 2	Physics 2	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh học thuật 1 - Viết	Writing AE1.	Bắt buộc	2	2	0	Không
	EN008IU	Tiếng Anh học thuật 1 – Nghe	Listening AE1	Bắt buộc	2	2	0	Không
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	Không
	PE008IU	Tư duy phân tích	Critical Thinking	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	Môn học song song PE015IU - Philosophy of Marxism and Leninism

	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3(0)1	0	3	Không
Học kỳ hè Tổng số tín chỉ: 5	PE017IU	Chủ nghĩa Xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	Không
	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	Không
Học kỳ 3 Tổng số tín chỉ: 19	CH011IU	Hóa học cho kỹ sư	Chemistry for Engineers	Bắt buộc	3	3	0	Môn song hành CH012IU - Chemistry Laboratory
	CH012IU	Thực hành hóa học	Chemistry Laboratory	Bắt buộc	1	0	1	Môn song hành CH011IU - Chemistry for Engineers
	BM090IU	Sinh học cho Kỹ Thuật Y Sinh	Biology for BME	Bắt buộc	4	3	1	Không
	BM053IU	Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering	Bắt buộc	3	3	0	Môn học trước MA001IU - Calculus 1
	BM054IU	Thực hành Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering Lab	Bắt buộc	1	0	1	Môn học trước MA001IU - Calculus 1
	EN011IU	Tiếng Anh học thuật 2 - Viết	Writing AE2	Bắt buộc	2	2	0	Không
	EN012IU	Tiếng Anh học thuật 2 – Nói	Speaking AE2	Bắt buộc	2	2	0	Không
	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	Bắt buộc	1	0	1	Môn học trước BM050IU - Lab 1A- Biomedical Instrumentations
	PE018IU	Lịch sử Đảng Cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Không
Học kỳ 4 Tổng số tín chỉ: 18	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Không
	CH014IU	Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME	Bắt buộc	3	3	0	Không
	BM098IU	Thực hành Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME Laboratory	Bắt buộc	1	0	1	Không
	BM091IU	Giải phẫu và sinh lý người	Human Anatomy and Physiology	Bắt buộc	3	3	0	Môn tiên quyết BM090IU - Biology for BME

	BM007IU	Kỹ thuật Y sinh đại cương	Introduction to Biomedical Engineering	Bắt buộc	4	3	1	Không
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	Không
	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	Bắt buộc	1	0	1	Môn học trước BM067IU - Lab 1B- Invitro Studies
Học kỳ hè Tổng số tín chỉ: 02		Giáo dục quốc phòng	Military Training					Không
	BM102IU	Thực hành thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering Lab	Bắt buộc	2	0	2	Không
Học kỳ 5 Tổng số tín chỉ: 19	MA023IU	Toán 3	Calculus 3	Bắt buộc	4	4	0	Không
	BM064IU	Tin học ứng dụng	Applied Informatics	Bắt buộc	4	3	1	Không
	BM082IU	Vật liệu sinh học	Biomaterials	Bắt buộc	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 1	Technical Electives 1 (**)	Tự chọn	4	3	1	Không
	BM017IU	Thiết kế y tế	Medical Design	Bắt buộc	1	0	1	Môn học trước BM052IU - Design 2A- Electronic Design
	BM101IU	Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering	Bắt buộc	2	2	0	Không
Học kỳ 6 Tổng số tín chỉ: 18	MA024IU	Phương trình vi phân.	Differential Equations	Bắt buộc	4	3	1	Không
	BM011IU	Thách thức kỹ thuật trong Y khoa 1	Engineering Challenges in Medicine I	Bắt buộc	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 2	Technical Electives 2 (**)	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 6	Technical Electives 6 (**)	Tự chọn	3	3	0	Không
	BM068IU	Đồ án 1	Project 1	Bắt buộc	1	0	1	Không
	BM005IU	Thống kê trong khoa học sức khỏe	Statistics for Health Science	Bắt buộc	3	2	1	Không

Học kỳ hè Tổng số tín chỉ: 03	BM020IU	Thực tập	Internship	Bắt buộc	3	0	3	Không
Học kỳ 7 Tổng số tín chỉ: 17	BM030IU	Thiết kế máy cơ khí	Machine Design	Bắt buộc	3	3	0	Không
	BM096IU	Trí tuệ nhân tạo trong y tế	AI for Healthcare	Bắt buộc	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 3	Technical Electives 3 (**)	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 7	Technical Electives 7 (**)	Tự chọn	3	3	0	Không
	BM069IU	Đồ án 2	Project 2	Bắt buộc	1	0	1	Không
	BM008IU	Y đức	Bioethics	Bắt buộc	3	3	0	Không
Học kỳ 8 Tổng số tín chỉ: 19	BM___IU	Môn tự chọn chuyên ngành 4	Technical Electives 4 (**)	Tự chọn	4	3	1	Không
	BM013IU	Kinh thầu trong Kỹ thuật Y Sinh	Entrepreneurship in Biomedical Engineering	Bắt buộc	3	3	0	Không
	_____IU	Môn tự chọn	Free elective	Tự chọn	3	3	0	Không
	BM009IU	Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh	BME Capstone Design	Bắt buộc	4	3	1	Không
	BM003IU	Đồ án chuẩn bị Luận văn tốt nghiệp	Pre-Thesis	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 5	Technical Electives 5 (**)	Tự chọn	4	3	1	Không

Học kỳ 9 Tổng số tín chỉ: 10	BM004IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Không
	Tổng				**151**	**114**	**37**	

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**	**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**	
Học kỳ 1 Tổng số tín chỉ: 00(31)*	ENTP01	Tiếng anh tăng cường IE1	IE1	-	17	-	-	Không
	ENTP02	Tiếng anh tăng cường IE2	IE2	-	13	-	-	Không
Học kỳ 2 Tổng số tín chỉ: 16(19)*	MA001IU	Physical Training 1	Calculus 1	Bắt buộc	4	4	0	Không
	PH013IU	Lý 1	Physics 1	Bắt buộc	2	2	0	Không
	PH014IU	Lý 2	Physics 2	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh học thuật 1 - Viết	Writing AE1.	Bắt buộc	2	2	0	Không
	EN008IU	Tiếng Anh học thuật 1 – Nghe	Listening AE1	Bắt buộc	2	2	0	Không
	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	Bắt buộc	1	0	1	Không
	PE008IU	Tư duy phân tích	Critical Thinking	Bắt buộc	3	3	0	Không
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3(0)1	0	3	Không

Họ kỳ Hè Tổng số tín chỉ: 8	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	Môn học song song PE015IU - Philosophy of Marxism and Leninism
	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	Không
Học kỳ 3 Tổng số tín chỉ: 19 (22)*	BM090IU	Sinh học cho Kỹ Thuật Y Sinh	Biology for BME	Bắt buộc	4	3	1	Không
	CH011IU	Hóa học cho kỹ sư	Chemistry for Engineers	Bắt buộc	3	3	0	Môn song hành CH012IU - Chemistry Laboratory
	CH012IU	Thực hành hóa học	Chemistry Laboratory	Bắt buộc	1	0	1	Môn song hành CH011IU - Chemistry for Engineers
	BM053IU	Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering	Bắt buộc	3	3	0	Môn học trước MA001IU - Calculus 1
	BM054IU	Thực hành Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering Lab	Bắt buộc	1	0	1	Môn học trước MA001IU - Calculus 1
	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	Bắt buộc	1	0	1	Môn học trước BM050IU - Lab 1A- Biomedical Instrumentations
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3(0)1	0	3	Không
	PE017IU	Chủ nghĩa Xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	Không
	EN011IU	Tiếng Anh học thuật 2 - Viết	Writing AE2	Bắt buộc	2	2	0	Không
	EN012IU	Tiếng Anh học thuật 2 – Nói	Speaking AE2	Bắt buộc	2	2	0	Không

Học kỳ 4 Tổng số tín chỉ: 18	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Không
	BM091IU	Giải phẫu và sinh lý người	Human Anatomy and Physiology	Bắt buộc	3	3	0	Môn tiên quyết BM090IU - Biology for BME
	CH014IU	Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME	Bắt buộc	3	3	0	Không
	BM098IU	Thực hành Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME Laboratory	Bắt buộc	1	0	1	Không
	BM007IU	Kỹ thuật Y sinh đại cương	Introduction to Biomedical Engineering	Bắt buộc	4	3	1	Không
	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	Bắt buộc	1	0	1	Môn học trước BM067IU - Lab 1B- Invitro Studies
	PE018IU	Lịch sử Đảng Cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Không
Học kỳ hè Tổng số tín chỉ: 02		Giáo dục quốc phòng	Military Training					Không
	BM102IU	Thực hành thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering Lab	Bắt buộc	2	0	2	Không
Học kỳ 5 Tổng số tín chỉ: 21	MA023IU	Toán 3	Calculus 3	Bắt buộc	4	4	0	Không
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	Không
	BM064IU	Tin học ứng dụng	Applied Informatics	Bắt buộc	4	3	1	Không
	BM082IU	Vật liệu sinh học	Biomaterials	Bắt buộc	4	3	1	Không
	BM101IU	Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering	Bắt buộc	2	2	0	Không
	BM017IU	Thiết kế y tế	Medical Design	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 1	Technical Electives 1 (**)	Tự chọn	4	3	1	Không

Học kỳ 6 Tổng số tín chỉ: 19	MA024IU	Phương trình vi phân.	Differential Equations	Bắt buộc	4	3	1	Không
	BM011IU	Thách thức kỹ thuật trong Y khoa 1	Engineering Challenges in Medicine I	Bắt buộc	3	3	0	Không
	BM005IU	Thống kê trong khoa học sức khỏe	Statistics for Health Science	Bắt buộc	3	2	1	Không
	BM___IU	Môn tự chọn chuyên ngành 2	Technical Electives 2 (**)	Tự chọn	4	3	1	Không
	BM068IU	Đồ án 1	Project 1	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 3	Technical Electives 3 (**)	Tự chọn	4	3	1	Không
Học kỳ hè Tổng số tín chỉ: 03	BM020IU	Thực tập	Internship	Bắt buộc	3	0	3	Không
Học kỳ 7 Tổng số tín chỉ: 18	BM___IU	Môn tự chọn chuyên ngành 4	Technical Electives 4 (**)	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 5	Technical Electives 5 (**)	Tự chọn	4	3	1	Không
	BM030IU	Thiết kế máy cơ khí	Machine Design	Bắt buộc	3	3	0	Không
	BM096IU	Trí tuệ nhân tạo trong y tế	AI for Healthcare	Bắt buộc	3	3	0	Không
	BM008IU	Y đức	Bioethics	Bắt buộc	3	3	0	Không
	BM069IU	Đồ án 2	Project 2	Bắt buộc	1	0	1	Không

Học kỳ 8 Tổng số tín chỉ: 12	BM013IU	Môn tự chọn chuyên ngành 4	Technical Electives 4 (**)	Bắt buộc	3	3	0	Không
	BM009IU	Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh	BME Capstone Design	Bắt buộc	4	3	1	Không
	_____IU	Môn tự chọn	Free elective	Tự chọn	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 7	Technical Electives 7 (**)	Tự chọn	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 6	Technical Electives 6 (**)	Tự chọn	3	3	0	Không
	BM003IU	Đồ án chuẩn bị Luận văn tốt nghiệp	Pre-Thesis	Bắt buộc	1	0	1	Không
Học kỳ 9 Tổng số tín chỉ:	BM004IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Không
	Tổng				**151**	**114**	**137**	

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**	**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**	
Học kỳ 1 Tổng số tín chỉ: 0(34)*	ENTP00	Tiếng anh tăng cường IE0	IE0	-	17	-	-	Không
	ENTP01	Tiếng anh tăng cường IE1	IE1	-	17	-	-	Không

Học kỳ 2 Tổng số tín chỉ: 5(21)*	ENTP02	Tiếng anh tăng cường IE2	IE 2	-	13	-	-	Không
	MA001IU	Toán 1	Calculus 1	Bắt buộc	4	4	0	Không
	PT001IU	Giáo dục thể chất 1	Physical Training 1	Bắt buộc	3(0)1	0	3	Không
	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	Bắt buộc	1	0	1	Không
Hè Tổng số tín chỉ: 8	PE021IU	Pháp luật đại cương	General Law	Bắt buộc	3	3	0	Không
	PE015IU	Triết học Mác-Lênin	Philosophy of Marxism and Leninism	Bắt buộc	3	3	0	Không
	PE016IU	Kinh tế chính trị Mác-Lênin	Political economics of Marxism and Leninism	Bắt buộc	2	2	0	Môn học song song PE015IU - Philosophy of Marxism and Leninism
Học kỳ 3 Tổng số tín chỉ: 18 (21)*	PH013IU	Lý 1	Physics 1	Bắt buộc	2	2	0	Không
	PH014IU	Lý 2	Physics 2	Bắt buộc	2	2	0	Không
	EN007IU	Tiếng Anh học thuật 1 - Viết	Writing AE1.	Bắt buộc	2	2	0	Không
	EN008IU	Tiếng Anh học thuật 1 – Nghe	Listening AE1	Bắt buộc	2	2	0	Không
	PE008IU	Tư duy phân tích	Critical Thinking	Bắt buộc	3	3	0	Không
	PT002IU	Giáo dục thể chất 2	Physical Training 2	Bắt buộc	3(0)1	0	3	Không
	MA003IU	Toán 2	Calculus 2	Bắt buộc	4	4	0	Không
	PE017IU	Chủ nghĩa Xã hội khoa học	Scientific socialism	Bắt buộc	2	2	0	Không
	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	Bắt buộc	1	0	1	Môn học trước BM050IU - Lab 1A- Biomedical Instrumentations

Học kỳ 4 Tổng số tín chỉ: 21	BM090IU	Sinh học cho Kỹ Thuật Y Sinh	Biology for BME	Bắt buộc	4	3	1	Không
	BM053IU	Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering	Bắt buộc	3	3	0	Môn học trước MA001IU - Calculus 1
	BM054IU	Thực hành Nguyên lý điện trong kỹ thuật y sinh	Principles of Electricity in Biomedical Engineering Lab	Bắt buộc	1	0	1	Môn học trước MA001IU - Calculus 1
	CH011IU	Hóa học cho kỹ sư	Chemistry for Engineers	Bắt buộc	3	3	0	Không
	CH012IU	Thực hành hóa học	Chemistry Laboratory	Bắt buộc	1	0	1	Không
	EN011IU	Tiếng Anh học thuật 2 - Viết	Writing AE2	Bắt buộc	2	2	0	Không
	EN012IU	Tiếng Anh học thuật 2 – Nói	Speaking AE2	Bắt buộc	2	2	0	Không
	MA023IU	Toán 3	Calculus 3	Bắt buộc	4	4	0	Không
	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	Bắt buộc	1	0	1	Môn học trước BM067IU - Lab 1B- Invitro Studies
Học kỳ hè Tổng số tín chỉ: 02		Giáo dục quốc phòng	Military Training					Không
	BM102IU	Thực hành thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering Lab	Bắt buộc	2	0	2	Không

Học kỳ 5 Tổng số tín chỉ: 20	BM091IU	Giải phẫu và sinh lý người	Human Anatomy and Physiology	Bắt buộc	3	3	0	Không
	BM064IU	Tin học ứng dụng	Applied Informatics	Bắt buộc	4	3	1	Không
	BM007IU	Kỹ thuật Y sinh đại cương	Introduction to Biomedical Engineering	Bắt buộc	4	3	1	Không
	CH014IU	Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME	Bắt buộc	3	3	0	Không
	BM098IU	Thực hành Hóa học cho Kỹ thuật Y Sinh	Chemistry for BME Laboratory	Bắt buộc	1	0	1	Không
	BM017IU	Thiết kế y tế	Medical Design	Bắt buộc	1	0	1	Môn học trước BM052IU - Design 2A- Electronic Design
	PE018IU	Lịch sử Đảng Cộng sản Việt Nam	History of Vietnamese Communist Party	Bắt buộc	2	2	0	Không
	BM101IU	Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh	Mechanical design and manufacturing processes in biomedical engineering	Bắt buộc	2	2	0	Không
Học kỳ 6 Tổng số tín chỉ: 21	BM___IU	Môn tự chọn chuyên ngành 1	Technical Electives 1 (**)	Tự chọn	4	3	1	Không
	MA024IU	Phương trình vi phân.	Differential Equations	Bắt buộc	4	3	1	Không
	BM082IU	Vật liệu sinh học	Biomaterials	Bắt buộc	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 3	Technical Electives 3 (**)	Tự chọn	4	3	1	Không
	BM069IU	Đồ án 2	Project 2	Bắt buộc	1	0	1	Không
	BM005IU	Thống kê trong khoa học sức khỏe	Statistics for Health Science	Bắt buộc	3	2	1	Không
	BM068IU	Đồ án 1	Project 1	Bắt buộc	1	0	1	Không
Học kỳ hè Tổng số tín chỉ: 03	BM020IU	Thực tập	Internship	Bắt buộc	3	0	3	Không

Học kỳ 7 Tổng số tín chỉ: 20	BM008IU	Y đức	Bioethics	Bắt buộc	3	3	0	Không
	BM011IU	Thách thức kỹ thuật trong Y khoa 1	Engineering Challenges in Medicine I	Bắt buộc	3	3	0	Không
	BM030IU	Thiết kế máy cơ khí	Machine Design	Bắt buộc	3	3	0	Không
	BM096IU	Trí tuệ nhân tạo trong y tế	AI for Healthcare	Bắt buộc	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 2	Technical Electives 2 (**)	Tự chọn	4	3	1	Không
	BM003IU	Đồ án chuẩn bị Luận văn tốt nghiệp	Pre-Thesis	Bắt buộc	1	0	1	Không
	BM___IU	Môn tự chọn chuyên ngành 6	Technical Electives 6 (**)	Tự chọn	3	3	0	Không
Học kỳ 8 Tổng số tín chỉ: 20	BM009IU	Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh	BME Capstone Design	Bắt buộc	4	3	1	Không
	BM013IU	Kinh thầu trong Kỹ thuật Y Sinh	Free elective	Tự chọn	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 7	Technical Electives 7 (**)	Tự chọn	3	3	0	Không
	BM___IU	Môn tự chọn chuyên ngành 4	Technical Electives 4 (**)	Tự chọn	4	3	1	Không
	BM___IU	Môn tự chọn chuyên ngành 5	Technical Electives 5 (**)	Tự chọn	4	3	1	Không
	PE019IU	Tư tưởng Hồ Chí Minh	Ho Chi Minh's Thoughts	Bắt buộc	2	2	0	Không
Học kỳ 9 Tổng số tín chỉ: 13	_____IU	Môn tự chọn	Free elective	Tự chọn	3	3	0	Không
	BM004IU	Luận văn tốt nghiệp	Thesis	Bắt buộc	10	0	10	Không
	Tổng				151	114	37	

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

(Danh sách các môn học được hệ thống theo học kỳ và phân bổ giảng dạy các kỹ năng vào các môn học: mức độ giảng dạy và trình độ năng lực yêu cầu với môn học theo trình độ năng lực. Thang đo năng lực Thầy/Cô cần xác định rõ, phù hợp với CTĐT của Thầy/Cô, khuyến khích sử dụng thang Bloom)

Mức độ đóng góp của các môn học vào chuẩn đầu ra của CTĐT ngành Kỹ thuật Y Sinh được trình bày như Bảng 10.

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

Học kỳ	Mã MH	Tin MH	Chuẩn đầu ra CTĐT						
			1		2		3		4
			PLO1	PLO6	PLO4	PLO7	PLO3	PLO5	PLO2
1	PE008IU	Critical Thinking						x	
1	MA001IU	Calculus 1	x						
1	PH013IU	Physics 1	x						
1	PH014IU	Physics 2	x						
1	BM050IU	Practice 1: Reverse Engineering				x			
1	EN007IU	Writing AE1							
1	EN008IU	Listening AE1						x	
1	EN011IU	Writing AE2							
1	EN012IU	Speaking AE2						x	
2	MA003IU	Calculus 2	x						
2	CH011IU	Chemistry for Engineers	x						
2	CH012IU	Chemistry Laboratory	x	x					
2	BM090IU	Biology for BME	x						
2	BM053IU	Principles of Electricity in Biomedical Engineering	x						
2	BM054IU	Principles of Electricity in Biomedical Engineering Lab		x	x				
2	BM067IU	Practice 2: Animal Cell and Microbiologies		x					
3	MA023IU	Calculus 3	x						
3	CH014IU	Chemistry for BME	x				x		x
3	BM098IU	Chemistry for BME Lab		x	x				
3	BM091IU	Human Anatomy and Physiology	x		x				
3	BM052IU	Practice 3: Electronic Design		x	x				
4	MA024IU	Differential Equations	x						
4	BM064IU	Applied Informatics	x	x			x		x
4	BM082IU	Biomaterials	x	x			x		x
4	BM017IU	Medical Design	x	x			x	x	x
5	BM005IU	Statistics for Health Science		x	x				
5	BM011IU	Engineering Challenges in Medicine I	x		x				

5	BM101IU	Mechanical design and manufacturing processes in biomedical engineering	x			x		x	
5	BM102IU	Mechanical design and manufacturing processes in biomedical engineering Lab				x			x
5	BM068IU	Project 1	x			x			
6	BM008IU	Bioethics			x				
6	BM030IU	Machine Design	x				x		x
6	BM069IU	Project 2	x		x	x			
7	BM009IU	BME Capstone Design	x		x	x	x	x	x
7	BM013IU	Entrepreneurship in Biomedical Engineering			x	x		x	
7	BM003IU	Pre-Thesis	x	x		x			
8	BM004IU	Thesis	x	x	x	x			
4-7	BM010IU	Biosignal Processing	x	x			x		x
4-7	BM060IU	Digital Systems	x	x			x		x
4-7	BM061IU	Digital Systems Lab	x	x	x				
4-7	BM062IU	Micro-electronic Devices		x			x	x	x
4-7	BM063IU	Micro-electronic Devices Laboratory			x				
4-7	BM089IU	Electronic Devices for Biomedical Design	x	x	x		x		x
4-7	BM033IU	Information Technology in the Health Care System		x	x		x		x
4-7	BM070IU	Information Technology in the Health Care System Lab		x	x				
4-7	BM075IU	Biomedical Photonics	x	x	x		x		x
4-7	BM076IU	Biomedical Photonics Lab		x			x	x	x
4-7	BM058IU	Biomedical Image Processing		x			x		x
4-7	BM073IU	Medical Imaging	x	x			x		x
4-7	BM074IU	Brain - Computer Interface		x			x		x
4-7	BM071IU	Computer Aided Diagnosis	x	x	x				
4-7	BM077IU	Pharmaceutical Engineering 1		x			x		x
4-7	BM078IU	Pharmaceutical Engineering 2	x	x			x		x

4-7	BM079IU	Principle of Pharmacokinetics	x	x					
4-7	BM080IU	Nanotechnology for Drug Delivery Systems		x	x		x		x
4-7	BM081IU	Drug Delivery Systems	x	x			x		x
4-7	BM083IU	Applications of Biomaterials in Regenerative Medicine		x					
4-7	BM084IU	Biocompatibility and Biodegradation of Biomaterials	x	x			x		x
4-7	BM085IU	Characterization and Properties of Biomaterials	x	x			x		x
4-7	BM086IU	Methods and Process in Fabrication of Scaffold	x	x			x		x
4-7	BM092IU	Cell/Tissue – Biomaterial interaction	x	x			x		x
4-7	BM093IU	Tissue engineering I					x		x
4-7	BM094IU	Principle of clinical tests and instrumentation	x	x	x		x		x
6-7	BM020IU	Internship			x	x			

12 **Mô tả vắn tắt nội dung và khối lượng các môn học** *(số thứ tự của môn học tương ứng với số thứ tự của môn học trong nội dung chương trình đào tạo)*

Tên môn học: PE015IU - Philosophy of Marxism and Leninism (Triết học Mác – Lênin).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những kiến thức cơ bản về triết học Mác – Lênin.

Tên môn học: PE016IU - Political economics of Marxism and Leninism (Kinh tế chính trị Mác – Lênin).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Môn học song song PE015IU - Philosophy of Marxism and Leninism
- Mô tả nội dung 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 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 té ở Việt Nam.

Tên môn học: PE017IU - Scientific socialism (Chủ nghĩa Xã hội Khoa học).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước PE015IU - Philosophy of Marxism and Leninism, PE016IU - Political economics of Marxism and Leninism
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những kiến thức cơ bản về chủ nghĩa xã hội khoa học

Tên môn học: PE018IU - History of Vietnamese Communist Party (Lịch sử Đảng Cộng sản Việt Nam).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước PE017IU - Scientific socialism
- Mô tả nội dung môn học: Môn học trang bị cho sinh viên những kiến thức cơ bản về Lịch sử Đảng Cộng sản Việt Nam

Tên môn học: PE019IU - Ho Chi Minh's Thoughts (Tư tưởng Hồ Chí Minh).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước PE017IU - Scientific socialism
- Mô tả nội dung 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 chủ nghĩa

xã hội, về Đảng Cộng sản và Nhà nước Việt Nam, về đại đoàn kết dân tộc và đoàn kết quốc tế, về văn hóa, đạo đức, con người.

Tên môn học: PE008IU - Critical Thinking (Tư duy phân tích).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Critical Thinking studies a process which is indispensable to all educated persons-the process by which we develop and support our beliefs and evaluate the strength of arguments made by others in real-life situations. It includes practice in inductive and deductive reasoning, presentation of arguments in oral and written form, and analysis of the use of language to influence thought. The course also applies the reasoning process to other fields such as business, science, law, social science, ethics, and the arts.

Tên môn học: PE021IU - General Law (General Law)

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: 0

Tên môn học: EN007IU - Writing AE1. (Tiếng Anh học thuật 1 - Viết).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides students with comprehensive instructions and practice in essay writing, including transforming ideas into different functions of writing such as process description, cause-effect, comparison-contrast, argumentative, and paraphrase-sum and paraphrase-summary essays. 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, proofreading, documentation and editing, this course prepares the students for research paper writing in the next level of AE2 writing.

Tên môn học: EN008IU - Listening AE1 (Tiếng Anh học thuật 1 – Nghe).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: 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.

Tên môn học: EN011IU - Writing AE2 (Tiếng Anh học thuật 2 - Viết).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: 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. 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

Tên môn học: EN012IU - Speaking AE2 (Tiếng Anh học thuật 2 – Nói).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Giving presentations today becomes a vital skill for students to succeed not only in university but also at work in the future. However, this may be seen as a nerve-racking task, especially when presented in a foreign language. Speaking AE2 provides the students with the knowledge and skills needed to deliver effective presentations. To do this, the course covers many aspects of giving presentation: preparing and planning, using the appropriate language, applying effective visual aids, building up confidence, performing body language, dealing with questions and responding, etc.

Tên môn học: MA001IU - Calculus 1 (Toán 1).

- Số tín chỉ: 4(4,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Functions; Limits; Continuity; Derivatives, Differentiation, Derivatives of Basic Elementary Functions, Differentiation Rules; Applications of Differentiation: l'Hôpital's Rule, Optimization, Newton's Method; Anti-derivatives; Indefinite Integrals, Definite Integrals, Fundamental Theorem of Calculus; Techniques of Integration; Improper Integrals; Applications of Integration.

Tên môn học: MA003IU - Calculus 2 (Toán 2).

- Số tín chỉ: 4(4,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước MA001IU - Calculus 1
- Mô tả nội dung môn học: Sequence and Series; Convergence Tests; Power Series; Taylor and Maclaurin Series; Cartesian Coordinates; Lines, Planes and Surfaces; Derivatives and Integrals of Vector Functions, Arc Length and Curvature, Parametric Surfaces; Functions of Several Variables; Limits, Continuity, Partial Derivatives, Tangent Planes; Gradient Vectors; Extreme; Lagrange Multipliers; Multiple Integrals: Double Integrals,

Triple Integrals, Techniques of Integration; Vector Fields, Line Integrals, Surface Integrals.

Tên môn học: MA023IU - Calculus 3 (Toán 3).

- Số tín chỉ: 4(4,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước MA003IU - Calculus 2
- Mô tả nội dung môn học: Complex numbers, complex series, complex functions,complex derivatives; Laplace transform, z-transform, Fourier series, Fourier transform, the inverse transform, transforms of derivatives and integrals, first-order differential equations, second-order differential equations, difference equations, applications to electrical circuits and signal processing.

Tên môn học: MA024IU - Differential Equations.

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước MA003IU - Calculus 2
- Mô tả nội dung môn học: First-order differential equations, second-order linear differential equations, undetermined coefficients, variation of parameters, applications, higher-order linear differential equations, systems of first-order linear equations, elementary partial differential equations and the method of separation of variables.

Tên môn học: PH013IU - Physics 1 (Lý 1).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: An introduction to mechanics including: planar forces, free body diagrams, planar equilibrium of rigid bodies, friction, distributed forces, i nternal forces, shear force and bending moment diagrams, simple stress and strain and associated material properties, kinematics and kinetic of particles, work and energy, motion of rigid bodies in a plane.

Tên môn học: PH014IU - Physics 2 (Lý 2).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides students with basic knowledge of fluid mechanics; macroscopic description of gases; heat and the first law of thermodynamics; heat engines and the second law of thermodynamics; microscopic description of gases and the kinetic theory of gases.

Tên môn học: CH011IU - Chemistry for Engineers (Hóa học cho kỹ sư).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn song hành CH012IU - Chemistry Laboratory
- Mô tả nội dung môn học: This one-semester course is designed for engineering students those who are pursuing a non-chemistry engineering degree such as information

technology, bio-technology, civil, biomedical, electronic and telecommunication engineering. The course will introduce the basic principles of chemistry and connect those principles to issues in engineering professions.

Tên môn học: CH012IU - Chemistry Laboratory (Thực hành hóa học).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn song hành CH011IU - Chemistry for Engineers
- Mô tả nội dung môn học: Chemistry Laboratory is an accompanied part for the Chemistry for Engineers, which is designed for engineering students those who are pursuing a non-chemistry engineering degree such as information technology, bio-technology, civil, biomedical, electronic and telecommunication engineering.

Tên môn học: BM007IU - Introduction to Biomedical Engineering (Kỹ thuật Y sinh đại cương).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM053IU - Principles of Electricity in Biomedical Engineering
- Mô tả nội dung môn học: This course consists of three main parts: (1) fundamental engineering technologies and methodologies, (2) their clinical applications and (3) topics related to the department orientations. In the first part students learn different engineering techniques and methods including mathematical modeling and simulation of a dynamic system, design methodology, geometric optics, kinematics, and statistics. In the second part students learn how these techniques or methods are applied in the medical field. Case studies focus on specific organs such as the eye, ear, and lung. In each study three aspects are covered: physiological, clinical, and instrumentation aspects. These 2 parts emphasize on the activities of the Medical Instrumentation orientation.

Tên môn học: CH014IU - Chemistry for BME (Hóa học cho Kỹ thuật Y Sinh).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước CH011IU - Chemistry for Engineers
- Mô tả nội dung môn học: This course is designed for non-chemistry majors, as it is intended for students pursuing a degree in biomedical engineering. The course covers The basic principles of analytical chemistry, introduces modern analytical chemistry and instrumental techniques with emphasis on techniques relevant to analysis in biomedical engineering. Applications of each technique will be discussed.

Tên môn học: BM098IU - Chemistry laboratory for BME (Thực hành Hóa học cho Kỹ thuật Y Sinh).

- Số tín chỉ: 1(1,0)
- Điều kiện tiên quyết/Môn học trước: Không

- Mô tả nội dung môn học: The course covers the basic principles of analytical chemistry, introduces modern analytical chemistry and instrumental techniques with emphasis on techniques relevant to analysis in biomedical engineering. Applications of each technique will be discussed.

Tên môn học: BM090IU - Biology for BME (Sinh học cho Kỹ Thuật Y Sinh).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course covers basic concepts and universal principles of biological molecules, cells, genetics, and biotechnology. The laboratory activities are designed to further investigate and illuminate each topic area in BME research settings.

Tên môn học: BM053IU - Principles of Electricity in Biomedical Engineering (Nguyên lý điện trong kỹ thuật y sinh)

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước MA001IU - Calculus 1
- Mô tả nội dung môn học: In the lecture, students will learn the DC electricity where the sources are constant with respect to time. In this domain, students learn all basic elements such as resistor, Op-Amp, capacitor and inductor as well as common analysis techniques to analyze circuits that contain those elements. With capacitor and inductor, students get familiar with the time variable notion. The lecture also covers the AC circuit where the sources vary periodically with respect to time. These notions are particularly useful for students in BME to understand the origins, generations, conductions and functioning of electrical signals in human physiology. Each lecture includes examples highlighting the specific impacts of electricity and electrical engineering in biomedical engineering.
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Tên môn học: BM054IU - Principles of Electricity in Biomedical Engineering Lab (Thực hành nguyên lý điện trong kỹ thuật y sinh)

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước MA001IU - Calculus 1
- Mô tả nội dung môn học: In the lectures students study common circuit elements such as resistors, capacitors, inductors, and operational amplifiers, and different circuit analysis methods in DC and AC steady state. In the labs, students practice with Bread-board, Power supply, Signal generator, Multi-meter, Oscilloscope, and Electrical elements.

Tên môn học: BM030IU - Machine Design (Thiết kế máy cơ khí).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước PH013IU - Physics 1
- Mô tả nội dung môn học: Introduction to the principles of design and analysis of machines and machine components. Design for functionality, motion, force, strength and reliability. The laboratory experience provides open-ended projects to reinforce the design process.

Tên môn học: BM064IU - Applied Informatics (Tin học ứng dụng).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course focuses on how to apply programming languages to solve engineering problems targeting towards biomedical fields. C-programming language provides students basic programming skills to develop and implement medical devices. MATLAB-programming language supports effective tools for mathematical calculations and graphical visualization of dataset.

Tên môn học: BM096IU - AI for Healthcare (Trí tuệ nhân tạo trong y tế)

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides an introduction to how we apply artificial intelligence in healthcare. Several typical problems of applied artifical intelligence in healthcare are introduced, such as diagnosis/segmentation/abnormalitty detection in CT, OCT, fundus, endoscope images, detecting diseases by signals, e.g., EEG, blood pressure, heart rate. The course offers artificial intelligence methods that are frequently utilized in healthcare systems, including k-nearest neighbor, support vector machine (SVM), neural network, convolutional neural network, recurrent neural network, generative adversarial network. There are lab activities in which students work on programing to build pratical schemes

Tên môn học: BM101IU - Mechanical design and Manufacturing processes in Biomedical Engineering (Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh).

- Số tín chỉ: 2(2,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Introduction to fundamental knowledge of mechanical design and manufacturing processes in biomedical engineering.

Tên môn học: BM102IU - Mechanical design and Manufacturing processes in Biomedical Engineering Lab (Thực hành thiết kế và chế tạo cơ khí trong kỹ thuật y sinh).

- Số tín chỉ: 2(0,2)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Learn skills of mechanical design and manufacturing processes in biomedical engineering.

Tên môn học: BM005IU - Statistics for health sciences (Thống kê trong khoa học sức khỏe).

- Số tín chỉ: 3(2,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM007IU - Introduction to Biomedical Engineering.

- Mô tả nội dung môn học: This course focuses on intermediate statistical methods which are often used in bioengineering and biomedicine. The course emphasizes the appropriateness, practical application and interpretation of a variety of analytic methods. Working with SPSS (Statistical package for the social sciences) supports students to deal with practical problems in statistical analysis.

Tên môn học: BM091IU - Human Anatomy and Physiology (Giải phẫu và sinh lý người).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn tiên quyết BM090IU - Biology for BME
- Mô tả nội dung môn học: This subject explains the physical and chemical factors that are responsible for the origin, development, and progression of life. This subject explains the specific characteristics and mechanisms of the human body that make it a living being. This subject explains the functions of tissues, organs and systems with the regulation and control mechanisms of the body.

Tên môn học: BM008IU – Bioethics (Y đức).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM007IU - Introduction to Biomedical Engineering
- Mô tả nội dung môn học: Many difficult ethical questions have arisen from the explosive growth of biomedical research and the health-care industry since World War II. For example, when does life begin to matter morally? When and how should doctors be allowed to help patients end their lives? Should embryos be cloned for research and/or reproduction? What sorts of living things are appropriate to use as research subjects? How should we distribute scarce and expensive medical resources? This course will show students how problems in bioethics can be approached from a variety of perspectives, with the aim of understanding how we have got, where we are, and how we should decide where to go next.

Tên môn học: BM082IU – Biomaterials (Vật liệu sinh học).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: An engineer of tissue engineering major should understand biomaterials, and its surface modification for specific applications. Also, an engineer must understand how to choose materials and how to design a scaffold for a specific implantation zone.

Tên môn học: BM009IU - BME Capstone Design Course (Thiết kế thượng đỉnh trong Kỹ thuật Y Sinh).

- Số tín chỉ: 4(3,1)

- Điều kiện tiên quyết/Môn học trước: Môn học trước BM007IU - Introduction to Biomedical Engineering
- Mô tả nội dung môn học: The course has three components: class lectures, laboratories, and projects. The lectures are built upon all previous BME coursework. They emphasize on the design principles of medical instrumentation and biomedical signal analysis. Topics include the origin of bioelectric potentials; the characteristics of various biological signals, transducers, instrumentation amplifiers, analogue and digital devices; and computer interfaces. Labs include the design, construction and testing of electrical circuits and computer interfaces to measure diverse biological signals. The semester-long group project consists of designing an instrument

Tên môn học: BM011IU - Engineering Challenges in Medicine I (Thách thức kỹ thuật trong Y khoa 1).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM091IU - Human Anatomy and Physiology
- Mô tả nội dung môn học: Engineering Challenges in Medicine (ECM) exposes students to technical issues encountered by physicians in hospitals that prevent them to advance in medical diagnosis and treatment. In this course, physician instructors will demonstrate pathophysiology, advantages and disadvantages of current medical management of common diseases, and ask students to propose their own solutions to overcome these challenges. ECM I covers basic principles of diagnostic imaging, electrocardiography and common diseases of the musculoskeletal, neurological, and cardiovascular systems.

Tên môn học: BM013IU - Entrepreneurship in Biomedical Engineering (Kinh thầu trong Kỹ thuật Y Sinh).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước EN011IU - Writing AE2
- Mô tả nội dung môn học: This course introduces various stages of the entrepreneurial process and provides knowledge of start-up development. Students will expose to this process by working on some key steps in establishing a start-up for a biomedical product or service. The main goal of the course is to prepare students with an entrepreneurial mindset so that they realize the importance of developing a biomedical product or service that meets the customer demand and can be commercialized.

Tên môn học: BM068IU - Project 1 (Đồ án 1).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước EN011IU - Writing AE2
- Mô tả nội dung môn học: Students will explore a specific topic in the medical fields. Students will learn how to do research through various skills of doing experiments, searching and identifying scientific journals as references related to the experiments from e-library, analyz

Tên môn học: BM003IU - Pre-thesis (Đồ án chuẩn bị Luận văn tốt nghiệp).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM068IU - Project 1
- Mô tả nội dung môn học: From previous experience and knowledge, under the potential thesis advisor supervision, the student will focus on a specific research topic to pave the way and establish a plan for the thesis.

Tên môn học: BM050IU – Practice 1: Reverse Engineering (Thực hành 1: Kỹ thuật đảo ngược).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This is the course of general knowledge in medicine and medical instrumentation. Students will learn how to take vital signs, do CPR and some common first aids as well as explore some common medical devices in our department's labs such as ECG, Ultrasound, X ray machine… They learn how to use mechanical tools to open these medical devices, disassemble and reassemble them, explore their working principles and block diagrams. As one of the first courses for BME students, it also covers the soft skills required for presentation, literature searching and report writing.

Tên môn học: BM067IU – Practice 2: Animal Cell and Microbiologies (Thực hành 2: Tế bào động vật và vi sinh vật).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM050IU - Practice 1: Reverse Engineering
- Mô tả nội dung môn học: This course introduces students to the essential theory and techniques for working with microorganism and animal cells. As these are among the most important model systems in biomedical engineering, this knowledge will enable students to conduct engineering and scientific projects using these systems. If students would like to further study these topics, they can consider taking courses such as Clinical Test, Tissue Engineering, Cell/tissue - Biomaterial Interaction and Biomaterials.

Tên môn học: BM052IU – Practice 3: Electronic Design (Thực hành 3: Thiết kế mạch điện).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước Practice 2: Animal Cell and Microbiologies
- Mô tả nội dung môn học: Students will study essential skills for medical device design. In the first half of the semester, students will study how to design an electrical schematic and PCB using Orcad. They also have a chance to make their own PCB using tools in our department's labs. Upon finishing the third semester, students can design theelectrical part of a medical device.

Tên môn học: BM017IU – Medical Design (Thiết kế y tế).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM052IU – Practice 3: Electronic Design
- Mô tả nội dung môn học: Students will explore important software used by engineers to build, analyze, and test the engineering design of a medical instrument. In the first half of the course, students will learn LABVIEW together with medical sensors supported by National Instruments (NI) to develop a prototype of medical devices. In the second half of the course, students will learn SOLIDWORK as a computer-aided design (CAD) tool to help engineers construct a 3-D model of medical devices.

Tên môn học: BM069IU - Project 2 (Đồ án 2).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM017IU – Medical Design
- Mô tả nội dung môn học: Students will do biomedical engineering projects. They will have a chance to apply what they have learned in previous semesters in designing, performing experiments, collecting and analyzing experimental data. In addition, students will improve their presenting, writing skills in a scientific manner.

Tên môn học: BM020IU – Internship (Thực tập).

- Số tín chỉ: 3(0,3)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Students will work in either companies, hospitals or research institutions in the country or abroad to acquire practical experiences in the real world.

Tên môn học: BM004IU - Thesis research (Luận văn tốt nghiệp) .

- Số tín chỉ: 10(0,1
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM003IU - Pre-thesis
- Mô tả nội dung môn học: Students will carry on to the success of the works planned in the pre-thesis course. The final results will be presented in front of a formal examiner panel.

Tên môn học: BM060IU - Digital Systems (Hệ thống số).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides the student to understand about digital systems in order to design digital circuits or systems. This course represents the following parts: Binary arithmetic, Boolean algebra, K-maps, Combinational Logic Circuit, Flip-Flops, Digital Arithmetic, Counters and Registers, Memory Devices, AD-DA Conversions and PLD.

Tên môn học: BM061IU - Digital Systems Lab (Thực hành Hệ thống số)

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides the student to understand about digital systems in order to design digital circuits or systems. This course represents the following parts: Binary arithmetic, Boolean algebra, K-maps, Combinational Logic Circuit, Flip-Flops, Digital Arithmetic, Counters and Registers, Memory Devices, AD-DA Conversions and PLD.

Tên môn học: BM062IU - Micro-electronic Devices (Thiết bị vi điện tử).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: The course is an introduction to microcontrollers including basic architecture, programming and applications of MCS-51 family and other MCS platforms.

Tên môn học: BM063IU - Micro-electronic Devices Laboratory (Thực hành thiết bị vi điện tử).

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: The course the lab session to apply the knowledge learnt in the Micro-electronic Devices class with the focus on basic architecture, programming and applications of MCS-51 family and other MCS platforms.

Tên môn học: BM089IU - Electronic Devices for Biomedical Design (Thiết bị điện tử cho Kỹ thuật Y Sinh).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Fundamentals of semiconductor devices and microelectronic circuits, characteristics of p-n, Zener diodes, and analog diode circuits. Principles of MOSFET and BJT operation, biasing, transistor analysis at midband frequencies.

Tên môn học: BM033IU - Information Technology in the Health Care System (Công nghệ thông tin trong hệ thống chăm sóc sức khỏe).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course will teach students how to analyze and apply various management programs and technology systems currently available to health care professionals. Lectures and tutorials will offer experiential learning opportunities. The tutorials will introduce the knowledge and software toolsets that will be used by the students to design an original health care delivery system application. Knowledge will include those used by professionals to design information healthcare systems, automated decision support systems and healthcare standards.

Tên môn học: BM070IU - Information Technology in the Health Care System lab (Thực hành công nghệ thông tin trong hệ thống chăm sóc sức khỏe)

- Số tín chỉ: 1(0,1
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course will teach students how to analyze and apply various management programs and technology systems currently available to health care professionals. Lectures and tutorials will offer experiential learning opportunities. The tutorials will introduce the knowledge and software toolsets that will be used by the students to design an original health care delivery system application. Knowledge will include those used by professionals to design information healthcare systems, automated decision support systems and healthcare standards.

Tên môn học: BM075IU - Biomedical Photonics (Quang học Y Sinh),

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course introduces some of the basic concepts of applying light in biomedical applications. This course is especially tailored for engineers who have no prior knowledge in biomedical sciences. The course first introduces some basic concepts in biomedical sciences so that students can be familiar with the techniques and the terminologies used in the field. Subsequently, the course would consider biological tissues as an optical material with some unique properties different from other conventional material, such as semiconductors, when light interacts with it. Several important research topics including microscopy, optical detection techniques,

Tên môn học: BM076IU - Biomedical Photonics Laboratory (Thực hành Quang học Y Sinh)

- Số tín chỉ: 1(0,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course introduces some of the basic concepts of applying light in biomedical applications. This course is especially tailored for engineers who have no prior knowledge in biomedical sciences. The course first introduces some basic concepts in biomedical sciences so that students can be familiar with the techniques and the terminologies used in the field. Subsequently, the course would consider biological tissues as an optical material with some unique properties different from other conventional material, such as semiconductors, when light interacts with it. Several important research topics including microscopy, optical detection techniques, and optical disease detection techniques will be discussed. Engineering students who take

Tên môn học: BM058IU - Biomedical Image Processing (Xử lý hình ảnh Y Sinh).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không

- Mô tả nội dung môn học: The goal of this course is to introduce techniques to enhance biomedical images to help physicians in diagnosis and treatment. This subject also introduces the principle of tomography techniques such as X-ray, CT, MRI and PET/CT. Moreover, it provides students essential knowledge of digital image processing including image acquisition, image formation, linear system, low-level image processing, image enhancement in frequency domain, pattern recognition, etc. A series of exercises and labs also provide students practical experience in working with biomedical image data.

Tên môn học: BM072IU - Computational Model in Medicine (Mô hình tính toán trong Y Khoa).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: The computer modeling and simulation of the heart and the circulation, gas exchange in the lungs, control of cell volume, the renal counter-current multiplier mechanism, and muscle mechanics, mechanisms of neural control, genetics, epidemics and dispersal

Tên môn học: BM073IU - Medical Imaging (Hình ảnh y khoa).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Physical and computational principles of different medical imaging modalities (including computed tomography, nuclear, magnetic resonance, ultrasound, and optical imaging) are discussed with the focus on image formulation and reconstruction. Hardware designs and clinical applications are also mentioned.

Tên môn học: BM074IU - Brain - Computer Interface (Giao diện não – máy).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: In this course, students will learn about the basic function and structure of the brain, the function of each part of the brain. In addition, students will be practiced on devices to learn how to interface between Brain-Computer. Collecting signals and analyzing them are also mentioned.

Tên môn học: BM071IU - Computer Aided Diagnosis (Chẩn đoán hỗ trợ bằng máy tính).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course is an introduction to diagnostic imaging and an overview of how computerized analysis of medical images has been employed to assist physicians in detecting or classifying lesions and screening for differential diagnosis. Topics include typical pathological abnormal patterns of various diagnostic imaging modalities with an emphasis on ECG, Ultrasound, and CT scan. Lab activities focus on interpreting ECG, CT scan and performing an Ultrasound exam.

Tên môn học: BM077IU - Pharmaceutical Engineering 1 (Kỹ thuật dược 1).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course emphasizes the primary engineering aspects of the pharmaceutical processes through methodologies, both applied and fundamental of dosage form design, to analyze and scale up manufacturing pharmaceutical processes involving liquid and dispersed-phase systems including solution, suspensions, transdermal systems, etc.

Tên môn học: BM078IU - Pharmaceutical Engineering 2 (Kỹ thuật dược 2).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course emphasizes the primary engineering aspects of the pharmaceutical processes through methodologies, both applied and fundamental of dosage form design, to analyze and scale up manufacturing pharmaceutical processes involving solids processing, such as solids characterization, blending, milling, granulation, tableting, coating, and others.

Tên môn học: BM079IU - Principle of Pharmacokinetics (Nguyên lý dược động học).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: The course is intended to provide the students with basic principles of pharmacokinetics including drug transport, various routes of drug administration, and drug absorption, distribution, metabolism, and elimination. Mathematical pharmacokinetic models are also presented.

Tên môn học: BM080IU - Nanotechnology for Drug Delivery Systems (Công nghệ nano cho hệ vận chuyển thuốc).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Since nanoparticulate drug delivery systems present very small size, they are promising in targeted therapy of diseased tissue, organ and hence, leading to the increased drug concentration at those places through biological barriers to increase the effectiveness of the treatment. The course depicts nanoparticles and technologies applied to targeted drug delivery to diseased cells.

Tên môn học: BM081IU - Drug Delivery Systems (Hệ vận chuyển thuốc).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: In this class, the students will be introduced the concept of drug delivery systems providing pharmaceutical agents at target sites, technology, regulatory

considerations and applications of each system. The course is also intended to provide the students with the design of controlled release drug delivery systems.

Tên môn học: BM010IU - Biosignal Processing (Xử lý tín hiệu Y Sinh).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM064IU - Applied Informatics
- Mô tả nội dung môn học: The course provides students the fundamental knowledge to process and analyze biosignals. The knowledge of Fourier transform, signal sampling, analog to digital conversion, and stochastic signal processing are covered in the class. The course also provides insight to different characteristics of typical biological signals including Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG).

Tên môn học: BM083IU - Applications of Biomaterials in Regenerative Medicine (Ứng dụng vật liệu sinh học trong y học tái tạo).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course is the basis for the student in biomedical engineering. It equips students with the basic knowledge about the types of tissues in the human body. This course will introduce some kinds of tissue in the human body, including: heart, liver, lungs, stomach, eyes, bones, blood vessels, etc.

Tên môn học: BM084IU - Biocompatibility and Biodegradation of Biomaterials (Tương thích sinh học và phân hủy sinh học của vật liệu sinh học).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Students will learn and understand the biocompatible and biodegradable measure of biomaterials. Students will learn and practice in the laboratory about interaction of cells and biomaterials (using MTT, SEM, confocal, etc.) and interaction of implanted biomaterials in animals (using H&E, MT staining).

Tên môn học: BM085IU - Characterization and Properties of Biomaterials (Đặc tính và tính chất của vật liệu sinh học).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This is a course for students majoring in biological materials. It equips students with the knowledge of how to determine the required properties and characteristics of biomaterials. Case studies and specific applications will beinvestigated. According to the specific damages to be repaired, the biomaterials must befabricated to match the required properties and characteristics.

Tên môn học: BM086IU - Methods and Process in Fabrication of Scaffold (Phương pháp và qui trình xây dựng scaffold).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course will introduce students to some common methods to fabricate the biomaterials that are used worldwide. During the course, students will create their own new materials according to their purposes.

Tên môn học: BM092IU - Cell/Tissue – Biomaterial interaction (Tương tác sinh học mô/tế bào).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: A crucial concept to understand about the tissue-biomaterial interface is that a lot of things happen there. The environment inside the body is chemically, electrically, and mechanically active, and the interface between an implanted biomaterial and the body is the location of a variety of dynamic biochemical processes and reactions. This course will introduce students to the molecular level events that happen at the tissue-implant interface, explore selected biological and physiological consequences of these events, methods to characterize interaction between cell/tissue and materials and specifically, design novel biomaterials that truly integrate with the body's natural tissues.

Tên môn học: BM093IU - Tissue engineering I (Kỹ thuật mô 1).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Tissue engineering encompasses several disciplinary fields of knowledge to enable the regeneration of malfunctioning tissues or even. whole organs. There are three main components in tissue engineering: scaffolds, cells, and signals. This course is the first part of the 2-semester course on Tissue engineering which introduces students to the basic knowledge of those three main components of tissue engineering. The following course (Tissue engineering II) will focus on the clinical applications.

Tên môn học: BM094IU - Principle of clinical tests and instrumentation (Nguyên lý và thiết bị xét nghiệm lâm sàng).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: The laboratory plays a crucial role in healthcare because it provides physicians and other health professionals with information to: (1) detect disease or predisposition to disease; (2) confirm or reject a diagnosis; (3) establish prognosis; (4) guide patient management; and (5) monitor efficacy of therapy. Therefore, a fundamental understanding of the principles of laboratory tests and instrumentation used in clinical laboratories is essential. This course will provide students an overview of medical

laboratories, principles of a wide range of analytical tests and instrumentations ranging from haematology to molecular pathology.

Tên môn học: BM012IU - Engineering Challenges in Medicine II (Thách thức kỹ thuật trong Y khoa 2).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Môn học trước BM011IU - Engineering Challenges in Medicine I
- Mô tả nội dung môn học: Engineering Challenges in Medicine (ECM) exposes students to technical issues encountered by physicians in hospitals that prevent them to advance in medical diagnosis and treatment. In this course, physician instructors will demonstrate pathophysiology, advantages and disadvantages of current medical management of common diseases, and ask students to propose their own solutions to overcome these challenges. ECM II covers the value of a diagnostic test, interpretation of basic laboratory tests and common diseases of the respiratory, renal, digestive, endocrinal systems, and cancers.

Tên môn học: PE014IU - Environmental Science (Khoa học môi trường).

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: To equip undergraduate students with essential knowledge about the environment, natural resources and human ecology. To increase general awareness of undergraduate students about possible impacts of human activities on the environment and natural resources in order to justify relevant economic practices.

Tên môn học: BM095IU - Medical Instrumentation (Thiết bị Y tế).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course covers the basic and advanced principles, concepts, and operations of medical sensors and devices. The origin and nature of measurable physiological signals are studied, including chemical, electrochemical, optical, and electromagnetic signals

Tên môn học: BM100IU - Principles of Neuroengineering (Nguyên Lý Kỹ Thuật Thần Kinh).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Covers how to innovate technologies for brain analysis and engineering, for accelerating the basic understanding of the brain, and leading to new therapeutic insight and inventions. Focuses on using physical, chemical and biological principles to understand technology design criteria governing ability to observe and alter brain structure and function. Topics include optogenetics, noninvasive brain imaging and

stimulation, nanotechnologies, stem cells and tissue engineering, and advanced molecular and structural imaging technologies. Design projects by students

Tên môn học: BM099IU - Stem Cell Technology (Công Nghệ Tế Bào Gốc).

- Số tín chỉ: 4(3,1)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Stem cells, tissue engineering and regenerative medicine are fast moving fields with vastly transformative implications for the future of health care and capital markets. Stem cells, which located in many tissues and organs in human body, are presented as miracle cells that can do anything. When administered to a patient withsome serious diseases they will rebuild the damaged tissues and make the patient recoverand live longevity. Understanding of stem cell characteristics, intrinsic regulations, and functions helps generating novel therapies for many acute and chronic diseases as well as developing the new strategies for tissue engineering. This course will focus on the science of stem cells to explore the

Tên môn học: BM103IU - Advanced Artificial Intelligence for Healthcare (Trí tuệ nhân tạo nâng cao trong y tế)

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: This course provides AI fundamental algorithms such as random forest, decision tree, support vector machine (SVM), boosting, Adaboost, XGBoost, artificial neural network (ANN), convolutional neural network, recurrent neural network. The real signal processing problems applied in healthcare are introduced such as applying SVM or randomforest, ANN to predict the EEG, blood pressure, or heart rate. This course also introduces the computer vision problems that can apply in healthcare such as segmentation, and object detection. There are lab activities in which students work on programing to build practical schemes

Tên môn học: BM104IU - Microfluidics (Vi lưu)

- Số tín chỉ: 3(3,0)
- Điều kiện tiên quyết/Môn học trước: Không
- Mô tả nội dung môn học: Microfluidics is both the science which studies the behavior of fluids through microchannels, and the technology of manufacturing microminiaturized devices containing chambers and tunnels through which fluids flow or are confined. Microfluidics deal with very small volumes of fluids (10-9 to 10-18 L), using channels with dimensions from several to hundreds of micrometers, which can be expanded even to millimeters. The key concept related to microfluidics is to integrate in a simple micro-sized system operations that commonly solicits a whole laboratory. This multidisciplinary field embraces research in physics, chemistry, medicine, engineering, materials science, and biology supporting the design of various microfluidic devices (known as Lab-on-a-chip/Organ-on-a-chip devices for (portable)diagnostics, drug related studies such as disease modeling, drug discovery, and drug delivery, as well as

regenerative medicine and tissue engineering. In this course, student will be introduced to: (1) Microfluidics (its definition and scientific aspects), (2) Fluid dynamic Theory to understand fluid behaviors at microscopic scale (3) Various microfarication techniques with focus on low-cost, simple techniques for microfluidics (4) Design of microfluidic devices for common biological/biomedical applications

TRƯỞNG KHOA KỸ THUẬT Y SINH	**KT. HIỆU TRƯỞNG** **PHÓ HIỆU TRƯỞNG**
Nguyễn Thị Hiệp	**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 KỸ THUẬT Y SINH KHÓA 2023 SO VỚI KHÓA 2022

(Kèm theo Quyết định số 1033/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**
   Thay thế môn học Principles of EE1 (EE051IU) bằng môn học Principles of Electricity in Biomedical Engineering (BM053IU).
   Thay thế môn học Principles of EE1 Lab (EE052IU) bằng môn học Principles of Electricity in Biomedical Engineering Lab (BM054IU).

2. **Các môn học bổ sung vào chương trình đào tạo**
   Môn học Pháp luật đại cương – General Law (PE021IU) 03 tín chỉ được đưa vào chương trình đào tạo, thay thế cho 01 môn học Tự chọn – Free elective 03 tín chỉ.

3. **Các điều chỉnh khác**
   Một số môn học thuộc chương trình đào tạo ngành Kỹ thuật Y Sinh khóa 2023 có những thay đổi (so với khóa 2022) như sau:

STT	Trước điều chỉnh (Khóa 2022)			Sau điều chỉnh (Khóa 2023)		
	Mã môn học	**Tên môn học**	**Nhóm môn học**	**Mã môn học**	**Tên môn học**	**Nhóm môn học**
1	BM050IU	Lab 1A - Biomedical Instrumentation	Kiến thức chuyên ngành	BM050IU	Practice 1: Reverse Engineering	Thực tập, khóa luận/luận văn tốt nghiệp
2	BM067IU	Lab 2B – In vitro studies	Kiến thức chuyên ngành	BM067IU	Practice 2: Animal Cells and Microbiologies	Thực tập, khóa luận/luận văn tốt nghiệp
3	BM052IU	Design 2A – Electronic Design	Kiến thức chuyên ngành	BM052IU	Practice 3: Electronic Design	Thực tập, khóa luận/luận văn tốt nghiệp
4	BM017IU	Design 2B – Medical Instrumentation	Kiến thức chuyên ngành	BM017IU	Medical Design	Thực tập, khóa luận/luận văn tốt nghiệp
5	BM069IU	Project 2	Kiến thức chuyên ngành	BM069IU	Project 2	Thực tập, khóa luận/luận văn tốt nghiệp

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

Các môn học sau được công nhận tương đương:

- Công nhận tương đương môn học Principles of Electricity in Biomedical Engineering (BM053IU) và Principles of EE1 (EE051IU).
- Công nhận tương đương môn học Principles of Electricity in Biomedical Engineering Lab (BM054IU) và môn học Principles of EE1 Lab (EE052IU).

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 1033/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

PE015IU - Philosophy of Marxism and Leninism (Triết học Mác – Lênin).

1. General Information
   - Course Title:
     + Vietnamese: Triết học Mác-Lênin
     + English: Marxist - Leninist Philosophy
   - Course ID: PE015IU
   - Course type:
     ☑ General ☐ Fundamental
     ☐ Specialization ☐ Others
     ☐ Skills ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

Ngoài 1 chương mở đầu nhằm giới thiệu khái lược về chủ nghĩa Mác-Lênin và một số vấn đề chung của môn học. Căn cứ vào mục tiêu môn học, nội dung chương trình môn học được cấu trúc thành 3 phần, 9 chương: Phần thứ nhất có 3 chương bao quát những nội dung cơ bản về thế giới quan và phương pháp luận của chủ nghĩa Mác-Lênin; phần thứ hai có 3 chương trình bày ba nội dung trọng tâm thuộc học thuyết kinh tế của chủ nghĩa Mác-Lênin về phương thức sản xuất tư bản chủ nghĩa; phần thứ ba có 3 chương, trong đó có 2 chương khái quát những nội dung cơ bản thuộc lý luận của chủ nghĩa Mác-Lênin về chủ nghĩa xã hội và 1 chương khái quát chủ nghĩa xã hội hiện thực và triển vọng.

3. Textbooks and Other Required Materials
   Textbooks:
   Reference Materials:
4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Môn học Những nguyên lý cơ bản của chủ nghĩa Mác-Lênin nhằm giúp cho sinh viên:	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Xác lập cơ sở lý luận cơ bản nhất để từ đó có thể tiếp cận được nội dung môn học Tư tưởng Hồ Chí Minh và Đường lối cách mạng	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	của Đảng Cộng sản Việt Nam, hiểu biết nền tảng tư tưởng của Đảng;		
G3	Xây dựng niềm tin, lý tưởng cách mạng cho sinh viên;	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Từng bước xác lập thế giới quan, nhân sinh quan và phương pháp luận chung nhất để tiếp cận các khoa học chuyên ngành được đào tạo.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Nhập môn những nguyên lý cơ bản của chủ nghĩa Mác-Lênin: Thế giới quan và phương pháp luận triết học của chủ nghĩa Mác-Lênin	G1, G2, G3	in class	A1.1, A1.2
2	Chương 1: Chủ nghĩa duy vật biện chứng	G1, G2, G3	in class	A1.1, A1.2
3	Chương 1 (tt)	G1, G2, G3	in class	A1.1, A1.2
4	Chương 2: Phép biện chứng duy vật	G1, G2, G3	in class	A1.1, A1.2
5	Chương 2 (tt)	G1, G2, G3	in class	A1.1, A1.2

6	Chương 3: Chủ nghĩa duy vật lịch sử - Học thuyết kinh tế của chủ nghĩa Mác-Lênin về phương thức sản xuất tư bản chủ nghĩa	G1, G2, G3	in class	A1.1, A1.2
7	Chương 3 (tt)	G1, G2, G3	in class	A1.1, A1.2
8	Chương 4: Học thuyết giá trị	G1, G2, G3	in class	A1.1, A1.2
	Midterm exam			A2.1
9	Chương 5: Học thuyết giá trị thặng dư	G1, G2, G3	in class	A1.1, A1.2
10	Chương 6: Học thuyết về chủ nghĩa tư bản độc quyền và chủ nghĩa tư bản độc quyền nhà nước - lý luận của chủ nghĩa Mác-Lênin về chủ nghĩa xã hội	G1, G2, G3	in class	A1.1, A1.2
11	Chương 6 (tt)	G1, G2, G3	in class	A1.1, A1.2
12	Chương 7: Sứ mệnh lịch sử của giai cấp công nhân và cách mạng xã hội chủ nghĩa	G1, G2, G3	in class	A1.1, A1.2
13	Chương 8: Những vấn đề chính trị-xã hội có tính quy luật trong tiến trình cách mạng xã hội chủ nghĩa	G1, G2, G3	in class	A1.1, A1.2
14	Chương 8 (tt)	G1, G2, G3	in class	A1.1, A1.2
15	Chương 9: Chủ nghĩa xã hội hiện thực và triển vọng	G1, G2, G3	in class	A1.1, A1.2
	Final exam			A3.1

Laboratory

Week/Class	Content	Learning outcomes	Assessment

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: OAA
- CourseCoordinator/Lecturer: NA
- Email: NA

PE016IU - Political economics of Marxism and Leninism (Kinh tế chính trị Mác – Lênin).

PE017IU - Scientific socialism (Chủ nghĩa Xã hội Khoa học).

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

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

1. General Information
   - Course Title:
     + Vietnamese: Tư tưởng Hồ Chí Minh
     + English: Ho Chi Minh's Thoughts
   - Course ID: PE019IU
   - Course type:
     ☑ General □ Fundamental
     □ Specialization □ Others
     □ Skills □ Project/Internship/Thesis
   - Number of credits: 2
     + Lecture: 2
     + Laboratory : 0
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

Ngoài chương mở đầu, nội dung môn học gồm 7 chương: chương 1, trình bày về cơ sở, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh; từ chương 2 đến chương 7 trình bày những nội dung cơ bản của Tư tưởng Hồ Chí Minh theo mục tiêu môn học.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Cung cấp những hiểu biết có tính hệ thống về tư tưởng, đạo đức, giá trị văn hoá, Hồ Chí Minh.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Tiếp tục cung cấp những kiến thức cơ bản về chủ nghĩa Mác - Lênin.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Cùng với môn học Những nguyên lý cơ bản của chủ nghĩa Mác-Lênin tạo lập những hiểu biết về nền tảng tư tưởng, kim chỉ nam hành động của Đảng và của cách mạng nước ta.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Góp phần xây dựng nền tảng đạo đức con người mới.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

G1.1	Hiểu biết có tính hệ thống về tư tưởng, đạo đức, giá trị văn hoá, Hồ Chí Minh.	I,T,U
G1.2	Hiểu biết về nền tảng tư tưởng, kim chỉ nam hành động của Đảng và của cách mạng nước ta.	I,T,U
G1.3	Thấm nhuần đạo đức con người mới.	I,T,U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chương mở đầu: Đối tượng, phương pháp nghiên cứu và ý nghĩa học tập môn tư tưởng Hồ Chí Minh	G1, G2, G3	in class	A1.1 A1.2
2	Chương 1: Cơ sở, quá trình hình thành và phát triển tư tưởng Hồ Chí Minh	G1, G2, G3	in class	A1.1 A1.2
3	Chương 1 (tt)	G1, G2, G3	in class	A1.1 A1.2
4	Chương 2: Tư tưởng Hồ Chí Minh về vấn đề dân tộc và cách mạng giải phóng dân tộc	G1, G2, G3	in class	A1.1 A1.2
5	Chương 2 (tt)	G1, G2, G3	in class	A1.1 A1.2
6	Chương 3: Tư tưởng Hồ Chí Minh về chủ nghĩa xã hội và con đường quá độ lên chủ nghĩa xã hội ở Việt Nam	G1, G2, G3	in class	A1.1 A1.2
7	Chương 3 (tt)	G1, G2, G3	in class	A1.1 A1.2
8	Chương 4: Tư tưởng Hồ Chí Minh về Đảng cộng sản Việt Nam	G1, G2, G3	in class	A1.1 A1.2

	Midterm exam			A2.1
9	Chương 4 (tt)	G1, G2, G3	in class	A1.1 A1.2
10	Chương 5: Tư tưởng Hồ Chí Minh về đại đoàn kết dân tộc và đoàn kết quốc tế	G1, G2, G3	in class	A1.1 A1.2
11	Chương 5 (tt)	G1, G2, G3	in class	A1.1 A1.2
12	Chương 6: Tư tưởng Hồ Chí Minh về dân chủ và xây dựng nhà nước của dân, do dân, vì dân	G1, G2, G3	in class	A1.1 A1.2
13	Chương 6 (tt)	G1, G2, G3	in class	A1.1 A1.2
14	Chương 7: Tư tưởng Hồ Chí Minh về văn hóa, đạo đức và xây dựng con người mới	G1, G2, G3	in class	A1.1 A1.2
15	Chương 7 (tt)	G1, G2, G3	in class	A1.1 A1.2
	Final exam			A3.2

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: OAA
- CourseCoordinator/Lecturer: NA
- Email: NA

PE008IU - Critical Thinking (Tư duy phân tích).

1. **General Information**
   - Course Title: CRITICAL THINKING *(Tư duy phân tích)*
   - Course Code: PE008IU
   - Semester: 2
   - Course Coordinator/Lecturer: Dr. Pham Huynh Tram
     phtram@hcmiu.edu.vn
2. **Prerequisites**: None
3. **Course description:**
   Critical Thinking studies a process which is indispensable to all educated persons--the process by which we develop and support our beliefs and evaluate the strength of arguments made by others in real-life situations. It includes practice in inductive and deductive reasoning, presentation of arguments in oral and written form, and analysis of the use of language to influence thought. The course also applies the reasoning process to other fields such as business, science, law, social science, ethics, and the arts.

   Number of Credits: 3
   Lectures: 45 hours
   Assignments & Presentations: Yes

4. **Textbooks and Other Required Materials:**
   [1] *Critical Thinking: A Student's Introduction, 2nd ed.* (Bassham, Irwin, Nardone, and Wallace).
   and Reference:
   [2] *Critical Thinking*, 9 th ed. (B. N. More, R. Parker)
   Web:http://highered.mcgrawhill.com/sites/0072879599/student_view0/chapter1/multiple_choice_quiz.html

5. **Course Expected Learning Outcomes**:

Successful completion of this course will enable you to

- identify, evaluate, and construct inductive and deductive arguments in spoken and written forms;
- recognize common fallacies in everyday reasoning;
- distinguish the kinds and purposes of definitions;
- distinguish the functions of language and its capacity to express and influence meaning; and
- recognize and assess arguments in various forums of reasoning.

The goals of the course are to help you

- develop the habits of assessing and defending the reasonableness of your beliefs and values and those of others;
- appreciate the importance of looking at an issue from a variety of points of view and of recognizing the complexity that surrounds most controversial issues; and
- appreciate the value of critical thinking in both public and private decision-making.

After you have finished this course, you should be more:

- *Self-aware,* recognizing your own biases and influences;

- *Inquisitive and curious*, wanting to learn more about issues before passing judgment;
- *Objective*, basing your judgments on evidence and avoiding twisting evidence to fit your opinion;
- *Open-minded*, having the ability to say, "I don't know" or "I was wrong";
- *Sensitive to language*, avoiding slanted language, recognizing ambiguous, vague, emotionally laden language, defining key terms;
- *Imaginative*, approaching topics and problems from various angles;
- *Fair and intellectually honest*, avoiding misrepresenting the ideas of others or misinterpreting data and research to fit your own purposes.

6. Course Outline:

Class	Content	Activities
1	- Discuss Syllabus and Course - Introductions of Students and Teachers - What'sThinking: creative thinking, critical thinking. - What is critical thinking - Critical thinking standards Clarify Precision Accuracy Relevance Consistency Logical correctness Completeness Fairness - The benefits of critical thinking	Read Chapter 1 - Lecture
2	- Barriers to critical thinking Egocentrism Sociocentrism Unwarranted assumption and stereotypes Relativistic thinking Wishful thinking - Characteristics of a critical thinker	Chapter 1 - Discussion
3	ReadRecognizing arguments - What is an argument? - Identifying premises and conclusions - What is not argument? Report Unsupported Assertions Conditional Statements Illustrations Explainations	Read Chapter 2/Lecture
4	Basic logical concepts Deduction and Induction	Read Chapter 3/Lecture

	How can we tell weather an argument is deductive or inductive? Common patterns of deductive reasoning Common patterns of inductive reasoning	
5	Deductive validity Inductive strength	Chapter 3 Discussion - Lecture
6	Categorical logic Categorical statements Translating into standard categorical form Categorical syllogism	Read Chapter 9/Lecture/Quiz
7	Propositional logic Conjunction Conjunction and validity Negation Disjunctions Conditional statements	Read Chapter 10/Lecture & Quiz
Midterm Exam		
8	Language Finding the right words: the next for precision The important of precise definitions + Exercise	Chapter 4 - Lecture
9	Logical fallacies I The concept of relevance Personal attack Attacking the motive Look who's talking Two wrongs make a right Scare tactics Appeal to pity Bandwagon Argument Straw man Red herring Equivocation Begging the question	Chapter 5 – Lecture & Discussion
10	Logical fallacies Fallacies of insufficient evidence Inappropriate appeal to authority Appeal to ignorance False Alternatives Loaded question Questionable cause Hasty generalization Slippery slope Weak analogy Inconsistency	Chapter 6 – Lecture/Quiz
11	Analyzing arguments	Chapter 7 – Lecture

	Diagram short arguments Summarizing longer arguments	
12	Evaluating arguments and truth claims What is an argument a good one? When is it reasonable to accept a premise? Refuting arguments Sample critical essay	Chapter 8 – Lecture
13	Inductive reasoning Introduction to induction Inductive generalization Statistics arguments Induction analogy Induction and causal arguments A few words about probability	Chapter 11 – Lecture & Discussion
14	Finding, Evaluating, and Using sources Finding sources Evaluating sources Taking notes Using sources	Chapter 12 – Lectuer & Quiz
15	Review	
Final exam		

7. **Course Assessment Policy:**

- Class participation, discussion, quiz and presentation: 20%
- Mid-term Exam (Essay &Multiple choices) - open-book exam: 30%
- Final (writing Exam: 20% + Report + Presentation: 30%): 50%

8. **Course general requirements**

Student is expected that you will spend at least **8 hours** per week studying this course. This time should be made up of reading, working on exercises and problem, group assignment and attending class lectures and tutorials. University regulations indicate that if students attend less than 80% of scheduled classes they may be refused final assessment. Regular attendance is essential for successful performance and learning in this course, particular in view of the interactive teaching and learning approach adopted.

PE021IU - General Law (General Law)

1. General information

Department	Office of Academic Affairs
Course classification	Foundation course
Course designation	Face to face
Semester(s) in whichthe course is taught	All semesters in each academic year
Person responsiblefor 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: 60 Contact hours (lecture, in class discussions): 45 hours Private study including examination preparation, specified in hours[1]: 15
Credit points	3
Required and recommended prerequisites for joining the course	N/A
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.
Course learning outcomes	Upon the successful completion of this course, students will be able to:

<table>
<tr><td></td><td>
<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 stateand 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 questionsCase-based exams
Essay exams
Oral exams</td></tr>
<tr><td>Study and examination requirements</td><td>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:
<table>
<tr><td>Assignment</td><td>20%</td></tr>
<tr><td>Midterm examination</td><td>30%</td></tr>
<tr><td>Final examination</td><td>50%</td></tr>
</table>
</td></tr>
</table>

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 undulydisrupts 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 laptopsis 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 bedeemed 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 upwith 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 BlackboardBooks: • PGS.TS. Phan Trung Hien, *Giáo trình Pháp Luật Đại cương*, NXBChính Trị Quốc Gia Sự Thật 2022. • Mai Hong Quy (Chief Editor) (2nd 2017), *Introduction to VietnameseLaw*, 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 forstudents 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 thiscourse 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*, NXBHồng 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: ReinforcedM: 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 systemavailable onBlackboard
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 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	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
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, andLaw 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-performanc evaluations	Discussions Case studies, especially cases related to corruption	PPT– Criminal lawavailable on Blackboard Criminal code 2015 available onBlackboard
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 relatedto corruption	PPT– Criminal lawavailable onBlackboard Criminal code 2015 available onBlackboard
8	**Revision for mid-term exam**		Quizzs Projecs		
9	**Civil Law (Part I)** • Definition and nature Civillaw 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 ofcontracts	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 code2015 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 oflabour law • Employees and employers • Working time, and restingtime • Salary (including salary forovertime working hours)	1-5 (Level M - Mastery)	Tests Peer evaluations Class-performance evaluations	Discussions Case studies	PPT– Labor law available on Blackboard Labor code2019 Available on Blackboard
14	**Labour Law** (Cont.)	1-5 (Level M -	Tests Peer evaluations	Discussions Case studies	PPT– Labor lawavailable on
	• **Employment contracts** • **Labor disciplines** • **Dispute settlements**	Mastery	Class-performance evaluations		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 nontangential. Shows a high degree of attention to logic and reasoning of points. Clearly leads the reader to the conclusion and stirs thought reg
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. Quotations may be poorly integrated into paragraphs. Some possible problems with source citations	Draws upon sources to support most points. Some evidence may not support arguments or may appear where inappropriate. Quotations integrated well into paragraphs. Sources cited correctly	Draws upon primary and secondary source information in useful and illuminating 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 framewor	Shows limited ability to structure problems in correspondenceto theoretical frameworks	Shows effort to link problems with the theoretical frameworks. There are still some mistakes	Shows ability to structure problems in correspondenceto theoretical frameworks correctly.	Shows ability to structure problems in correspondence to theoretical frameworks correctly. The

			ks			Minor mistakesin resolving problems	problems arewell resolved
5		**Quality of arguments**	Shows no effort to construct logical arguments. Fails to support analysis	Shows little attempt to offersupport for key claims or to relate evidenceto analysis. Reasons offeredare irrelevant.	Shows argumentof poor quality. Weak, undeveloped reasons are offeredto support key claims	Shows clear, relevant and logical arguments.	Shows identifiable, reasonable and sound arguments. Clear reasons are offered to support key claims.

EN007IU - Writing AE1. (Tiếng Anh học thuật 1 - Viết).

WRITING AE1 (ACADEMIC WRITING)

1. **General Information**
   - Course Title: Writing AE1 (*Tiếng Anh học thuật 1 - Viết)*
   - Course Code: EN007IU
   - Course Coordinator/Lecturer:
2. **Prerequisites**: None
3. **Course description:** This course provides students with comprehensive instructions and practice in essay writing, including transforming ideas into differentfunctions of writing such as process description, cause-effect, comparison-contrast, argumentative, and paraphrase-summary essays. 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, proofreading, documentation and editing, this course prepares the students for research paper writing in the next level of AE2 writing..
4. **Pre-requisite:** Students must fulfill ONE of the following requirements to attend this course
   - Hold TOEFL iBT certificate with score ≥ 61
   - Hold IELTS certificate with score ≥ 6.0
   - Have studied IE2 course
5. **Material:**
   - Text book: Writing academic English (4rd ed.) by Oshima, A., & Hogue, A. White Plains, NY: Pearson Longman. 2006
   - References: Great Writing 4, Great essays by Keith S. Folse, April Muchmore-Vokoun and Elena Vestri Solomon, Heinle Cengage Learning, 2010
6. **Course objectives:** Upon completion of the course, students are able to:
   - Understand and follow different steps in the writing process to produce a complete essay
   - Employ different ways to improve their writing such as self-assessment, peer feedback and teacher comments
   - Use different functions of writing to successfully communicate their purposes to the audience (process description, cause-effect, comparison-contrast, argumentative, and paraphrase- summary essays)
   - Read critically, analyze and annotate an academic text
7. **Course implementation**

   Time: 15 weeks, 2 periods per week

   Studying activity organization:
   - Preparation: Students are supposed to read the materials thoroughly before class, especially sample essays in the course books, in order to promote autonomous learning.

- Instructor's activities: A variety of teaching techniques will be applied in delivering the lessons, from lecture to discussion, from individual work or group work to presentation. Teachers will play the part as both instructors and facilitators.
- Team project: Beside the contact hours, the course involves a number of out-of- class hours for group work so that students can review, discuss and learn things together. Throughout 2 weeks working on the group project, the students are supposed to develop their critical thinking and teamwork skills.
- Review: Recapitulation is done in preparation for the final exam. Teachers will respond to any questions raised by students in order to make clear the content and purpose of the whole course. Course evaluation will also be done in this session.
- Self-study: Further practice outside the classroom is highly recommended to students to reinforce the skills they are trained in class. Teachers are willing to give feedback and comments

8. Course outline

Week	No. of periods	Coursebook		Assignments
		Chapter	***Pages***	
1	2	**The process of Academic Writing** Step 1: Creating (Prewriting) Step 2: Planning (Outlining) Step 3: Writing Step 4: Polishing	265-277	Editing Practice
2	2	**Chapter 8:** ***Paraphrase and Summary*** Paraphrasing Plagiarism and How to avoid Plagiarism	127 - 136	*Paraphrasing Practice*
3	2	**Chapter 4: From Paragraph to Essay** The introductory paragraph Body paragraphs The concluding paragraph	56 - 80	
4	2	**Chapter 4: From Paragraph to Essay (Cont'd)** Essay outlining, ,Review, Writing Practice. Reading (Questions & Suggestions forDiscussion or Writing)		
5	2	**Chapter 5: Process Essays** Thesis statements for process essay Transitional signals Writing Practice	81-93	*Sentence Structure* (**P. 179-193**) *Making an outline*
6	2	**Chapter 5: Process Essays (Cont'd)** Review/ Correction Reading 2 (Questions & Suggestions for Discussion or Writing)		***In-class Assignment*** **Reading 1** (Questions & Suggestions for Writing **P.89-91**)

7	2	**Chapter 6: Cause/ Effect Essays Organization** **Signal words and phrases Writing Practice**	94-110	
8	2	**Chapter 6: Cause/ Effect Essays (Cont'd)** **Review/ Correction** **Reading (Questions & Suggestions for Discussion or Writing)**		
MID-TERM EXAMINATION				
9	2	**Chapter 7: Comparison/ Contrast Essays** OrganizationSignal words Writing Practice	111 - 126	
10	2	**Chapter 7: Comparison/ Contrast Essays (Cont'd)** Review Peer correction/ Self assessment		***Home Assignment*** **Reading** (Questions & Suggestions for Writing **P. 124-126**)
11	2	**Chapter 8:** ***Paraphrase and Summary (Cont'd)*** Summarizing Review/ Correction Summarizing	136 - 141	*Summarizing Practice*
12	2	**Chapter 9: Argumentative Essays** Organization The introductory paragraphWriting Practice	142-160	***Writing Project*** **(home assignment)**
13	2	**Chapter 9: Argumentative Essays (Cont'd)** Review/Correction Topic 1 – Reading 1 & 2 (Questions)		Paraphrasing & Argumentative Essay Writing
14	2	**Argumentative Essays Project Presentation**		**Discussion**
15	2	**Review**		
FINAL EXAMINATION				

9. Policies

- 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 (eg. certified paper from doctors), students may re-take the examination

- Class behavior:

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.

10. Assessment

Assessment Summary

No.	***Assessment Task***	***Scoring***	***Weighting***
1	3 assignments (in-class, home, project) *Read and write 3 short essays due in week 6, 9, and 12 (~250 words)*	100	30%
2	Mid-term Exam *perform the ability to develop topic sentences and concluding restatement & write a cause/effect essay (300 - 350 words)*	100	30%
3	Final Exam *Write an argumentative essay (300 - 350 words) and perform the ability to paraphrase and summarize.*	100	40%

- Writing Project: Students are asked to work in a small group (up to 5 students), and aresupposed to search for one argumentative article, then paraphrase, and write one counter-argumentative essay. The project should be at least 5-page long including front cover page (students' names & IDs, instructor's name, title), original article, paraphrasing, the counter-argument, and the back cover page (including source).

- Bonus points *for students' participation and homework completion: From 1 to 5 pts added to theassignments score.*

For example: Student A has got a 78 for his assignments and he participated fully in all activities,then the instructor can decide to give him a bonus 5. As a result, he may gain an 83 (78+5) for the assignment score.

Passing Grade: 50%

EN008IU - Listening AE1 (Tiếng Anh học thuật 1 – Nghe).

LISTENING AE1 (LISTENING & NOTE-TAKING)

1. **General Information**
   - Course Title: Listening AE1 *(Tiếng Anh học thuật 1 – Nghe)*
   - Course Code: EN008IU
   - Course Coordinator/Lecturer:
2. **Prerequisites**: None
3. **Course description:** 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.
4. **Pre-requisite:** Students must fulfill ONE of the following requirements to attend this course
   - Hold TOEFL iBT certificate with score ≥ 61
   - Hold IELTS certificate with score ≥ 6.0
   - Complete IE2 course
5. **Material:**
   - Text book: Lecture Ready 3 – Laurie Frazie, Shalle Leeming, Oxford University Press, 2013
   - References: Lecture Ready 1, 2 – Laurie Frazie, Shalle Leeming, Oxford University Press, 2013
6. **Course objectives:** Upon completion of the course, students are able to:
   - Respond to academic lectures with appropriate strategies and confidence;
   - Improve their specialized knowledge of academic lectures; and
   - Communicate effectively with their classmates and professors.
7. **Course implementation**

   Time: 15 weeks, 2 periods per week

   Studying activity organization:

   a. 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.

   b. 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.

   c. 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.

d. Wrap-up: Due to the tight schedule and the longer duration for each class meeting, instructors are expected to solidly wrap up each lesson instead of the wrap-up sessions before the in-class ongoing assessment (week 4) and the final exam (week 8).

8. Course outline

WEEK	P.	Chapter	Listening oriented activities	Speaking oriented activities
WEEK 1	2	ORIENTATION		
WEEK 2	2	**Chapter 1** **New Trends in Marketing Research**	Recognizing topic introducing and lecture plan presenting expressions Organizing ideas by outlining	Expressing ideas during a discussion
WEEK 3	2	**Chapter 2** **Business Ethics**	Recognizing transition expressions Using symbols and abbreviations	Asking for clarification and elaboration during a discussion
WEEK 4	2	REVIEW		
WEEK 5	2	**Chapter 3** **Trends in Children's Media Use**	Recognizing generalization and support expressions	Giving opinions and asking for opinions during a discussion
WEEK 6	2	**Chapter 4** **The Changing Music Industry**	Recognizing expressions for clarification or emphasis Organizing notes by using a split-page format	Expressing interest and asking for elaboration during a discussion
WEEK 7	2	**Chapter 5** **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	**Chapter 6** **Intelligent Machines**	Recognizing expressions used to predict causes and effects Using arrows to show the relationship between causes and effects	Learning to compromise and reach a consensus during a discussion
WEEK 10	2	REVIEW		
WEEK 11	2	**Chapter 7** **Sibling Relationships**	Recognizing expressions of comparison and contrast Noting comparison and contrast	Expanding on ideas during a discussion
WEEK 12	2	**Chapter 8** **Multiple Intelligences**	Recognizing non-verbal signals indicating important information Representing information in list form	Keeping the discussion on topic
WEEK 13	2	REVIEW		
WEEK 14	2	Chapter 9 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				

Please be noted that the course aims to improve students' listening and note-taking skills so that class time should be dominated by activities involving strategies, skills and listening practice.

9. Policies

- Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least80% 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

10. Assessment

No.	***Assessment Task***	***Scoring***	***Weighting***
1	On-going assessment (participation, individual work, group work, assignments, etc.)	Out of 100	20%
2	Midterm exam	Out of 100	40%
3	Final Exam	Out of 100	40%

Passing Grade: 50%

EN011IU - Writing AE2 (Tiếng Anh học thuật 2 - Viết).

WRITING AE2 (RESEARCH PAPER WRITING)

1. **General Information**
   - Course Title: Writing AE2 *(Tiếng Anh học thuật 2 - Viết)*
   - Course Code: EN011IU
   - Course Coordinator/Lecturer:
2. **Prerequisites**: None
3. **Course description:** 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. 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.
4. **Pre-requisite:** complete Writing AE1 course
5. **Material:**
   - Text book: Study Writing - Hamp-Lyons, L. and B. Heasley. Cambridge, UK: Cambridge University Press. (2006)
   - References:
     i. Folse, K. S. & Pugh, T. (2010). Great writing 5: Greater essays. Boston: Heinle, Cengage Learning.
     ii. McCormack, J. & Slaught, J. (2009). English for academic study: Extended writing and research skills. Cambridge: Cambridge University Press. Garnet Education
     iii. Keezer, S. (ed) (2003). Write your research report. A real-time guide. New Jersey: Pearson Learning Group.
     iv. Articles and Essays taken from The Allyn and Bacon Guide to Writing by Ramage et al (2009), Pearson Longman
6. **Course objectives:** Upon completing this course, students are expected to be able to employ the research writing skills obtained to work on their own paper in their major study
7. **Course implementation**

   Time: 15 weeks, 2 periods per week

   Studying activity organization:

a. Preparation activities: aim to help students identify particular problems which the students may encounter when generating ideas and composing these ideas for a specific academic writing task. Group work is promoted to help them think about how ideas are generated and what useful writing techniques should be used to express these ideas. These activities include reading different academic texts and identifying the problem as well as the writing technique in a general academic writing context, and then in a more specific writing-research-paper context.

b. While-and post-listening activities: are intended to enable students to apply the problem-solving knowledge and writing techniques they have just learned to meet the demands of in-class writing practice. This is followed by cooperative feedback. When the students have finished their writing, they are encouraged to discuss and review each other's texts. Lecturers also write and offer their work for the whole class discussion. Finally, the students are required to rewrite their texts; which involves mainly correcting the mistakes.

c. Follow-up activities: Because of a wide range of writing tasks, many are more appropriate for homework. These require a lot of researching on the World Wide Web to write long texts. Lecturers' feedback is provided on individual writing.

d. Review week: In general, after three weeks, lecturers may implement a wrap-up and review session in which lecturers and students will review thefocus of the previous units and work on their residue. The course review session in the last week acts as the time when lecturers help students with any concerns related to the focused contents of the whole course

8. Course outline

WEEK	CONTENT—SUGGESTED TASKS (SMALL GROUPS)	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 personalstyles 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 structuresThe 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 gapThe 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**	HW: Task 15
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 processesWriting 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 sectionsFinding 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 connectionTeacher evaluation	HW: Task 9
13	**Unit 10: Creating the Whole Text** Structure of the research paper Creating your own research	**Assignment 2: Tasks 11 &12**

14	**Unit 10: Creating the Whole Text** **Plagiarism Creating citations** **Paraphrase and summary. Authorial identity**	
15	**Course Review**	
FINAL EXAM		

9. Policies and Expectations: Attendance, Missed Tests, Class Behaviors

- 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 (eg. certified paper from doctors), students may re-take the examination

- Class behavior: 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: 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 or to schedule an appointment for additional help or from their

10. Assessment: Regular on-time attendance in these courses is expected. Students may miss only 3 classes without penalty. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination

No.	***Assessment Task***	***Scoring***	***Weighting***
1	Class participation and Assignments	Out of 100	30%
2	Mid-term Exam	Out of 100	30%
3	Final Exam	Out of 100	40%

Passing Grade: 50%

EN012IU - Speaking AE2 (Tiếng Anh học thuật 2 – Nói).

SPEAKING AE2 (EFFECTIVE PRESENTATIONS)

1. **General Information**
   - Course Title: Speaking AE2 *(Tiếng Anh học thuật 2 – Nói)*
   - Course Code: EN012IU
   - Course Coordinator/Lecturer:
2. **Prerequisites**: None
3. **Course description:** Giving presentations today becomes a vital skill for students to succeed not only in university but also at work in the future. However, this may be seen as a nerve-racking task, especially when presented in a foreign language. Speaking AE2 provides the students with the knowledge and skills needed to deliver effective presentations. To do this, the course covers many aspects of giving presentation: preparing and planning, using the appropriate language, applying effective visual aids, building up confidence, performing body language, dealing with questions and responding, etc.
4. **Pre-requisite:** TOEFL iBT $\geq$ 61, IELTS $\geq$ 6.0
5. **Material:**
   - Text book: Effective Presentations - Jeremy Comfort, Oxford University Press, 1997
   - References: Study Speaking: a course in spoken English for academic purposes - By Kenneth Anderson, Joan Maclean, Tony Lynch - Cambridge University Press (2004)
6. **Course objectives:** On completion of the course, the students are able to prepare and deliver effective, formal, structured presentations that are appropriate to the specific environment and audience.
7. **Course implementation**

   Time: The course is 15 weeks long, consisting of 15 classes with 2 periods per class.

   Studying activity organization:
   a. Classroom skill-based practice given in the textbooks and in the supplementary material to build up fluency and accuracy.
   b. Continuing English language development to revisit some important grammar points and integrate listening and speaking/ writing and speaking.
   c. Pronunciation activities embedded in each lesson.
   d. Wide range of speaking activities (debate, discussion, etc) depending on interests and needs of students in each class.
8. **Course outline**

WEEK	MATERIAL COVERED	ACTIVITY
WEEK 1	ORIENTATION & INTRODUCTION	Students will receive an introduction toEffective Public Speaking.
WEEK 2	BUILDING UP CONFIDENCE	Student will give a short speech about themselves to help them overcome initial shyness of standing up and speaking in public
WEEK 3	**Unit 1: What is the Point?** Pages 6-11Video clipHandouts: - Page 11 (Student book)	Students will watch and discuss a poor presentation and will practice giving presentations in groups. Selected students will present to the class.
WEEK 4	**Unit 2: Making a Start Pages 12-17 Video clip Handouts: - Page 17 (Student book)**	Students will see and discuss a video of poor and good versions of an introduction, and will practice giving introductions to speeches in groups. Selected students will present to the class.
WEEK 5	**Unit 3: Linking the Parts Pages 18-23 Video clip Handouts: - Page 22 (Student book)**	Students will watch and discuss a video of poor and good versions of transitions, and practice giving short speeches in groups. Selected students will present to the class.
WEEK 6	**Unit 7: Finishing Off Pages 40-43 Video clip**	Students will watch and discuss a video showing good and poor closings and will practice giving endings to presentations in groups. Selected students will present to the class
WEEK 7	**PRACTICE PRESENTATIONS 1**	Students will prepare and deliver a short presentation on one of the topics chosen by the instructor. Selected students will present to the class.
WEEK 8	**Unit 4: The Right Kind of Language Pages 24-29 Video clip Handouts: - Pages 74 (Student book)**	Students will watch and discuss a video of an individual reading a research report and giving a presentation, will discuss advantages and disadvantages of reading a speech, and will learn how to analyze text to determine complexity level. Selected students will present to the class.
MIDTERM EXAMINATION Students will give a five to six minute informative presentation to be determined. *(The topic for Midterm exam is announced in Week 6)*		

WEEK 9	**<u>Unit 5:</u> Visual Aids** Pages 30-35Video clip Handouts: - Page 35 (Student book)	Students will view and discuss a video showing use of good and poor visual aids, and practice giving presentations using visual aids in groups. Selected students will present to the class.
WEEK 10	**<u>REPORTING CHANGE</u>**	Students will practice using the vocabulary to describe reporting change in organizations (profit, sales, revenue, cost) and explaining why these changes occurred. Students will practice giving presentation in groups. Time permitting selected students will present to the class.
WEEK 11	**<u>Unit 6: Body Language</u>** **<u>Pages 36-39 Video clip</u>**	Students will view and discuss a video showing use of good and poor body language, and practice giving presentations in groups. Selected students will present to the class.
WEEK 12	**<u>Unit 8: Questions Time</u>** **<u>Pages 44-49 Video clip Handouts:</u>** **<u>- Page 49 (Student book)</u>**	Students will view and discuss a video showing use of appropriate and inappropriate answering of questions, and practice giving answering questions in groups. Selected students will present to the class.
WEEK 13	**<u>Unit 9: Finishing Up</u>** **<u>Pages 44-49</u>** **<u>Video clip Unit 1 & Unit 9</u>**	Students will view and discuss a video showing use of good and bad presentations, and then practice giving presentations in their groups. Selected students will present to the class.
WEEK 14	**<u>EXTRA SPEAKING ACTIVITIES</u>**	Example: Public debating lecture & students will debate in groups.
WEEK 15	**<u>PRACTICE PRESENTATIONS 2</u>**	Students will practice their presentation in class and be evaluated by peers
FINAL EXAMINATION Students will deliver a seven to eight minute persuasive presentation on a topic to be determined *(The topic for Final exam is announced in Week 13)*		

9. Policies and Expectations: Attendance, Missed Tests, Class Behaviors

- **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 (eg. certified paper from doctors), students may re-take the examination.

- Class behavior: 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.

11. Assessment: Regular on-time attendance in these courses is expected. Students may miss only 3 classes without penalty. It is compulsory that the students attend at least 80% of the course to be eligible for the final examination

Assessment Summary

No.	***Assessment Task***	***Scoring***	***Weighting***
1	Extra Speaking Activities (debate, discussion, group/ individual presentation, etc.)	Out of 100	30%
2	Mid-term Exam (Students will give a five to six minute informative presentation to be determined.)	Out of 100	30%
3	Final Exam (Students will deliver a seven to eight minute persuasive presentation on a topic to be determined.)	Out of 100	40%

Pass grade: 50%

MA001IU - Calculus 1 (Toán 1).

Course Code: MA001IU **No. of Credits: 4**
Instructor: ***Prof. D.Sc. Phan Quoc Khanh***
Dr. Nguyen Ngoc Hai

A. COURSE OVERVIEW:

1. **Course Objectives**: ◆ To provide the students with the main ideas and techniques of calculus, concerning limits, continuity, differentiation and integration.
   ◆ To provide an understanding of the practical meaning, significance and applications of these ideas and techniques, through practical examples taken from many areas of engineering, business and the life sciences
   ◆ To develop skills in mathematical modelling and problem solving, in thinking logically, and in creatively applying existing knowledge to new situations
   ◆ To develop confidence and fluency in discussing mathematics in English.
2. **Prerequisite**: none
3. **Main Content**: Functions; Limits; Continuity; Derivatives, Differentiation, Derivatives of Basic Elementary Functions, Differentiation Rules; Applications of Differentiation: l'Hôpital's Rule, Optimization, Newton's Method; Anti-derivatives; Indefinite Integrals, Definite Integrals, Fundamental Theorem of Calculus; Techniques of Integration; Improper Integrals; Applications of Integration.
4. **Assessment**:
   Assignment and Class Attendance: 20%
   Midterm Test: 20%
   Final Exam: 60%
5. **Documents**:
   Main textbook: J. Stewart, *Calculus. Concepts and Contexts*, 5th ed., Thomson Learning, 2005.

   Other textbooks:
   1. J. Rogawski, *Calculus, Early Transcendentals*, W.H. Freeman, 2008.
   2. R.N. Greenwell, N.P. Ritchey, and M.L. Lial, *Calculus with Applications for the Life Sciences*, Addition Wesley, 2003.

B. A DETAILED OUTLINE:

Chapter	Name of Chapter	Descriptions
01	Functions, Limits and Continuity	1.1 What is Calculus? 1.2 Straight Lines. Equations of Lines 1.3 Functions and Graphs 1.4 New Functions from Old Functions. Inverse Functions 1.5 Parametric Curves 1.6 Definition of a Limit. One-sided Limits 1.7 Laws of Limits. Evaluating Limits. The Squeeze Theorem 1.8 Continuity 1.9 The Intermediate Value Theorem 1.10 Limits Involving Infinity
02	Differentiation	2.1 The Tangent and Velocity Problems. Rates of Change 2.2 The Derivative. Higher-Order Derivatives

		2.3 Rules of Differentiation. Finding Derivatives using Maple 2.4 Rates of Change in the Natural and Social Sciences 2.5 Implicit Differentiation 2.6 Differentiation of Inverse Functions 2.7 Linear Approximations. Differentials.
03	Applications of Differentiation	3.1 Related Rates 3.2 Maxima and Minima. Critical Points 3.3 The Mean Value Theorem. The First Derivative Test. Concavity. Shapes of Curves. 3.4 Curve Sketching. Graphing with Calculus and Computers using Maple 3.5 Indeterminate Forms and l'Hôpital's Rules 3.6 Maxima and Minima Problems 3.7 Newton's Method 3.8 Anti-derivatives and Indefinite Integrals
04	Integration	4.1 Areas under Curves and Distances 4.2 The Definite Integral 4.3 Properties of the Definite Integral. 4.4 The Fundamental Theorem of Calculus 4.5 Integration by Substitution 4.6 Integration by Parts 4.7 Additional Techniques of Integration. Partial Fractions 4.8 Integration Using Tables and Computer Algebra Systems 4.9 Numerical Integration 4.10 Improper Integrals
05	Applications of Integration	5.1 Areas between Curves 5.2 Areas Enclosed by Parametric Curves 5.3 Volumes 5.4 Arc Length 5.5 Average Value of a Function 5.6 Applications to Engineering, Economics and Science

MA003IU - Calculus 2 (Toán 2).

Course Code: MA003IU **No. of Credits: 4**
Instructor: ***Prof. D.Sc. Phan Quoc Khanh, Dr. Mai Duc Thanh***

A. COURSE OVERVIEW:

1. **Course Objective**: To provide the students with the main notions and techniques of calculus of functions of several variables concerning limits, continuity, differentiation and integation; basic skills of computing the sum of series. Many applications explain how to use these notions and techniques in practical situations.
2. **Prerequisite**: Calculus I
3. **Major Contents:** Sequence and Series; Convergence Tests; Power Series; Taylor and Maclaurin Series; Cartesian Coordinates; Lines, Planes and Surfaces; Derivatives and Integrals of Vector Functions, Arc Length and Curvature, Parametric Surfaces; Functions of Several Variables; Limits, Continuity, Partial Derivatives, Tangent Planes; Gradient Vectors; Extrema; Lagrange Multipliers; Multiple Integrals: Double Integrals, Triple Integrals, Techniques of Integration; Vector Fields, Line Integrals, Surface Integrals.
4. **Assessment**:
   Assignment and Class Attendance: 20%
   Midterm Test: 20%
   Final Exam: 60%
5. **Documents**:

Main documents:

1. J. Rogawski, *Calculus, Early Transcendentals*, W. H. Freeman, 2008.
2. J. Stewart, *Calculus. Concepts and Contexts*, Thomson Learning, 5fth edition, 2005.

References:

1. R. Adams, Calculus. A Complete Course, Addison-Wesley, 1991.
2. R.N. Greenwell, N.P. Ritchey, and M.L. Lial, Caculus with Applications for the Life Science, Addition Wesley, 2002.
3. M.L. Lial, R.N. Greenwell, and A.D. Miller, Calculus with Applications, Addition Wesley, 1998.

B. A DETAILED OUTLINE:

Name of Chapter	Descriptions
Chapter 1. Sequences and Series	1.1 Sequences 1.2 Series 1.3 The Integral and Comparison Tests; Estimating Sums 1.4 Other Convergence Tests 1.5 Power Series 1.6 Representations of Functions as Power Series 1.7 Taylor & Maclaurin Series 1.8 Applications of Taylor Polynomials
Chapter 2. Analytic Geometry of Space , Vector Functions	2.1 Euclidean n-Space and Cartesian Coordinates 2.2 Vectors in 3-Spaces 2.3 The Dot Product and Applications 2.4 The Cross Product and Applications 2.5 Lines, Planes, and Surfaces 2.6 Cylindrical & Spherical Coordinate Systems 2.7 Vector Functions and Space Curves 2.8 Parametric Surfaces
Chapter 3. Partial Derivatives	3.1 Functions of Several Variables 3.2 Limits and Continuity

	3.3 Partial Derivatives 3.4 Tangent Planes and Linear Approximations 3.5 The Chain Rule 3.6 Directional Derivatives and Gradient Vectors 3.7 Maximum and Minimum Values 3.8 Lagrange Multipliers
Chapter 4. Multiple Integals	4.1 Double Integrals over Rectangular Regions 4.2 Iterated Integrals 4.3 Double Integrals over General Regions 4.4 Double Integrals in Polar Coordinates 4.5 Applications of Double Integrals 4.6 Surface Area 4.7 Triple Integrals 4.8 Triple Integrals in Cylindrical and Spherical Coordinates
Chapter 5. Vector Calculus	5.1 Vector Fields 5.2 Line Integrals 5.3 The Fundamental Theorem of Line Integrals 5.4 Green's Theorem 5.5 Curl and Divergence 5.6 Surface Integrals 5.7 Stokes' Theorem and Divergence Theorem

MA023IU - Calculus 3 (Toán 3).

Course Code: MA023IU No. of Credits: 4
Instructor: ***Prof. D.Sc. Phan Quoc Khanh***
Dr. Nguyen Ngoc Hai

A. COURSE OVERVIEW:

1. **Course Objectives**: To give the students:
    1. Knowledge of complex numbers and series, complex functions, and complex derivatives
    2. Knowledge of Laplace transforms, z-transforms, Fourier series and Fourier transforms, Fourier spectrum, frequency response, etc
    3. Mathematical and computational skills needed in solving differential equations and in fields such as electric circuits, communications, signal processing and control, etc
    4. To develop confidence and fluency in discussing mathematics in English.
2. **Prerequisites**: Calculus I, Calculus II
3. **Main Content**:
   Complex numbers, complex series, complex functions, complex derivatives; Laplace transform, z-transform, Fourier series, Fourier transform, the inverse transform, transforms of derivatives and integrals, first-order differential equations, second-order differential equations, difference equations, applications to electrical circuits and signal processing.
4. **Assessment**:
   Assignment and Class Attendance: 20%
   Midterm Test: 20%
   Final Exam: 60%
4. **Documents**:
   Main textbook**:** G. James, *Advanced Modern Engineering Mathematics*, 3rd ed., Prentice Hall, 2004**.**
   Other textbooks:
   1. E. Kreyszig, *Advanced Engineering Mathematics*, 9th ed., John Wiley & Sons, 2006.
   2. R.C. Drof, J. A. Svoboda, *Introduction to Electric Circuits*, 6th ed., John Weley & Sons, 2004.
   3. J.W. Nilsson and S.A. Riedel, *Electric Circuits*, 7th Ed, Prentice Hall, 2005.
   4. J.H. McClellan, R.W. Schafer, M.A, Yoder, *Signal Processing First*, Prentice Hall, 2003.
   5. A.V. Oppenhem, A.S. Willsky, *Signals & Systems*, 2nd ed., Prentice Hall, 1997.
   6. B.P. Lathi, *Linear Systems and Signals*, Oxford University Press, 2005.

B. DETAILED OUTLINE:

Chapter name	Descriptions
Chapter 1. Complex Numbers and Functions	1.8 Introduction 1.9 The Argand diagram 1.10 The arithmetic of complex numbers 1.11 Polar form of a complex number 1.12 Euler's formula 1.13 Powers and roots of complex numbers 1.14 Circular and hyperbolic functions 1.15 Logarithm of a complex number 1.16 Complex functions and mappings

	1.10 Complex differentiation. Cauchy-Riemann equations 1.11 Conjugate and harmonic functions 1.12 Power series. Taylor series 1.13 Laurent series
Chapter 2. Laplace Transforms	2.1 Definition and examples 2.2 Existence of the Laplace transform 2.3 Properties of the Laplace transform 2.4 The inverse transform 2.5 Transforms of derivatives and integrals 2.6 Differential equations 2.7 Engineering applications. 2.8 Step functions and Laplace transforms 2.9 The second shift theorem 2.10 Differential equations 2.11 Periodic functions 2.12 Impulse functions and Laplace transforms 2.13 Relationship between Heaviside step and impulse functions 2.14 Transfer functions. Stability. Impulse response 2.15 Initial-and final value-theorems 2.16 Convolution. System response to an arbitrary input 2.17 Engineering applications.
Chapter 3. The z Transform	3.1 Definition and examples 3.2 Properties of the z transform 3.3 The inverse z transform 3.4 Discrete-time systems and difference equations 3.5 z transfer functions 3.6 The impulse response. Stability 3.7 Convolution 3.8 The relationship between Laplace and z transforms 3.9 Engineering applications
Chapter 4. Fourier Series	4.1 Periodic functions. The Fourier coefficients 4.2 Functions of period 2π 4.3 Even and odd functions and harmonics 4.4 Linear property. Convergence of the Fourier series 4.5 Functions of period T 4.6 Functions defined over a finite inteval 4.7 Differentiation and integration of Fourier series. 4.8 Coefficients in terms of jumps at discontinuities 4.9 Engineering applications 4.10 Complex form of Fourier series 4.11 The multiplication theorem and Parseval's theorem 4.12 Discrete frequency spectra. Power spectrum 4.13 Engineering applications

Chapter 5. Fourier Transforms	5.1 The Fourier integral 5.2 The Fourier transform pair. The continuous Fourier spectra 5.3 Properties of the Fourier transform 5.4 The frequency response 5.5 Energy and power 5.6 Convolution 5.7 Fourier transform for sequences 5.8 The discrete Fourier transform 5.9 Estimation of the continuous Fourier transform 5.10 The fast Fourier transform 5.11 Engineering applications

MA024IU - Differential Equations.

PART I: THEORY

Course Code: **No. of Credits: 3**
Instructor: ***Prof. D.Sc. Phan Quoc Khanh***
Dr. Nguyen Ngoc Hai

A. COURSE OVERVIEW:

1. **Course Objectives**: ◆ To provide the students with the main ideas of the basic theory of differential equations and with techniques for solving some important types of differential equation.
◆ To study applications of differential equations through practical examples taken from many areas of engineering, business, social sciences, etc.
◆ To develop the ability to construct and analyze mathematical models based on differential equations.
2. **Prerequisites:** Calculus I, Calculus II
3. **Main Content**:

First-order differential equations, second-order linear differential equations, undetermined coefficients, variation of parameters, applications, higher-order linear differential equations, systems of first-order linear equations, elementary partial differential equations and the method of separation of variables.

4. **Assessment**:

Assignment and Class Attendance: 20%
Midterm Test: 20%
Final Exam: 60%

5. **Documents**:

Textbook:
W.E. Boyce, R.C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, 8th ed., John Wiley & Sons, 2004.

B. A DETAILED OUTLINE:

Chapter name	Descriptions
Chapter 1. Introduction	1.1 Some Basic Mathematical Models; Direction Fields 1.2 Classification of Differential Equations
Chapter 2. First Order Differential Equations	2.1 Linear Equations; Method of Integrating Factors 2.2 Separable Equations 2.3 Modeling with First Order Equations 2.5 Exact Equations (skip Integrating Factors)
Chapter 3. Second Order Linear Equations	3.1 Second Order Equations 3.2 Fundamental Solutions of Linear Homogeneous Equations 3.3 Linear Independence and the Wronskian 3.4 Complex Roots of the Characteristic Equation 3.5 Repeated Roots

	3.6 Nonhomogeneous Equations; Method of Undetermined Coefficients 3.7 Variation of Parameters 3.8 Applications of Second Order Linear Equations
Chapter 4. Higher Order Linear Equations	4.1 General Theory of nth Order Linear Equations 4.2 Homogeneous Equations with Constant Coefficients 4.3 The Method of Undetermined Coefficients
Chapter 5. Systems of First-Order Linear Equations	6.1 Review of Linear Algebra 6.2 Basic Theory of Systems of First Order Linear Equations 6.3 Homogeneous Linear Systems with Constant Coefficients 6.4 Complex Eigenvalues 6.5 Repeated Eigenvalues
Chapter 6. Introduction to Partial Differential Equations	6.1 Introduction 6.2 Review of Fourier Series 6.2 Separation of Variables. Heat Conduction Problems 6.3 Wave Equations 6.4 Laplace's Equations

PART II: PRACTICE WITH MAPLE/MATLAB

Course Code: **No. of Credits: 1**
Instructor: ***Dr. Nguyen Ngoc Hai***

A. COURSE OVERVIEW:

1. **Course Objectives**: To provide the students with an introduction to differential equations and techniques for solving important types of differential equation using software packages such as Maple and Matlab. On completion of the course the students should be able to:
   - Use software packages to solve almost important classes of differential equations.
   - Visualize solution curves and solve other related geometric problems.
   - To find approximate solutions of differential equations using numerical methods.
2. **Prerequisites:** None
3. **Main Content**:

First-order differential equations, second-order linear differential equations, higher-order linear differential equations, series solutions of second-order linear differential equations with nonconstant coefficients, systems of first-order linear equations, partial differential equations, numerical methods.

4. **Documents**:

Textbook:
W.E. Boyce, R.C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, 8th ed., John Wiley & Sons, 2004.

B. A DETAILED OUTLINE:

Chapter name	Descriptions

Chapter 1. Introduction	1.1 Integral Curves. 1.2 Direction Fields
Chapter 2. First Order Differential Equations	2.1 Linear Equations 2.2 Separable Equations 2.2 Exact Equations
Chapter 3. Second Order Linear Equations	3.1 Homogeneous Equations with Constant Coefficients 3.2 Nonhomogeneous Equations with Constant Coefficients
Chapter 4. Higher Order Linear Equations	4.1 Homogeneous Equations with Constant Coefficients 4.2 Nonhomogeneous Equations with Constant Coefficients
Chapter 5 Series Solutions of Second Order Linear Equations	5.1 Series Solutions Near an Ordinary Point 5.2 Series Solutions Near a Regular Singular Point
Chapter 6. Systems of First-Order Linear Equations	6.1 Homogeneous Linear Systems with Constant Coefficients 6.2 Nonhomogeneous Linear Systems 6.3 Phase plane
Chapter 7 Introduction to Partial Differential Equations	7.1 Heat Conduction Equations 7.2 Wave Equations 7.3 Laplace's Equations
Chapter 8 Numerical Methods	8.1 The Euler or Tangent Line Method 8.2 Improvements on the Euler Method 8.3 The Runge-Kutta Method 8.4 Systems of First Order Equations

PH013IU - Physics 1 (Lý 1).

1. **Name of course**: PHYSICS 1 (GENERAL MECHANICS)
2. **Course code:** PH013IU
3. **Course type:** General
   ☒ Requirement Course
   ☐ Elective Course
4. **Number of credits:** 2 credits
   - Theory: 2 credits
   - Practice: 0 credit
5. **Prerequisite:** No
6. **Parallel teaching in the course:** No
7. **Course Description:** An introduction to mechanics including: planar forces, free body diagrams, planar equilibrium of rigid bodies, friction, distributed forces, internal forces, shear force and bending moment diagrams, simple stress and strain and associated material properties, kinematics and kinetic of particles, work and energy, motion of rigid bodies in a plane.
8. **Course objectives/Course learning outcomes:**

No.	Course Objectives	Program Learning outcomes
1	Construct the basic knowledge of general Mechanics Physics	An ability to apply knowledge of mathematics, science, and engineering
2	Solve problems in engineering environment by applying both theoretical and experimental techniques	
3	Understand and acquire skills needed to use physical laws governing real process and to solve them in the engineering environment	
4	Develop confidence and fluency in discussing physics in English.	An ability to communicate effectively

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

Time: 15 Weeks; 2 Periods per week

Teaching and learning activities

- Classroom activities: Lectures, discussions, presentations
- Self-learning: Reading, homework
- Team work: Assignment

11. Course outline

Week	Topics	Chapter
1	**Motion in One Dimension** - Position, Velocity, and Acceleration	**Chapter 1: Bases of Kinematics**

	- One-Dimensional Motion with Constant Acceleration - Freely Falling Objects	
2	**Motion in Two Dimensions** - The Position, Velocity, and Acceleration Vectors - Two-Dimensional Motion with Constant Acceleration. Projectile Motion - Circular Motion. Tangential and Radial Acceleration - Relative Velocity and Relative Acceleration	
3	- Newton's First Law and Inertial Frames - Newton's Second Law - Newton's Third Law	**Chapter 2: The Law of Motion**
4	- Some Applications of Newton's Laws o The Gravitational Force and Weight o Forces of Friction o Uniform Circular Motion and Non-uniform Circular Motion o Motion in the Presence of Resistive Forces - Motion in Accelerated Frames	
5	- Work Done by Force. Power - Kinetic Energy and the Work. - Kinetic Energy Theorem	**Chapter 3: Work and Mechanical Energy**
6	- Potential Energy of a System - Conservation of Mechanical Energy - Conservative and Non-conservative Forces	
7	- Changes in Mechanical Energy for Non-conservative Forces - Relationship Between Conservative Forces and Potential Energy	
8	- Linear Momentum and Its Conservation - Impulse and Momentum - Collisions in One Dimension and Two - Dimensional Collisions	**Chapter 4: Linear Momentum and Collisions**
9	- The Center of Mass. Motion of a System of Particles - Rocket Propulsion	
10	- Rotational Kinematics: Rotational Motion with Constant Angular Acceleration - Torque and Angular Acceleration - Moments of Inertia	**Chapter 5: Rotation of a Rigid Object About a Fixed Axis**
11	- Rotational Kinetic Energy	

	- Rolling Motion of a Rigid Object - Angular Momentum of a Rotating Rigid Object - Conservation of Angular Momentum	
12	- The Conditions for Equilibrium	**Chapter 6: Equilibrium and Elasticity**
13	- The Center of Gravity	
14	- Newton's Law of Gravitation - Kepler's Laws and the Motion of Planets	**Chapter 7: Universal Gravitation**
15	- The Gravitational Field and Gravitational - Potential Energy	

12. Course Assessment:

Grading:

- Assignment: 20%
- Midterm Test: 20%
- Final Exam: 60%

PH014IU - Physics 2 (Lý 2).

1. **Name of course**: PHYSICS 2 (FLUID MECHANICS AND THERMAL PHYSICS)
2. **Course code:** PH014IU
3. **Course type:** General
   ☒Requirement Course
   ☐Elective Course
4. **Number of credits:** 2 credits
   - Theory: 2 credits
   - Practice: 0 credit
5. **Prerequisite:** No
6. **Parallel teaching in the course:** No
7. **Course Description:**

This course provides students with basic knowledge of fluid mechanics; macroscopic description of gases; heat and the first law of thermodynamics; heat engines and the second law of thermodynamics; microscopic description of gases and the kinetic theory of gases.

8. **Course objectives/Course learning outcomes:**

No.	Course Objectives	Program Learning outcomes
1	Construct the basic knowledge of Fluid Mechanics and Thermal Physics	An ability to apply knowledge of mathematics, science, and engineering
2	Solve problems in engineering environment by applying both theoretical and experimental techniques	
3	Understand and acquire skills needed to use physical laws governing real process and to solve them in the engineering environment	
4	Develop confidence and fluency in discussing physics in English.	An ability to communicate effectively

9. **Textbooks and references:**

Textbooks :

- Halliday D., Resnick R. and Walker, J. (2011) *Fundamentals of Physics*, 9th edition, John Willey and Sons, Inc.

References:

- Alonso M. and Finn E.J. (1992) *Physics*, Addison-Wesley Publishing Company.
- Hecht, E. (2000) *Physics: Calculus*, 2nd edition, Brooks/Cole.
- Faughn/Serway (2006) *Serway's College Physics*, Thomson Brooks/Cole.

10. **Course implementation**
    a. **Time:** 15 Weeks; 2 Periods per week
    b. **Teaching and learning activities**
       - Classroom activities: Lectures, discussions, presentations
       - Self-learning: Reading, homework
       - Team work: Assignment
11. **Course outline**

Week	Topics	Chapter
1	- Variation of Pressure with Depth	**Chapter 1: Fluid Mechanics**
2	- Fluid Dynamics - Bernoulli's Equation	
3	- Temperature and the Zeroth Law of Thermodynamics - Ideal Gas	**Chapter 2: Macroscopic Description of An Ideal Gas**
4	- Experimental Laws of an Ideal Gas	
5	- Equation of State for an Ideal Gas	
6	- Thermal Expansion of Solids and Liquids. - Heat and Internal Energy	**Chapter 3: Heat and The First Law of Thermodynamics**
7	- Heat Capacity and Specific Heat. Phase Change. Latent Heat - Heat Transfer : Convection, Conduction, and Radiation	
8	- Work and Heat in Thermodynamic Processes - The First Law of Thermodynamics. Some Applications.	
9	- Reversible and Irreversible Processes	**Chapter 4: Heat Engines and the Second Law of Thermodynamics**
10	- The Carnot Engine	
11	- Entropy. Entropy Changes in Irreversible Processes	
12	- Molecular Model of an Ideal Gas - Molar Specific Heat of an Ideal Gas	**Chapter 5: The Kinetic Theory of Gases**
13	- Adiabatic Processes for an Ideal Gas - The Equipartition of Energy	
14	- The Boltzmann Distribution Law - Distribution of Molecular Speeds	
15	- Mean Free Path - Entropy on a Microscopic Scale	

12. Course Assessment:

Grading:

- Assignment: 20%
- Midterm Test: 20%
- Final Exam: 60%

13. Policies:

- *Attendance:* Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination.
- *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 problem and group assignment.

- *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.)

CH011IU - Chemistry for Engineers (Hóa học cho kỹ thuật)

1. **Course title (code): CH011IU**
2. **Number of credits:** 3(3,0)
3. **Instructor:** Huynh Kim Lam (PhD)
4. **Prerequisite**: none
5. **Course objectives:**

a. To introduce students to general chemistry and to provide students with a firm foundation in chemistry for careers in science and engineering. Upon successful completion of this course, the students should be able to demonstrate basic knowledge of the following:

- The role of chemistry for engineers
- Measurements in chemistry
- Matter and state of matter
- Structure of atoms, molecules and ions
- Periodicity
- Chemical bonds
- Intermolecular forces, liquid and solid
- Gases, liquids, solids and their properties
- Types and rates of chemical reactions
- Chemical equilibrium
- Electrolytes, acid-base, pH, buffer
- Thermochemistry and thermodynamics
- Electrochemistry
- Nuclear chemistry

b. Development of their critical thinking and problem-solving skills for applying chemistry in an engineering context.

c. Ability to explain many aspects of everyday life using chemistry concepts.

- Chemical reactions
- pH and buffers
- Oxidation-Reduction titration with $KMnO_4$
- Chemical equilibrium
- Factors affecting reaction rates

6. **Course description:**

This one-semester course is designed for engineering students those who are pursuing a non-chemistry engineering degree such as information technology, bio-technology, civil, biomedical, electronic and telecommunication engineering. The course will introduce the basic principles of chemistry and connect those principles to issues in engineering professions. The related lab-work is not included in this course.

7. **Course details:**

- Lecture 1 (01 teaching hrs): Introduction to General Chemistry for Engineers: The role of general chemistry for engineers; Chapter outline
- Lecture 2 (02 teaching hrs): Measurements in Chemistry: Physical quantities: number and unit; Measurement and significant figures; Scientific notation; Measuring mass; Measuring length and volume; Density; Measuring temperature; Rounding off numbers; Converting a quantity from one unit to another

- Lecture 3 (02 teaching hrs): Introduction to Matter: Matter and state of matter (gas, liquid, solid and plasma); General concepts of mass and energy; Matter and change: chemical change and physical change; Classification of matter: element, compound and mixture (homogeneous and heterogeneous)
- Lecture 4 (04 teaching hrs): Atoms, Molecules and Ions: Atoms and their structure, model of an tom; Nucleus of an atom; Electron cloud of an atom; Chemical symbols; Isotopes; Rules about electrons; Molecular compounds; Communicating molecular structure; Ions and ionic compounds; Monatomic ions and polyatomic ions; Hydrates; Chemical nomenclature
- Lecture 5 (02 teaching hrs): Periodicity: Classification of the elements; General periodic trends; Atomic size and trends in atomic size; Ionization energy; The first ionization energy with atomic number; Electron affinity; Electronegativity
- Lecture 6 (04 teaching hrs): Chemical Bonds: The concepts of chemical bonds; Classification of chemical bonds; Ionic bonds; Covalentbonds; Metallic bonds; Valence electrons; Bond and lone pairs; Molecular geometry, the VSEPR model and structure determination by VSEPR; Bond polarity; Polar and nonpolar molecules; Electro-negativity and chemical bonds; Bond lengths and bond strengths
- Lecture 7 (04 teaching hrs): Intermolecular Forces: The concepts of intermolecular forces; Dipole-dipole forces; Hydrogen bonding; Ion- dipole forces; Induced dipole forces; Ion-induced dipole forces; Dipole-induced dipole forces; Induced dipole- induced dipole forces; Intermolecular forces and physical properties;
- Lecture 8 (02 teaching hrs): Gases and Their Properties: The concepts of gas and vapor; Properties of gases; Gas pressure; Boyle's law; Charles's law; Gay-Lussac's law; The combined gas law; Avogadro's law; Ideal gas law; Partial pressure (Dalton's law); Effusion (graham's law)
- Lecture 9 (02 teaching hrs): Solutions and Their Properties: The concepts of solutions; Classification of solutions; The nature of solute in solutions; Energy changes and the solution process; Units of concentration; Factors affecting olubility; Henry's law; Physical behavior of solutions: colligative properties; Raoult's law; Osmosis and osmotic pressure
- Lecture 10 (02 teaching hrs): Solids and Their Properties: Solid and types of solid; Crystal structure and the unit cell; Unit cells and coordination number; Metals and alloys; Conductor, semiconductor and Insulator
- Lecture 11 (02 teaching hrs): Chemical Reactions: Chemical change; Chemical equation; Types of reactions
- Lecture 12 (02 teaching hrs): Chemical Kinetics: Rates of chemical reactions; Factors that affect the reaction rates; Rate laws; First order reaction; Second order reaction; Third order reaction; Zero order reaction
- Lecture 13 (02 teaching hrs): Chemical Equilibrium: The concepts of chemical equilibrium; Equilibrium constant; Equilibrium expression; Homogenous and heterogeneous equilibrium; Le chatelier's principle
- Lecture 14 (04 teaching hrs): Electrolytes, Acid- Base, pH and Buffer: Strong and weak electrolytes; Acid-base theories: Arrhenius, Bronsted-Lowry and Lewis theory; Conjugate pairs; Conjugate acid-base strength; Ionization of water, ion-product constant Kw for water; pH; Equilibrium constants for weak acids;

Equilibrium constants for weak bases; Calculating pH from Ka; Buffer, calculating pH of a buffer; Henderson- Hasselbalch equation; Buffer capacity

- Lecture 15 (04 teaching hrs): Thermochemistry and Thermodynamics: System and surrounding; Energy and work; Internal energy: kinetic and potential energy; Energy and temperature; Heat and heat transfer mechanism; Conservation of energy; Heat of reaction and calorimetry; State of a system and state functions; The first law of thermodynamics; Enthalpy and enthalpy change; Enthalpy of reaction; Hess's law; Enthalpy of formation; Standard enthalpyEnthalpy from bond energy; Enthalpy of solution; Entropy and the second law of thermodynamics; The third law of thermodynamics; Standard entropy; Gibbs free energy
- Lecture 16 (04 teaching hrs): Electrochemistry: The concepts of electrochemistry; Oxidation number; Balancing redox equations; Galvanic cell; Standard reduction potentials; Nernst equation; Batteries; Corrosion; Rusting of iron; Electrolysis
- Lecture 17 (02 teaching hrs): Nuclear Chemistry: The concepts of radioactivity; Types of nuclear reactions; Types of radiation; Energy of nuclear reactions; Fission and fusion; Effect of radiation on matter; Detecting radiation; Radiation exposure and contamination; Rate of nuclear reactions; Radiocarbon dating; Radiation units

8. References:

- Required book(s)
  - "Chemistry for Engineers – An Applied Approach" by Mary Jane Shultz (2007) "General Chemistry" by Darrell Ebbing and Steven D. Gammon (9th Ed., 2010)
  - "Chemistry: A Molecular Approach" by Nivaldo J. Tro (2nd Ed., 2008) "Chemistry, Principles and Reactions" by Masterton and Hurley (6th Ed., 2009)
- On IU Blackboard: Link to course documents on BB
- Website(s): https://sites.google.com/site/lkhclasses/

9. Grading: projector and computer connected to the internet to use online tools.

- Midterm Exam (20-40%): 30%
- Final Exam (35-60%): 50%
- Others (10-30%):1 20%

10. Policy

- Language

English only. Both students and instructors are encouraged to use English for all communications, either in or outside of class. At minimum English must be used when in class.

- Attendance

Students must attend at least 80% of the classes in order to qualify for siting the midterm and final exams. All absence, if not emergent, requires approval of the instructor(s) in advance. Absence for exams requires in-advanced approval of the Office of Academic Affairs.

- Safety

Both instructor(s) and students are requested to strictly follow the rules/regulations related to safety issued by the university and/or the school. Violation, no matter on intention or not, implies immediate dimission from class or lab-work session.

- Teaching hours

All classes start sharply at 08:00 in the morning and 13:00 in the afternoon. Each teaching period lasts for 45 mins and must be delivered in the presence of either the instructor(s) or his/her teaching assistant. Students that do not come on time can be considered as not attending the class.

- Communication

Conversation between instructor(s) and students is possible via in-person contact or email. It is recommended that students check with the instructor(s) first before attempting to use telephone for communication.

- Qualification of the instructor(s)

Instructor(s) and his/her teaching assistant, once approved by the university and the school, i.e. names appear on the semester's official schedule, are qualified for teaching. They are fully responsible for the quality of teaching reflected via the preparation of this syllabus, available materials uploaded on IU-Blackboard, lecture notes or handouts and, if the course requires lab-work, lab manual. Without permission from the university and the school no other person could teach on behalf of the instructor(s)

- Report

Any matter related to the course should be directly reported and discussed with the instructor(s) before attempting to resolve it at the school or the university levels. Appointment to meet with the Dean of School could be made via the school's secretary or via email biotechnology@hcmiu.edu.vn. Students who wish to remain anonymous could write and drop their complaints in the White Box in front of the school's office.

CH012IU - Chemistry Laboratory (Thực hành hoá học)

1. **Course title (code): CH012IU**
2. **Number of credits:** 1(0,1)
3. **Instructor: Huynh Kim Lam, Ph.D.**
4. **Responsible department:** School of Biotechnology
5. **Prerequisite**: none
6. **Course objectives:**
   To introduce students to experiments on general chemistry and to provide students with a firm foundation in chemistry for careers in science and engineering (together with the Chemistry for Engineers class). Upon successful completion of this course, the students should be able to demonstrate lab skills and basic knowledge of the following:
   - Chemical reactions
   - pH and buffers
   - Oxidation-Reduction titration with $KMnO_4$
   - Chemical equilibrium
   - Factors affecting reaction rates
7. **Course description:**
   This course is designed for non-chemistry majors, as it is intended for students pursuing a degree in information technology, electronic and telecommunication. The course introduces the lab-work with emphasis on techniques relevant to engineering in chemistry.

8. **Course details:**

No.	Content	Teaching hour
		Practice
1	Laboratory orientation	04
2	Expt. 01 - Chemical Reactions	04
3	Expt. 02- pH and buffers	04
4	Expt. 03 - Redox Titration with $KMnO_4$	04
5	Expt. 04 - Chemical Equilibrium	04
6	Expt. 05 - Factors affecting reaction rates	04
TOTAL		**24**

9. **References:**
   - "General Chemistry" by Darrell Ebbing and Steven D. Gammon (9^{th} Ed., 2010)
   - "Chemistry: A Molecular Approach" by Nivaldo J. Tro (2^{nd} Ed., 2008)
   - "Chemistry, Principles and Reactions" by Masterton and Hurley (6^{th} Ed., 2009)

10. **Teaching equipment:** projector and computer connected to the internet to use online tools.

11. **Evaluation:**

Activity	Number	Percentage

Prelab	05	20
Reports	05	50
Final exam	01	30

12. Consultancy offered to students:

- Lectures and references will be introduced through the class website: https://sites.google.com/site/lkhclasses/
- Group discussion by seminar, forum or email exchange.
- In-person consultancy according to the approved agenda of the School.

BM007IU - Introduction to Biomedical Engineering (Kỹ thuật Y sinh đại cương)

1. General Information

- Course Title:
  + Vietnamese: Kỹ thuật Y sinh đại cương
  + English: Introdution to Biomedical Engineering
- Course ID: BM007IU
- Course type:

☐ General	☑ Fundamental
☐ Specialization	☐ Others
☐ Skills	☐ Project/Internship/Thesis

- Number of credits: 4
  + Lecture: 3
  + Laboratory : 1
- Prerequisites: BM053IU - Principles of Electricity in Biomedical Engineering
- Parallel Courses:

2. Course Description

This course consists of three main parts: (1) fundamental engineering technologies and methodologies, (2) their clinical applications and (3) topics related to the department orientations. In the first part students learn different engineering techniques and methods including mathematical modeling and simulation of a dynamic system, design methodology, geometric optics, kinematics, and statistics. In the second part students learn how these techniques or methods are applied in medical field. Case studies focus on specific organs such as eye, ear, and lung. In each study three aspects are covered: physiological, clinical, and instrumentation aspects. These 2 parts emphasize on the activities of the Medical Instrumentation orientation. In the third part other activities of the Department will be briefly introduced including Signal and Image Processing, Pharmaceutical Engineering and Regenerative Medicine. Besides, a semester long project is assigned. The project requires students to conceive, design and build a working device related to Biomedical Engineering field. This course is accompanied by lab works which introduce students by hands-on ways to topics related to different research orientations of the Department.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The goal of the course is to offer a broad view of BME with emphasis on the current activities in the Department. The student will have a decent comprehension of diverse orientations to be selected during the later years.	(1)-(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Analyzing the implication of BME in real world and its relationship with other traditional engineering fields (d, h, i)	I, T, U
G1.2	Applying the philosophy and approaches of the BME Department in the national and international settings (d, h, i)	I, T, U
G1.3	Applying engineering methods in the investigations of biomedical issues such as optics in the vision, mathematical modeling in the respiratory and auditory systems, kinematics in the design of protheses (a, b, e, f)	I, T, U
G1.4	Applying the statistical methods in the experimental designs and interpreting the information obtained by experimental results such as confidence interval, level of significance (a, b, e, f)	I, T, U
G1.5	Managing a project with critical path method and Gantt chart (d, e, f, g, h, i, j, k)	I, T, U
G1.6	Creating a prototype to test a scientific hypothesis according to an assignment (a, b, c, d, e, f, g, h, k)	I, T, U
G1.7	Applying online literature search and bioethics while performing a project and conducting experiments (f)	I, T, U
G1.8	Applying some techniques used in drug delivery system (k)	I, T, U
G1.9	Experimenting on living human to measure biosignals such as EEG, EMG, ECG and the oxyhemoglobine and deoxyhemoglobine fluctuation in the blood vessels of the brain (k)	I, T, U
G1.10	Applying soft skills such as teamwork, self-learning, problem solving and public presentation (g, k).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to BME	G1, G2	Lecture, discussion	Homework
2	Medical Device Design	G1, G2	Lecture, discussion	Quiz
3	Project Management	G1, G2	Lecture, discussion	Homework
4	Standardization	G1, G2	Lecture, discussion	Quiz
5	Geometric Optics and their applications in human eyes and vision	G1, G2	Lecture, discussion	Homework
6	System Modeling and its applications in human lungs and ears	G1, G2	Lecture, discussion	Quiz
7	Kinematics and Knee Prosthesis	G1, G2	Lecture, discussion	Homework
8	Biostatistics	G1, G2	Lecture, discussion	Quiz
9	Bioethics	G1, G2	Lecture, discussion	Homework
10	Functional Near Infrared Spectroscopy (fNIRS)	G1, G2	Lecture, discussion	Quiz
11	Nanotechnology and Drug Delivery System	G1, G2	Lecture, discussion	Homework
12	Regenerative Medicine	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Online Literature Search	---	Attendance, Lab report
2	Pharmaceutical Engineering	---	Attendance, Lab report
3	Biomedical Photonics	---	Attendance, Lab report
4	Using BioPac system	---	Attendance, Lab report
5	Using M-Visio for technical drawing	---	Attendance, Lab report
6	Regenerative Medicine (lab 1)	---	Attendance, Lab report
7	Regenerative Medicine (lab 2)	---	Attendance, Lab report
8	Using M-Excel for statistical analyses	---	Attendance, Lab report
9	Clinical Engineering	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

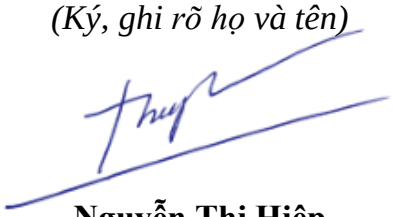
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vo Van Toi
- Email: vvtoi@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

CH014IU - Chemistry for BME (Hóa học cho Kỹ thuật y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Hóa học cho Kỹ thuật y sinh
     + English: Chemistry for BME
   - Course ID: CH014IU
   - Course type:
     - General
     - Fundamental
     - Specialization
     - Others
     - Skills
     - Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: Chemistry for Engineers
   - Parallel Courses:
2. Course Description

This course is designed for non-chemistry majors, as it is intended for students pursuing a degree in biomedical engineering. The course covers The basic principles of analytical chemistry, introduces modern analytical chemistry and instrumental techniques with emphasis on techniques relevant to analysis in biomedical engineering. Applications of each technique will be discussed.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The course provides basic knowledge of analytical chemistry regarding fundamental principles, a wide range of techniques with the most important points involved in each technique and their most useful applications.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand basic principles of analytical chemistry and modern instrumental analysis (Program outcomes: (a), (d))	I, T, U

G1.2	Understand the importance of sampling, pretreatment, calibration and data handling for the significance and reliability of derived results (Program outcomes: (a), (b), (f), (k))	I, T, U
G1.3	Solve quantitative and qualitative analytical problems (Program outcomes: (a), (b), (d), (f), (k))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction to analytical chemistry	G1	in class	A1.1 A1.2
2	Chapter 2: Basic tools of analytical chemistry	G1	in class	A1.1 A1.2
3	Chapter 3: The language of analytical chemistry	G1	in class	A1.1 A1.2
4	Chapter 4: Evaluating analytical data	G1	in class	A1.1 A1.2
5	Chapter 5: Calibrations, Standardizations, and Blank Corrections	G1	in class	A1.1 A1.2
6	Chapter 7: Obtaining and preparing samples for analysis	G1	in class	A1.1 A1.2
7	Chapter 8: Gravimetric methods	G1	in class	A1.1 A1.2

8	Chapter 9: Titrimetric methods	G1	in class	A1.1 A1.2
9	Chapter 10: Spectroscopic methods	G1	in class	A1.1 A1.2
10	Chapter 11: Electrochemical methods	G1	in class	A1.1 A1.2
11	Chapter 12: Chromatographic methods	G1	in class	A1.1 A1.2

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

BM098IU - Chemistry laboratory for BME (Thực hành Hóa học cho Kỹ thuật y sinh)

1. General Information

- Course Title:
  + Vietnamese:Thực hành Hóa học cho Kỹ thuật y sinh
  + English: Chemistry laboratory for BME
- Course ID: BM098IU
- Course type:

□ General	□ Fundamental
□ Specialization	□ Others
☑ Skills	□ Project/Internship/Thesis

- Number of credits: 1
  + Lecture: 0
  + Laboratory : 1
- Prerequisites: None
- Parallel Courses:

2. Course Description

The course covers the basic principles of analytical chemistry, introduces modern analytical chemistry and instrumental techniques with emphasis on techniques relevant to analysis in biomedical engineering. Applications of each technique will be discussed.

3. Textbooks and Other Required Materials

Textbooks:

[1] Lab handout

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand basic principles of analytical chemistry and modern instrumental analysis	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Understand the importance of sampling, pretreatment, calibration and data handling for the significance and reliability of derived results	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Solve quantitative and qualitative analytical problems	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	an ability to apply knowledge of chemistry, science, and calculations	I, T, U
G1.2	an ability to identify, formulate, and solve chemistry problems	I, T, U
G1.3	an ability to use the techniques, skills, and modern analytic tools necessary for analytical chemistry	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:None

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Laboratory introduction	---	Attendance, Lab report
2	Solution preparation	---	Attendance, Lab report
3	Acid – base titration	---	Attendance, Lab report
4	Gravimetric method	---	Attendance, Lab report
5	Electrochemical method	---	Attendance, Lab report
6	UV-Vis spectroscopy	---	Attendance, Lab report
7	Thin layer chromatography	---	Attendance, Lab report
8	Exam	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final

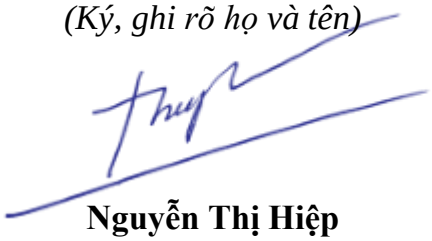
examination. Missed tests: Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Truong Phuoc Long
   - Email: tplong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM090IU - Biology for BME (Sinh học cho Kỹ Thuật Y Sinh).

1. General Information
   - Course Title:
     + Vietnamese:Sinh học cho kỹ thuật y sinh
     + English: Biology for BME
   - Course ID: BM090IU
   - Course type:
     ☑ General □ Fundamental
     □ Specialization □ Others
     □ Skills □ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course covers basic concepts and universal principles of biological molecules, cells, genetics, and biotechnology. The laboratory activities are designed to further investigate and illuminate each topic area in BME research settings.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Students will be able to explain the relationship between structure – function of biomolecules and apply their knowledge to explain the mechanism and treatment strategy for human diseases that are caused by loss/dysfunction of biomolecules	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Student will develop knowledge on biomolecular structure and function, cellular activities, control of gene expression in cells so that they will be able to bring information together to for a solution for biological/medical problem.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(A) An ability to apply knowledge of mathematics, science, and engineering to solve biomedical	I, T, U

	engineering problems	
G1.2	(B) An ability to design and conduct experiments, as well as to analyze and interpret biomedical and health data	I, T, U
G1.3	(E) An ability to identify, formulate, and solve biomedical engineering problems	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction to Biology for BME	G1, G2, G3	in class	A1.1
2	Chapter 2: Chemical context of Life	G1, G2, G3	in class	A1.1 A1.2
3	Chapter 3: Biological macromolecules	G1, G2, G3	in class	A1.1
4	Chapter 3: Cont.	G1, G2, G3	in class	A1.1
5	Chapter 4: Tour of cell	G1, G2, G3	in class	A1.1 A1.2
6	Chapter 4: Cont.	G1, G2, G3	in class	A1.1
7	Chapter 5: Cell metabolism	G1, G2, G3	in class	A1.1
8	Chapter 6: Cell cycle, growth and division	G1, G2, G3	in class	A1.1 A1.2
9	Chapter 6: Cont.	G1, G2, G3	in class	A1.1
	Midterm exam			A2.1
10	Chapter 7: Structure and function of cellular membrane	G1, G2, G3	in class	A1.1
11	Chapter 7: Cont.	G1, G2, G3	in class	A1.1
12	Chapter 8: Gene expression and control of gene expression	G1, G2, G3	in class	A1.1 A1.2
13	Chapter 8: Cont.	G1, G2, G3	in class	A1.1

14	Chapter 9: Introduction to Bacteria and Virus	G1, G2, G3	in class	A1.1 A1.2
15	Chapter 9: Cont.	G1, G2, G3	in class	A1.1
	Final exam			A3.2

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	Overview of medical laboratory	G1, G2	B1.1
2	Visit of medical laboratory in hospital	G1, G2	B1.1
3	Visit of physician office laboratory	G1, G2	B1.1
4	Blood collection, fractionation	G1, G2	B1.1
5	Microscopic observation of blood cells	G1, G2	B1.1
6	Case Study	G1, G2	B1.1
7	Lab Report	G1, G2	B1.2
8	Final Examination		B1.3

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

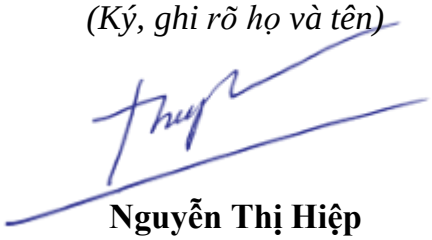
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long,
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM053IU - Principles of Electricity in Biomedical Engineering (Nguyên lý điện trong kỹ thuật y sinh),
BM054IU - Principles of Electricity in Biomedical Engineering Lab Thực hành nguyên lý điện trong kỹ thuật y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Nguyên lý điện trong kỹ thuật y sinh , Thực hành nguyên lý điện trong kỹ thuật y sinh
     + English: Principles of Electricity in Biomedical Engineering, Principles of Electricity in Biomedical Engineering Lab
   - Course ID: BM053IU-BM054IU
   - Course type:

☐ General	☑ Fundamental
☐ Specialization	☐ Others
☐ Skills	☐ Project/Internship/Thesis

   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Calculus 2
   - Parallel Courses:

2. Course Description

In the lecture, students will learn the DC electricity where the sources are constant with respect to time. In this domain, students learn all basic elements such as resistor, Op-Amp, capacitor and inductor as well as common analysis techniques to analyze circuits that contain those elements. With capacitor and inductor, students get familiar with the time variable notion. The lecture also covers the AC circuit where the sources vary periodically with respect to time. These notions are particularly useful for students in BME to understand the origins, generations, conductions and functioning of electrical signals in human physiology. Each lecture includes examples highlighting the specific impacts of electricity and electrical engineering in biomedical engineering.

3. Textbooks and Other Required Materials
   Textbooks:
   Reference Materials:
4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Students will be able to explain the functions and implementations of simple electrical elements in electrical networks, and electrical	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	devices.		

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Applying DC and AC electrical voltage, current, energy, power, circuit connection, switch and ground (a, e, k).	I, T, U
G1.2	Evaluating voltages, currents and powers of a DC circuit consisting of resistors, current sources and voltage sources using different methods such as: voltage and current division, mesh, node, source conversion, superposition, Thevenin and Norton, and maximum power transfer and power efficiency (a, e, k).	I, T, U
G1.3	Creating series and parallel circuits consisting of resistors, current sources and voltage sources (a, e, k).	I, T, U
G1.4	Analyzing the transient and steady state responses of voltages and currents of a DC circuit consisting of resistors and either capacitors or inductors, current sources and voltage sources (a, e, k)	I, T, U
G1.5	Analyzing the DC gain and outputs of an operation amplifier circuit. (a, e, k)	I, T, U
G1.6	Analyzing the sinusoidal steady state response of a circuit consisting of RLC. (a, e, k)	I, T, U
G1.7	Analyzing the basic functions of electrical elements such as resistors, capacitors and inductors, current sources and voltage sources and their implications in the real world and biomedical devices (h)	I, T, U
G1.8	Analyzing the voltages and currents of different elements such as power supplies, function generators, resistors, capacitors, inductors and op-amp in a circuit using multi-meter and oscilloscope (a, k)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Generalities	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
2	Foundation of Electricity	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
3	Resistor and Resistance	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
4	Basic Resistive Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
5	Standard Methods to Analyze Resistive Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
6	Standard Methods to Analyze Resistive Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
7	Operational Amplifier	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
8	Operational Amplifier	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
	Midterm exam			A2.1
9	Capacitor and Capacitance	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
10	Inductor and Inductance	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2

11	Inductor and Inductance	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
12	AC Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
13	AC Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
14	AC Circuits	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
15	Electrical Safety	G1, G2, G3, G4, G5, G6, G7, G8	in class	A1.1 A1.2
	Final exam			A3.2

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	Introduction to Electrical circuit Electricity safety	G1, G2, G3, G4, G5	B1.1 B1.2
2	Kirchoff's Current and Voltage Laws	G1, G2, G3, G4, G5	B1.1 B1.2
3	AC circuit	G4, G5, G6, G7, G8	B1.1 B1.2
4	Mesh and Nodal Analysis of AC Circuit	G4, G5, G6, G7, G8	B1.1 B1.2
5	Thevenin Theorem	G4, G5, G6, G7, G8	B1.1 B1.2
6	Frequency and Phase Shift Measurement	G4, G5, G6, G7, G8	B1.1 B1.2
7	Operational Amplifier	G4, G5, G6, G7, G8	B1.1 B1.2
8	Final lab exam	G4, G5, G6, G7, G8	B1.1 B1.2

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

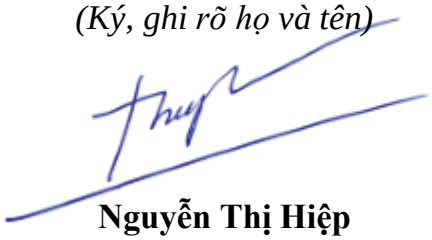
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Pham Thi Thu Hien
- Email: ptthien@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM030IU - Machine Design (Thiết kế máy cơ khí)

1. General Information

- Course Title:
  + Vietnamese: Thiết kế máy cơ khí
  + English: Machine Design
- Course ID: BM030IU
- Course type:

☐ General ☑Fundamental

☐ Specialization ☐ Others

☐ Skills ☐ Project/Internship/Thesis

- Number of credits: 3
  + Lecture: 3
  + Laboratory : 0
- Prerequisites: PH013IU - Physics 1
- Parallel Courses:

2. Course Description

Introduction to the principles of design and analysis of machines and machine components. Design for functionality, motion, force, strength and reliability. The laboratory experience provides open-ended projects to reinforce the design process.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand the fundamental kinematics of machines.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Understand the fundamental kinetics of machines.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Understand the fundamentals of stress analysis of bean-like machine Parts.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Understand the fundamentals of deflection analysis of beam-like machine parts.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Enhance problem-solving and communication skills through short and long design projects.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U
G1.2	(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	I, T, U
G1.3	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	I, T, U
G1.4	(e) an ability to identify, formulate, and solve engineering problems	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Synthesis	G1, G2	In class	Homework
2	Vector Loops	G1, G2	In class	Quiz
3	Position Solutions	G1, G2	In class	Homework
4	Velocity Solutions	G1, G2	In class	Quiz
5	Accel Solutions	G1, G2	In class	Homework
6	Point Path, Curvature	G1, G2	In class	Quiz
7	Rolling Contact	G1, G2	In class	Homework
8	Instant Centers	G1, G2	In class	Quiz

9	Cams	G1, G2	In class	Homework
10	Typical Kinematics Projects (Graphical synthesis of a sofa bed mechanism & Analysis of a film advance mechanism)	G1, G2	In class	Quiz
11	Dynamic Force Analysis	G1, G2	In class	Homework
12	Static Force Analysis	G1, G2	In class	Quiz
13	Graphical Methods	G1, G2	In class	Homework
14	Friction effects	G1, G2	In class	Quiz
15	Buckling	G1, G2	In class	Homework
16	Typical Kinetics Projects: (Baseball pitching mechanism & Bus windshield wiper mechanism)	G1, G2	In class	Quiz
17	Stress Analysis Procedure	G1, G2	In class	Homework
18	State of Stress	G1, G2	In class	Quiz
19	Stress Patterns	G1, G2	In class	Homework
20	Superposition of Stress Patterns	G1, G2	In class	Quiz
21	Typical Stress Projects: (Design of a sign post & Design of a food mixer shaft)	G1, G2	In class	Homework
22	Materials	G1, G2	In class	Quiz
23	Ductile Failure Theories	G1, G2	In class	Homework
24	Brittle Failure Theories	G1, G2	In class	Quiz

8. Course Policy

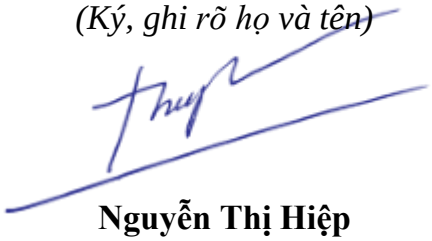
Student responsibility: Students are expected to spend at least 8 hours per week for self studying. This time should be made up of reading, working on exercises and problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Nguyen Thanh Qua
   - Email: ntqua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM064IU - Applied Informatics (Tin học ứng dụng)

1. General Information
   - Course Title:
     + Vietnamese:Tin học ứng dụng
     + English: Applied Informatics
   - Course ID: BM064IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course focuses on how to apply programming languages to solve engineering problems targeting towards biomedical fields. C-programming language provides students basic programming skills to develop and implement medical devices. MATLAB-programming language supports effective tools for mathematic calculations and graphical visualization of dataset.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Able to construct algorithms to solve engineering problems.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Be able to write C-codes for particular engineering problems.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Be introduced to the concept of graphical user interface in MATLAB to develop new MATLAB toolbox.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Be able to apply MATLAB tools to solve complicated mathematic problems such as algebra computations on big matrix, polynomial fitting, differential equations.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Be able to apply MATLAB tools for modeling, data visualization, data analysis .	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G6	Perception of the contribution of	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	Applied Informatics to public health.		

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U
G1.2	(e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.3	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	I, T, U
G1.4	(f) an understanding of professional and ethical responsibility	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction of programming for engineering	G1-G6	Lecture, discussion	Homework
2	Introduction to C programming, variables, standard inputs and outputs	G1-G6	Lecture, discussion	Quiz
3	Structure programming and functions	G1-G6	Lecture, discussion	Homework
4	Arrays and pointers	G1-G6	Lecture, discussion	Quiz
5	String libraries	G1-G6	Lecture, discussion	Homework

6	Structure and bit operators, file input/output	G1-G6	Lecture, discussion	Quiz
7	Advanced programing structure with linked-list and binary tree	G1-G6	Lecture, discussion	Homework
8	Introduction to MATLAB	G1-G6	Lecture, discussion	Quiz
9	Arrays and linear algebra	G1-G6	Lecture, discussion	Homework
10	Scripts, function files, and programming structures	G1-G6	Lecture, discussion	Quiz
11	Plotting and graphical user interfaces	G1-G6	Lecture, discussion	Homework
12	Summary	G1-G6	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

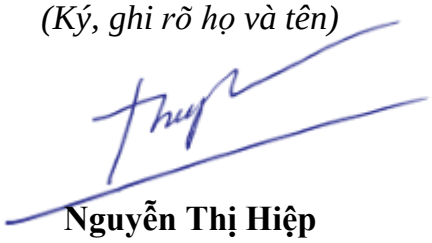
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ngo Thi Lua
- Email: ntlua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM096IU - AI for Healthcare (Trí tuệ nhân tạo trong y tế)

1. General Information
   - Course Title:
     + Vietnamese:Trí tuệ nhân tạo trong y tế
     + English: AI for Healthcare
   - Course ID: BM096IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: Biosignal Processing, Linear Algebra
   - Parallel Courses:
2. Course Description

This course provides an introduction to how we apply artificial intelligence in healthcare. Several typical problems of applied artifical intelligence in healthcare are introduced, such as diagnosis/segmentation/abnormalitty detection in CT, OCT, fundus, endoscope images, detecting diseases by signals, e.g., EEG, blood pressure, heart rate. The course offers artificial intelligence methods that are frequently utilized in healthcare systems, including k-nearest neighbor, support vector machine (SVM), neural network, convolutional neural network, recurrent neural network, generative adversarial network. There are lab activities in which students work on programing to build pratical schemes.

3. Textbooks and Other Required Materials

Textbooks:

[2] Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, The MIT Press, 2016 (free online: http://www.deeplearningbook.org/)

[3] Hands-on Machine Learning with Scikit-Learn & Tensorflow, Aurelien Geron, O'Reilly, 2017.

[4] Information Technologies in Biomedicine, Ewa Pietka, Jacek Kawa, Springer 2008

Reference Materials:

- Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, The MIT Press, 2016 (free online: http://www.deeplearningbook.org/)
- Hands-on Machine Learning with Scikit-Learn & Tensorflow, Aurelien Geron, O'Reilly, 2017.
- Information Technologies in Biomedicine, Ewa Pietka, Jacek Kawa, Springer 2008

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Recognizing problems in healthcare that can apply AI	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Have ability to formulate the problems	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

G3	Analyzing and solve the problems using AI tools	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Recognizing a normal ECG and sectional medical images	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Evaluating the impacts and limitations of different schemes	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	an ability to apply mathematics and AI tools to solve biomedical engineering problems	I, T, U
G1.2	an ability to design and conduct experiments, to analyze and interpret biomedical and health data, as well as to clean data to apply AI	I, T, U
G1.3	an ability to identify, formulate, and solve biomedical engineering problems	I, T, U
G1.4	a knowledge of contemporary issues related to health and biomedical engineering	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lectures:

Week/ Class	Subject/Chapter	Content
1	Introduction	Introduction: Historical Review, Current Status and Future Potential of Artificial Intelligence in Healthcare
2	AI models in Healthcare problems	AI models in Healthcare problems: Classification
3	AI models in Healthcare problems (cont.)	AI models in Healthcare problems: Segmentation

4	AI models in Healthcare problems (cont.)	AI models in Healthcare problems: Abnormality detection and others
5	Classification problem	Classification problem: Data-driven approach K-nearest neighbor
6	Classification problem	Classification problem: Linear classification Support vector machine
7	Optimization	Optimization: Loss functions Optimization, stochastic gradient descent
Midterm exam		
8	Neural networks	Neural networks: Backpropagation Multi-layer Perceptrons
9	Convolutional neural networks	Convolutional neural networks: Convolutional, pooling, dropout layers
10	Training Neural Networks	Training Neural Networks: Update rules, ensembles, data augmentation, transfer learning
11	CNN Architectures	CNN Architectures: AlexNet, VGG, GoogLeNet, ResNet, etc
12	Recurrent Neural Networks	Recurrent Neural Networks: RNN, LSTM, GRU
13	Generative Adversarial Networks	Generative Adversarial Networks: Generative Adversarial Networks Conditional Generative Adversarial Networks
14	Visualizing and Understanding Feature	Visualizing and Understanding Feature
15	Deep Reinforcement Learning	Deep Reinforcement Learning
Final exam		

Laboratory

Week/ Class	Subject/Chapter	Content
1	Lab 1	Lab 1: Intro to Python (Numpy, Tensorflow)
2	Lab 2	Lab 2: kNN, SVM
3	Lab 3	Lab 3: Build a NN from scratch
4	Lab 4	Lab 4: CNNs for classification
5	Lab 5	Lab 5: CNNs for segmentation
6	Lab 6	Lab 6: CNNs for abnormality detection
7	Lab 7	Lab 7: RNNs, GANs
8	Lab 8	Presentation

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Ngo Thi Lua
   - Email: ntlua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

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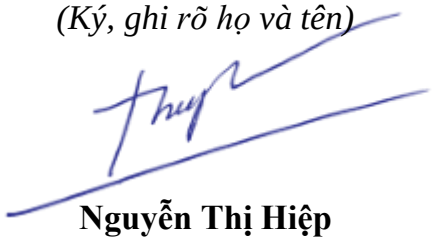

Nguyễn Thị Hiệp

BM101IU - Mechanical design and Manufacturing processes in Biomedical Engineering (Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh).

1. General Information

- Course Title:

+ Vietnamese: Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh

+ English: Mechanical design and Manufacturing processes in Biomedical Engineering

- Course ID: BM101IU

- Course type:

☐ General	☐ Fundamental
☑ Specialization	☐ Others
☐ Skills	☐ Project/Internship/Thesis

- Number of credits: 2
- Prerequisites: Mechanical design and Manufacturing processes in Biomedical Engineering Lab / Edusoft: none
- Parallel Courses: None

2. Course Description

Introduction to fundamental knowledge of mechanical design and manufacturing processes in biomedical engineering.

3. Textbooks and Other Required Materials

Textbooks: Class and recitation notes

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand legal rules and requirements in medical devices and the roles of related governmental agencies such as FDA	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Understand projection methods. Be capable of reading specifications of a technical drawing and using a drawing software to plot a technical drawing.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Understand the characteristics of different fabrication processes	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

G4	Design a medical related device.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand the specifications of a technical drawing and to plot a technical drawing for the manufacturing of a device using a commercial computer drawing software.	I, T, U
G1.2	Use the techniques, skills, and modern tools necessary for mechanical design and manufacturing.	I, T, U
G1.3	Design a device, use hand tools and machine tools to fabricate its mechanical components and assemble them into a device.	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%

7. Course Outline

Lecture:

Chapter	Content
1	Basic regulation of biomedical devices (Ref: https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/overview-device-regulation)
2	Projection: 3D object to 2D drawing. Reading a blue-print
3	Fabrication methods: Additive Manufacturing, 3D Printing, Cold Welding
4	Fabrication methods: Plastic injection, molding
5	Fabrication methods: Electroerosion
6	Computer aided design (CAD) and computer aided manufacturing (CAM)
7	Using Solid work

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is

compulsory that 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Vo Van Toi
   - Email: vvtoi@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

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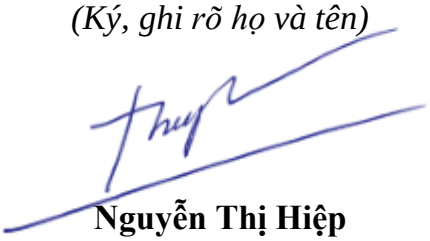


Nguyễn Thị Hiệp

BM102IU - Mechanical design and Manufacturing processes in Biomedical Engineering Lab (Thực hành phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh).

1. General Information

- Course Title:
  + Vietnamese:Phương pháp thiết kế và chế tạo cơ khí trong kỹ thuật y sinh: Phần thực hành
  + English: Mechanical design and Manufacturing processes in Biomedical Engineering Lab
- Course ID: BM102IU
- Course type:

☐ General	☐ Fundamental
☑ Specialization	☐ Others
☐ Skills	☐ Project/Internship/Thesis

- Number of credits: 2
- Prerequisites: None
- Parallel Courses:

2. Course Description

Learn skills of mechanical design and manufacturing processes in biomedical engineering.

3. Textbooks and Other Required Materials

Textbooks: Class and recitation notes

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Use professional measurement tools with precision	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Use appropriate fabrication process and tools to machine a selected material	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Disassemble and reassemble a device	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Design a device, use hand tools and machine tools to fabricate its mechanical components and assemble them into a device.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Operate a CNC machine and 3D printer	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand the specifications of a technical drawing and be able to use a commercial computer drawing software.	I, T, U
G1.2	Use the techniques, skills, and modern tools necessary for mechanical design and manufacturing.	I, T, U
G1.3	Design a device, use hand tools and machine tools to fabricate its mechanical components and assemble them into a device.	I, T, U

6. Course Assessment

Laboratory			
B1. Process assessment	Attendance	7	20%
	Practical exercises	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Week/ Class	Content
1	Lab & Fab safety instructions. Using measurement tools
2	Using hand tools
3	Fabricating a device with hand tools
4	Disassembling and Assembling a device
5	Machining with hard metal (iron, steel, …)
6	Machining with soft metal (brass, aluminum…)
7	Machining with other materials (plastics, woods ...)
8	Welding
9	Using machine tools: Lathe
10	Using machine tools: Milling machine
11	Using machine tools: Griding machine, Drilling machine
12	Using 3D printer
13	Using CNC machine
14	Fabricating a device with machine tools
15	Fabricating a device with machine tools

8. Course Policy

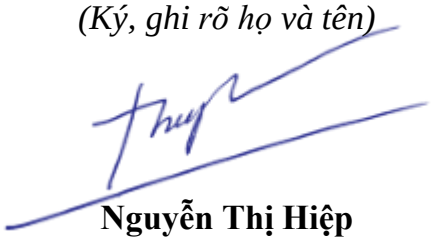
Student responsibility: Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Vo Van Toi
   - Email: vvtoi@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM005IU - Statistics for health sciences (Thống kê trong khoa học sức khỏe).

1. General Information
   - Course Title:
     + Vietnamese:Thống kê trong khoa học sức khỏe
     + English: Statistics for health sciences
   - Course ID: BM005IU
   - Course type:
     - ☐ General
     - ☑ Fundamental
     - ☐ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 2
     + Laboratory : 1
   - Prerequisites: BM007IU - Introduction to Biomedical Engineering
   - Parallel Courses:
2. Course Description

This course focuses on intermediate statistical methods which are often used in bioengineering and biomedicine. The course emphasizes the appropriateness, practical application and interpretation of a variety of analytic methods. Working with SPSS (Statistical package for the social sciences) supports student to deal with practical problems in statistical analysis.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G!	After completing the course, students are able to apply the fundamentals of statistics, the roles of statistics in analyzing and interpreting experimental data, and know how to apply software to solve practical problems and how to report the analyses.	a,e,b,k,	3.5-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Apply the principles of statistics in bioengineering and biomedicine (A3)	I, T, U
G1.2	Be introduced to the concept of modeling and its application in prediction (E1)	I, T, U
G1.3	Apply statistical analyses to find suitable methods in a particular situation to analyze and interpret data (B3)	I, T, U
G1.4	Perform the statistical methods using SPSS (K3), (B3)	I, T, U
G1.5	Apply statistical analyses in scientific papers and present the results from analyses in written form in a	I, T, U

	professional manner (G2)	
G1.6	Be introduced to sources of health databases (J1)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Basic concepts: Study designs, sampling methods, randomization, types of data	G1, G2	Lecture, Class discussion	Homework
2	Describing data: Measures of central tendency, dispersion, frequency, graphs, Normal distribution, Sampling distributions of the sample means, Standard error, Confidence interval	G1, G2	Lecture, Class discussion	Quiz
3	Analyzing data.	G1, G2	Lecture, Class discussion	Homework
4	Confounding	G1, G2	Lecture, Class discussion	Quiz
5	Effect modification/statistical interaction	G1, G2	Lecture, Class discussion	Homework
6	Review scientific paper	G1, G2	Lecture, Class discussion	Homework
7	Survival analysis (optional)	G1, G2	Lecture, Class discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Introduction to SPSS: Input/Import/Merge data, Clean data, Recode data	---	Attendance, Lab report
2	Using SPSS to describe data: Descriptive statistics, Graphs	---	Attendance, Lab report
3	Using SPSS for means comparison	---	Attendance, Lab report
4	Using SPSS to compare proportions, measure association, perform diagnostic tests	---	Attendance, Lab report
5	Running simple linear regression by SPSS	---	Attendance, Lab report
6	Running multiple linear regression & logistic regression by SPSS	---	Attendance, Lab report
7	Running regression with effect modification using SPSS	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

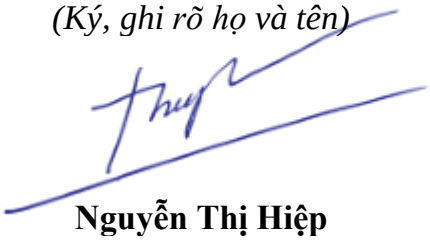
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Truong Phuoc Long
- Email: tplong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM091IU - Human Anatomy and Physiology (Giải phẫu và sinh lý người).

1. General Information
   - Course Title:
     + Vietnamese:Giải phẫu và sinh lý người
     + English: Human Anatomy and Physiology
   - Course ID: BM091IU
   - Course type:
     - ☐ General
     - ☐ Specialization
     - ☐ Skills
     - ☑ Fundamental
     - ☐ Others
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: BM090IU - Biology for BME
   - Parallel Courses:
2. Course Description

This subject explains the physical and chemical factors that are responsible for the origin, development, and progression of life. This subject explains the specific characteristics and mechanisms of the human body that make it a living being. This subject explains the functions of tissues, organs and systems with the regulation and control mechanisms of body.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Objective 1: understand the functions of tissues, organs and systems of body.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Objective 2: explain the functions and and control mechanisms of the organs and body systems.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understanding the structure of body systems (Program outcome: c, f)	I, T, U
G1.2	Understanding the functions and working mechanisms of body systems (Program outcome: c, f)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to Human Anatomy and Physiology	G1, G2	in class	A1.1 A1.2
2	Overview of the Body Systems	G1, G2	in class	A1.1 A1.2
3	Types of Tissues	G1, G2	in class	A1.1 A1.2
4	Integumentary system and the Senses	G1, G2	in class	A1.1 A1.2
5	Musculoskeletal system	G1, G2	in class	A1.1 A1.2
6	The Heart	G1, G2	in class	A1.1 A1.2
7	Circulatory system and Blood	G1, G2	in class	A1.1 A1.2
8	Respiratory system	G1, G2	in class	A1.1 A1.2
9	Renal system	G1, G2	in class	A1.1 A1.2
	Midterm exam			A2.1
10	Digestive System	G1, G2	in class	A1.1 A1.2
11	Nervous System	G1, G2	in class	A1.1 A1.2
12	Autonomic Nervous System	G1, G2	in class	A1.1 A1.2
13	Endocrine system	G1, G2	in class	A1.1 A1.2

14	Reproductive System	G1, G2	in class	A1.1 A1.2
15	Immune System	G1, G2	in class	A1.1 A1.2
	Final exam			A3.2

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Trinh Nhu Thuy
- Email: tnthuy@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM008IU – Bioethics (Y đức)

1. General Information
   - Course Title:
     + Vietnamese: Y đức
     + English: Bioethics
   - Course ID: BM008IU
   - Course type:
     - ☐ General
     - ☑ Fundamental
     - ☐ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: BM007IU - Introduction to Biomedical Engineering
   - Parallel Courses:
2. Course Description

Many difficult ethical questions have arisen from the explosive growth of biomedical research and the health-care industry since World War II. For example, when does life begin to matter morally? When and how should doctors be allowed to help patients end their lives? Should embryos be cloned for research and/or reproduction? What sorts of living things is appropriate to use as research subjects? How should we distribute scarce and expensive medical resources? This course will show students how problems in bioethics can be approached from a variety of perspectives, with the aim of understanding how we have got, where we are, and how we should decide where to go next.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The students will be provided the capability of identifying ethical issues in medicine, health care and life science, as well as rational justification for ethical decisions	(1)-(7)	3.0-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Analysing key issues, ethical principles, traditional topics of bioethics such as the relationship between health professionals and patients, clinical research ethics, the ethics of ending lives (i.e. abortion and euthanasia), etc. as well as current controversies	I, T, U

	surrounding rapidly advancing biological and medical science and technology such as cloning, stem cell research, vaccine, medical instrumentation, implant and prosthesis, etc. (Program outcomes: (a), (f), (i), (j))	
G1.2	Evaluating medical, philosophical, theological, moral and legal aspects of bioethical questions (Program outcomes: (a), (f))	I, T, U
G1.3	Applying communication skills to express your own views clearly in class disscussion and engage the views of your classmates (Program outcome: (g))	I, T, U
G1.4	Applying concrete implications of ethical dilemmas and the importance of establishing careful and morally serious approaches to their resolution (Program outcome: (f))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Quiz 1: Self-Understanding about Bioethics	G1, G2	In class	Homework
2	Chapter 1: Exploring Bioethics	G1, G2	In class	Quiz
3	Chapter 2: Beings, human beings and persons	G1, G2	In class	Homework
4	Chapter 3: Above all do no harm	G1, G2	In class	Quiz
5	Chapter 4: Must doctors help their patients?	G1, G2	In class	Homework
6	Chapter 5: Killing: A caring thing to do?	G1, G2	In class	Quiz
7	Chapter 7: The beginnings of life	G1, G2	In class	Homework

8	Chapter 8: Whose body is it anyway?	G1, G2	In class	Quiz
9	Chapter 9: A woman's right to choose	G1, G2	In class	Homework
10	Chapter 10: Respect for persons	G1, G2	In class	Quiz
11	Chapter 11: Death is abolished	G1, G2	In class	Homework
12	Presentation and Discussion	G1, G2	In class	Quiz
13	Review			

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

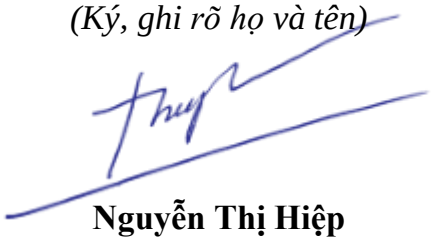
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ha Thi Thanh Huong
- Email: htthuong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM082IU – Biomaterials (Vật liệu sinh học)

1. General Information
   - Course Title:
     + Vietnamese:Vật liệu sinh học
     + English: Biomaterials
   - Course ID: BM082IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

An engineer of tissue engineering major should understand biomaterials, and its surface modification for specific applications. Also, an engineer must understand how to choose materials and how to design a scaffold for specific implantation zone.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	To explain basic principles of biocompatibility and implants performance, review different strategies to modify and/or design materials that are biocompatible. Also, this course will explain what biodegradability is and how it affects biomaterial design. These allow students to understand material selection and structure-function relationships and read, understand and assimilate papers, publications and lectures in the biomaterials. Student will obtain enough knowledge to develop analysis and critical-thinking skills for the evaluation of relevant literature.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

G1.1	Give the definition of a biomaterial (Program outcome: e, j)	I, T, U
G1.2	Describe the structure and composition of naturally occurring biomaterials, such as tooth enamel, bone, collagen, skin etc. (Program outcome: e, k)	I, T, U
G1.3	Derive mathematical expressions relating to material stress, strain and viscoelastic properties and describe and quantify failure mechanisms (Program outcome: b)	I, T, U
G1.4	Describe methods of manufacture of the different types of materials used in medicine and biosciences, their properties and their suitability for a particular function (Program outcome: l)	I, T, U
G1.5	Describe methods of modifying surfaces and their impact on the material/biological interface. (Program outcome: a,l,m)	I, T, U
G1.6	Describe physical techniques used in biomaterials research, such as x-ray photoelectron spectroscopy, electron microscopy, scanning probe microscopy, force microscopy and quartz crystal resonance and apply these to qualitatively and quantitatively derive information about how materials interact with biological systems. (Program outcome: b)).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Course introduction	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Polymers: Polymer synthesis, Polymer characterization	G1, G2	Lecture, discussion	Quiz

3	Chapter 3: Biodegradable polymers: chemistry of hydrolysis, degradation mechanisms	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Hydrogels: hydrogel structure and crosslinking, hydrogel swelling and characterization	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Hydrogels: Polyelectrolyte swelling and applications	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Adhesives and coatings: Natural polymers and adhesion; Surface treatments and analysis	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Biomaterial analysis: Thermal & Advanced mechanical analysis	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Biologic Recognition: Protein adsorption; Engineered recognition	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Biologic Response: Thrombosis/ Blood compatibility; Tissue compatibility and testing	G1, G2	Lecture, discussion	Homework
10	Chapter 10: Controlled Release: Membrane systems; Swellable systems	G1, G2	Lecture, discussion	Homework
11	Chapter 11: Micro and nanoparticle systems: Overview; Stealth systems	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Fabrication of a hydrogel for skin regeneration	---	Attendance, Lab report
2	Swelling and degradation of a sponge	---	Attendance, Lab report
3	Fabrication of a scaffold for tissue regeneration – Preparation of raw materials	---	Attendance, Lab report
4	Fabrication of a scaffold for tissue regeneration – Fabrication Process	---	Attendance, Lab report
5	Fabrication of a scaffold for tissue	---	Attendance,

	regeneration – Swelling and degradation		Lab report
6	Synthesis of Hydroxyapatite using microwave method for bone regeneration	---	Attendance, Lab report
7	Synthesis of Hydroxyapatite using sonic method for bone regeneration	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Thi Hiep
- Email: nthiep@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

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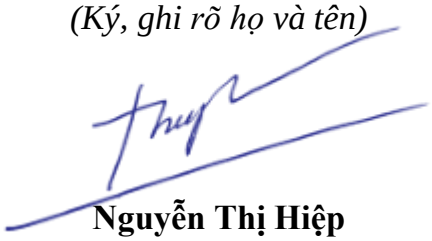


Nguyễn Thị Hiệp

BM009IU - BME Capstone Design Course (Đồ án thiết kế Kỹ thuật y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Đồ án thiết kế Kỹ thuật y sinh
     + English: BME Capstone Design Course
   - Course ID: BM009IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: BM007IU - Introduction to Biomedical Engineering
   - Parallel Courses:
2. Course Description

The course has three components: class lectures, laboratories, and project. The lectures are built upon all previous BME coursework. They emphasize on the design principles of medical instrumentation and biomedical signal analysis. Topics include the origin of bioelectric potentials; the characteristics of various biological signals, transducers, instrumentation amplifiers, analogue and digital devices; and computer interfaces. Labs include the design, construction and testing of electrical circuits and computer interfaces to measure diverse biological signals. The semester long group project consists of designing an instrument requested from hospitals or the BME Department labs. Students work in a team of different orientations.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The goal of the course is to encourage students to use knowledgeacquired in other courses to focus on the design of a useful device and to develop self-learning skills.	(1)-(7)	4.0-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Evaluating the relationship between traditional and biomedical engineering impacts (a, h)	I, T, U
G1.2	Evaluating the origin of biopotentials (a, h)	I, T, U
G1.3	Evaluating the resistive, capacitive and inductive sensors and electro-mechanical actuators used in biomedical engineering (a, h)	I, T, U

G1.4	Evaluating the diversity of medical devices (a, h)	I, T, U
G1.5	Evaluating the notion of multiple and open-ended solution in the design (a, h).	I, T, U
G1.6	Creating circuits to amplify the bio-signals and eliminate the noise (a, h)	I, T, U
G1.7	Applying soft skills such as teamwork, problem solving, self-learning and public presentation (g, k)	I, T, U
G1.8	Applying scientific knowledge to identify issues of a problem to be solved and technical skills to create a device capable of performing functions, experiments and measurements to solve the above issues (a, b, c, d, e, f, g, h, k).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Basic concepts of Medical Instrumentation	G1, G2	In class	Homework
2	Basic Sensors and Actuators in biology and medicine	G1, G2	In class	Quiz
3	Human Factors Engineering	G1, G2	In class	Homework
4	Biopotential Amplifiers	G1, G2	In class	Quiz
5	Biopotential Electrodes	G1, G2	In class	Homework
6	Feedback Control	G1, G2	In class	Quiz
7	Origin of Biopotentials	G1, G2	In class	Homework
8	Design of a blood pressure and heart rate measurement device	G1, G2	In class	Homework
9	Design of a spirometer	G1, G2	In class	Quiz

Laboratory

Week/Class	Content	Learning	Assessment

		outcomes	
1	Using Arduino: Introduction, interface and control. Practices: Blinking LED, Simple LED controller, LCD Interface, LCD displaying, LCD using Arduino	---	Attendance, Lab report
2	Using Sensors: Selecting, Signal acquiring. Practices: Thermal measurement, ECG acquiring	---	Attendance, Lab report
3	Using Actuators: Selecting, Motors controlling, Signal acquiring. Practices: DC motor, PWM, Stepping motor	---	Attendance, Lab report
4	Using Design Software and Hardware: Solidworks, 3D printers. Practice: Design simple components with Solidworks, implement it on 3D printers	---	Attendance, Lab report
5	Define the characteristics of the device to be designed, and describe its related scientific, medical and economic backgrounds	---	Attendance, Lab report
6	Identify and analyze existing devices on the market and possible design solutions	---	Attendance, Lab report
7	Determine working plan and schedule	---	Attendance, Lab report
8	Develop hardware	---	Attendance, Lab report
9	Develop software	---	Attendance, Lab report
10	Integrate and test the functioning of the system	---	Attendance, Lab report
11	Test the device on real subjects (using only non-invasive and in vivo methods) or real situations, analyze the results and propose works to be done.	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

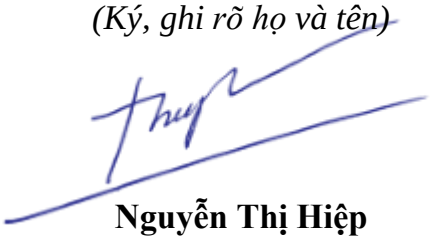
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vo Van Toi
- Email: vvtoi@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM011IU - Engineering Challenges in Medicine I (Thách thức kỹ thuật trong Y khoa 1)

1. General Information
   - Course Title:
     + Vietnamese:Thách thức kỹ thuật trong Y khoa 1
     + English: Engineering Challenges in Medicine I
   - Course ID: BM011IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: BM091IU - Human Anatomy and Physiology
   - Parallel Courses:
2. Course Description

Engineering Challenges in Medicine (ECM) exposes students to technical issues encountered by physicians in hospitals that prevent them to advance in medical diagnosis and treatment. In this course, physician instructors will demonstrate pathophysiology, advantages and disadvantages of current medical management of common diseases, and ask students to propose their own solutions to overcome these challenges. ECM I covers basic principles of diagnostic imaging, electrocardiography and common diseases of the musculoskeletal, neurological, and cardiovascular systems.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	ECM I aims to familiarize students with medical management for common diseases of musculoskeletal, neurological and cardiovascular system so that students can develop skills to identify medical challenges and propose their own solutions for innovation or creation.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Explain and illustrate pathophysiology of some	I, T, U

	common diseases - (a) an ability to apply knowledge of mathematics, science, and engineering	
G1.2	Interpret common arrhythmia on ECG and identify normal brain waves on EEG - (a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U
G1.3	Compare and contrast the working principles, pros and cons of Ultrasound, CT and MRI - (a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U
G1.4	Identify and analyze pros and cons in current medical diagnosis, treatment and prevention of common diseases - (a) an ability to apply knowledge of mathematics, science, and engineering; (e) the ability to identify, formulate, and solve engineering problems; (j) a knowledge of contemporary issues	I, T, U
G1.5	Summarize and address common challenges in medical management and suggest solutions - (a) an ability to apply knowledge of mathematics, science, and engineering; (e) the ability to identify, formulate, and solve engineering problems; (j) a knowledge of contemporary issues	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction	G1, G2	Lecture, discussion	Homework
2	Common Diagnostic Procedures	G1, G2	Lecture, discussion	Quiz
3	Musculoskeletal Diseases	G1, G2	Lecture, discussion	Homework

4	Neurological Diseases	G1, G2	Lecture, discussion	Homework
5	Cardiovascular Diseases	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

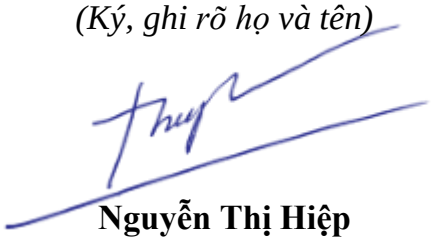
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Dao Thi Thanh Binh
- Email: binh.daothanh@gmail.com

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM013IU - Entrepreneurship in Biomedical Engineering (Kinh thầu trong Kỹ thuật Y Sinh).

1. General Information

- Course Title:

  + Vietnamese:Kinh thầu trong Kỹ thuật y sinh

  + English: Entrepreneurship in Biomedical Engineering

- Course ID: BM013IU

- Course type:

  ☐ General ☑ Fundamental

  ☐ Specialization ☐ Others

  ☐ Skills ☐ Project/Internship/Thesis

- Number of credits: 3

  + Lecture: 3

  + Laboratory : 0

- Prerequisites: EN011IU - Writing AE2

- Parallel Courses:

2. Course Description

This course introduces various stages of the entrepreneurial process and provides knowledge of start-up development. Students will expose to this process by working on some key steps in establishing a start-up for a biomedical product or service. The main goal of the course is to prepare students with an entrepreneurial mindset so that they realize the importance of developing a biomedical product or service that meets the customer demand and can be commercialized.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	In this course, students are to learn entrepreneurship in BME through a "hands-on" approach, in which students have to deal with real	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	issues and challenges. So the unifying framework for the course is the assignment for developing the business plan for a "real" venture in BME. Students are to use and integrate the concepts, tools and frameworks from the course to evaluate their business ideas, to develop the business plan for the selected idea and to pitch this business plan to active entrepreneurs and practicing venture capital professionals.		

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Describe start-up development process	I, T, U
G1.2	Identify opportunities to establish a start-up on a biomedical product or service	I, T, U
G1.3	Conduct market research to understand the real needs of customers and market competition in order to validate target market segment and value proposition and evaluate the identified opportunity (H1, I2)	I, T, U
G1.4	Estimate the cost for start-up development and make financial projection (H2)	I, T, U
G1.5	Identify different ways and sources of financing for biomedical start-ups (J1)	I, T, U
G1.6	Collaborate within a start-up team (D3)	I, T, U
G1.7	Sharpen analytical thinking through evaluation of other teams' projects	I, T, U
G1.8	Persuade the stakeholders through defense of own team's project (G1, G3)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to Entrepreneurship, Entrepreneurial mindset	G1, G2	Lecture, discussion	Homework
2	Opportunity identification and evaluation	G1, G2	Lecture, discussion	Quiz
3	Developing Marketing Strategy	G1, G2	Lecture, discussion	Homework
4	Distinctive competence & sustainable competitive advantage	G1, G2	Lecture, discussion	Quiz
5	Segmentation & Positioning	G1, G2	Lecture, discussion	Homework
6	Market research	G1, G2	Lecture, discussion	Quiz
7	Understanding Your Customers and Competitors	G1, G2	Lecture, discussion	Homework
8	Identifying Your Value Proposition	G1, G2	Lecture, discussion	Quiz
9	Market Entry and Market Penetration	G1, G2	Lecture, discussion	Homework
10	The Marketing Mix	G1, G2	Lecture, discussion	Quiz
11	Guerilla Marketing	G1, G2	Lecture, discussion	Homework
12	Financial projections	G1, G2	Lecture, discussion	Quiz
13	Sources of financing	G1, G2	Lecture, discussion	Homework
14	Pricing	G1, G2	Lecture, discussion	Quiz
15	Crowdfunding	G1, G2	Lecture, discussion	Homework
16	Business plan	G1, G2	Lecture, discussion	Homework
17	Optional: Intellectual Property, Legal basics, Cash management	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and

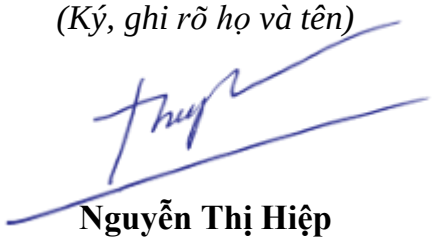
group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination. Missed tests: Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Phan Gia Hoang
   - Email: giahoang108@gmail.com

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM068IU - Project 1 (Đồ án 1)

1. General Information
   - Course Title:
     + Vietnamese:Đồ án 1
     + English: Project 1
   - Course ID: BM068IU
   - Course type:
     - ☐ General
     - ☐ Specialization
     - ☐ Skills
     - ☐ Fundamental
     - ☐ Others
     - ☑ Project/Internship/Thesis
   - Number of credits: 1
     + Lecture: 0
     + Laboratory : 1
   - Prerequisites: EN011IU - Writing AE2
   - Parallel Courses:
2. Course Description

Students will explore a specific topic in the medical fields. Students will learn how to do a research through various skills of doing experiments, searching and identifying scientific journals as references related to the experiments from e-library, analyzing data, weekly report meeting with advisor, writing scientific report, and etc. At the end of the course, student will submit a final report.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to independently conduct logical search for relevant literature	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Analyze literature, drawing comparisons and connections to formulate biomedical engineering problems	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	An ability to make a research plan With appropriate experimental methods and design	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	An ability to prepare a well-structured scientific report	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(B) An ability to design and conduct experiments, as well as to analyze and interpret biomedical and health data	I, T, U
G1.2	(E) An ability to identify, formulate, and solve biomedical engineering problems	I, T, U
G1.3	(I) A recognition of the need for, and an ability to engage in life-long learning	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	How to conduct literature review	G1-G4	Lecture, discussion	Homework
2	Formulate research topic	G1-G4	Lecture, discussion	Quiz
3	Experimental plan, data analysis	G1-G4	Lecture, discussion	Homework
4	Citation management software	G1-G4	Lecture, discussion	Quiz
5	Progress meeting	G1-G4	Lecture, discussion	Homework

6	How to write a scientific report	G1-G4	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ha Thi Thanh Huong
- Email: htthuong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

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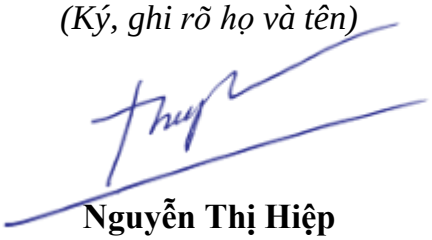


Nguyễn Thị Hiệp

BM003IU - Pre-thesis (Đồ án chuẩn bị luận văn tốt nghiệp)

1. General Information
   - Course Title:
     + Vietnamese:Đồ án chuẩn bị LVTN
     + English: Pre-thesis
   - Course ID: BM003IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☐ Specialization
     - ☐ Others
     - ☐ Skills
     - ☑ Project/Internship/Thesis
   - Number of credits: 1
     + Lecture: 0
     + Laboratory : 1
   - Prerequisites: BM068IU - Project 1
   - Parallel Courses:
2. Course Description

Pre-thesis is a semester-long course taken at the senior year. Students engage in a research project to explore in literature published research achievements in a research field that students have already agreed upon with potential thesis advisors. This is an independent work. Students and advisors meet to discuss together as much as needed. In the end, students must narrow down their works to a specific research topic and develop a detailed plan for works to be done for the thesis. For an unsatisfactory work, students must prolong the time until completion or change the topic or the advisor. The course culminates in a written pre-thesis report. Students also defend their results in an oral presentation in front of the Department faculty committee during the exam week.

3. Textbooks and Other Required Materials

Textbooks: As needed

Reference Materials: Published scientific articles and technical documents

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Students use their knowledge and experiences acquired in previous courses, learn how to use literature search skills to identify works that have been done, and use analysis and synthesis skills to identify a specific work that needs to be done. After finishing this course students acquire knowledge and comprehension of the scientific research process. They know how to identify a scientific issue and propose how to solve it.	(i), (e), (k), (g)	3.5-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Searching the literature relevant to the topic; Differentiating between primary, secondary and tertiary sources of information; Producing a critical review ofthe literature relevant to the topic to be studied.	I,T,U
G1.2	Formulating a hypothesis/design requirements; Carrying out the investigations; Collecting, collating and analyzing data from their investigations; Designingand constructing a prototype.	I,T,U
G1.3	Drawing valid conclusions from the analysis of the data/results; Discussing the relevance of the conclusions in the context of the literature relating tothat topic.	I,T,U
G1.4	Reporting the findings of the investigation by manuscript; oral presentation; poster. Orally describe,discuss and defend their work.	I,T,U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

This is an independent, original and personal course.

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

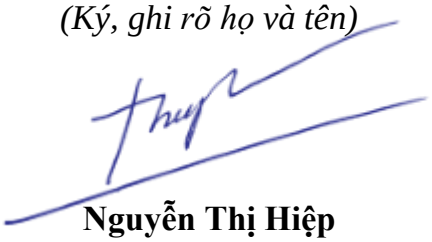
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Tran Le Giang
- Email: tlgiang@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM050IU - Practice 1: Reverse Engineering (Thực hành 1: Kỹ thuật đảo ngược)

1. General Information

- Course Title:
  + Vietnamese: Thực hành 1: Kỹ thuật đảo ngược
  + English: Practice 1: Reverse Engineering
- Course ID: BM050IU
- Course type:

☐ General	☐ Fundamental
☐ Specialization	☐ Others
☐ Skills	☑ Project/Internship/Thesis

- Number of credits: 1
  + Lecture: 0
  + Laboratory : 1
- Prerequisites: None
- Parallel Courses:

2. Course Description

This is a course of general knowledge in medicine, medical instrumentation, and basic of Arduino. Students will learn how to take vital signs, do CPR and some common first aids, and explore common medical devices in our department's labs such as ECG, Ultrasound, Ventilator, CT machines… which are provided by the industrial partners. Students learn how to use mechanical tools to disassemble and reassemble medical devices and explore their working principles and block diagrams. Moreover, students will study some basics about the Arduino circuit and apply them to the project which built up the simple medical device/ equipment. As one of the first courses for BME students, it also covers the soft skills required for presentation, literature searching, and report writing.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Take vital signs, do CPR and some common first aids, basic of Arduino	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Describe basic working principles and block diagram of some common medical devices	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Work effectively	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	together as a team to do group assignments		

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Disassemble and reassemble popular medical devices - (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	I, T, U
G1.2	Illustrate the working principles of studied medical devices - (e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.3	Demonstrate soft skills of building teamwork, searching for documents, writing report, making PowerPoint presentation/poster - (i) a recognition of the need for, and an ability to engage in life-long learning	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	0	0%
	Homeworks	0	0%
A2. Midterm assessment	Midterm exam	0	0%
A3. Final assessment	Final Exam	0	0%
	Project report	0	0%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Quiz, Lab report	7	40%
B2. Final assessment	Final Exam	1	40%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Assessment
1	Introduction of a logbook, Laboratory Safety, Arduino 1	G1.1, G1.2	Attendance, Homework
2	Arduino 2	G1.1, G1.2	Attendance, Homework
3	Arduino 3	G1.1, G1.2	Attendance, Homework
4	Sphygmomanometer and Ventilator machine	G1.1, G1.2, G1.3	Attendance, Quiz, Report
5	ECG machine and patient monitor	G1.1, G1.2, G1.3	Attendance, Quiz, Report

6	Ultrasound and CT scan machine	G1.1, G1.2, G1.3	Attendance, Quiz, Report
7	CPR and common First Aids	G1.1, G1.2,	Attendance
8	Final project presentation	G1.1, G1.2, G1.3	Attendance, Report

8. Course Policy

Student responsibility: Students are expected to spend at least 8 hours per week self-studying. This time should be made up of reading, working on exercises and problems and group assignments. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination. Missed test: 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.)

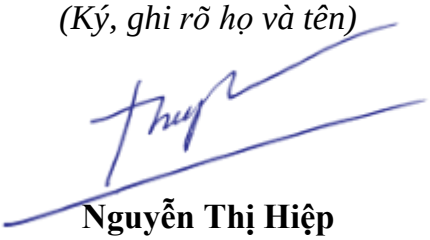
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Thanh Qua
- Email: ntqua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM067IU - Practice 2: Animal Cells and Microbiologies (Thực hành 2: Tế bào động vật và vi sinh vật)

- Course Title:
  - Vietnamese: **Thực hành 2: Tế bào động vật và vi sinh vật**
  - English: **Practice 2: Animal Cells and Mirobiologies**
- Course ID: **BM067IU**
- Course level: ☒ Undergrad ☐ Master ☐ Both
- Course type: ☐ General ☐ Fundamental ☐ Specialization (required) ☐ Specialization (elective) ☒ Project/Internship/Thesis ☐ Others: ……..
- Number of credits: 1
  - Lecture: 0
  - Laboratory: 1
- Prerequisites: Only for students that already take or are taking Biology for BME
- Parallel Courses: Nil
- Course it replaces: Nil
- Course standing in curriculum: Freshman year or above

1. Course Description

This course introduces students to the essential theory and techniques for working with microorganisms and animal cells. As these are among the most important model systems in biomedical engineering, this knowledge will enable students to conduct engineering and scientific projects using these systems. If students would like to further study these topics, they can consider taking courses such as Clinical Test, Tissue Engineering, Cell/tissue - Biomaterial Interaction and Biomaterials. This course includes a field trip to microbiology labs (hospital, research institute...) in which students will learn the practical protocols related to microorganisms and animal cells.

2. Textbooks and Other Required Materials

[1]. Lab hand-outs

[2]. Lecturer will provide further references based on each specific topic

3. Course Goals

At the end of the course, students will:

- Be able to understand the essential theory and conduct the fundamental techniques for working with microorganism and animal cells.
- Be familiar with and able to perform several fundamental scientific skills, including: Taking note in lab notebook., Designing experiments and evaluating result, Making figures/figure legend, Making and presenting poster, Writing lab report.

4. Learning Outcome

5.1 Student outcomes

This course support for the attainment of the following student outcomes:

b. An ability to design and conduct experiments, as well as to analyze and interpret data

5.2 Course Learning outcomes

Learning outcome code	Course learning outcomes	Program Learning outcomes after ABET
G1	Understand the essential theory and conduct the fundamental techniques for working with microorganism and animal cells.	b
G2	Be familiar with and able to perform several fundamental scientific skills, including: Taking note in lab notebook, Designing experiments and evaluating result, Making figures/figure legend, Making and presenting poster, Writing lab report	b

5. Course Assessment

Assessment component	Assessment form	Week	CLOs	SOs	Percentage %
Laboratory					
B1. Process assessment	B1.1 Participations	Every week	G1, G2	B	10 %
	B1.2 Quiz (at the beginning and end of class)	Every week	G1, G2	B	40 %
B2. Final assessment	B2.1 Lab report	Week 6 and week 11	G1, G2	B	20 %
	B2.2 Poster	Week 11	G1, G2	B	15 %
	B2.3 Poster	Week 11	G1, G2	B	15 %

	presentation				

6. Course Outline

Week/ Class	Subject/Chapter	**Title**	**Content**
1	Lab 1	Introduction to tissue culture – Part I	*Why learning tissue culture?* *Cell types and their needs* *Design of a cell culture facility*
2	Lab 2	Introduction to tissue culture – Part II	*Sterile techniques* *Common contaminations and how to avoid/handle* *Culture media preparation*
3	Lab 3	Culture initiation	*Cell thawing* *Live/death identification* *Cell counting* *Cell plating onto different culture vessels and media conditions*
4	Lab 4	Subculture Cell and Substrate Interaction	*Assessment of cell growth with microscope* *Subculture of cells onto different substrates* *Morphology evaluation with SEM and bright field microscope after cell plating*
5	Lab 5	Viability Assessment	*Cell and other material interaction* *Other structural and biochemical indicators: ATP, NADPH, membrane integrity*
6	Lab 6	Basic equipment, Aseptic technique, preparation and sterilization of culture media	*Basic rules and requirements in microbiology lab* *Aseptic technique* *Culture medium* *Preparation and sterilization of media to culture bacteria.*
7	Lab 7	Microbial culture techniques	*Culture techniques of microorganism* *Cultural characteristics of microorganisms*
8	Lab 8	Staining techniques, observation of microbial under microscope	*Observation of live bacteria under microscope* *Simple staining technique* *Gram staining technique*
9	Lab 9	Final course assessment	*Lab exam*

7. Course Policy

- 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 problem and group assignment.
- Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least 90 % of the course to be eligible for the final presentation.
- Missed tests: Students are not allowed to miss the final presentation. There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

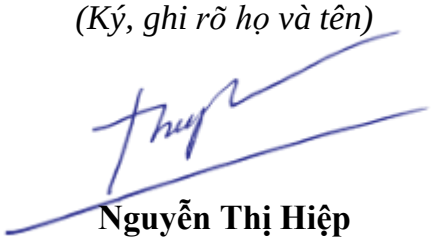
8. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- Course Coordinator/Lecturer: Truong Phuoc Long
- Email : tplong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM052IU - Practice 3: Electronic Design (Thực hành 3: Thiết kế mạch điện)

1. **Name of course**:
   - Vietnamese: Thực hành 3: Thiết kế mạch điện
   - English: Practice 3: Electronic Design
2. **Course code: BM052IU**
3. **Course type:**
   - ☒ Specialization
   - ☐ Core
   - ☒ Requirement
   - ☐ Elective
4. **Number of credits:** 1 credit
   - Theory: 0 credits
   - Practice: 1 credit
5. **Prerequisite:** Principles of EE 1
6. **Parallel teaching in the course:** None
7. **Course Description**: Students will study essential skills for medical device design. In the first half of semester, students will study how to design an electrical schematic and PCB using CAD software. They also have chance to make their own PCB using tools in our department's labs by conducting 2 practical projects. These projects are demanded from industry. Upon finishing the third semester, students can design electrical part of a medical device. Students also have chance to visit PCB production companies.
8. **Course objectives:** On completion of the course, students will have skill to:
   - Design the schematic of electronic circuits.
   - PCB design using CAD software.
   - Make an electronic circuits in Lab using tools in department's labs.
9. **Textbooks and references:**

   Textbooks:
   - *R. Khandpur, Printed Circuit Boards: Design, Fabrication, and Assembly, McGraw-Hill Electronic Engineering, 2005*
   - *Nihal Kularatna, Electronic Circuit Design: From Concept to Implementation, CRC Press, 2008*

   References: Lecturer will provide references based on each specific topic.
10. **Learning outcomes**

	Course Learning outcomes	**Performance indicators for outcomes**
Skill	1. Able to formulate, develop and test a PCA prototype of medical devices.	2C. **Implementing** engineering design to specific biomedical engineering problems

	2. Able to create a system to meet desired needs within requirements of practical products.	2A. **Identify constraints and requirements of the design** to meet the needs with **consideration** of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. 2B. **Design a** system, component, or process with **required specifications and functions**
Attitude	3. Perception of the contribution of research to public health.	4A. Evaluate the **professional and ethical dimensions** of engineering cases

11. Course implementation

a. **Time:** 8~10 week, 05 periods per week

b. Teaching and learning activities

- Classroom activities: Lectures, discussions, lab & presentations
- Self-learning: Design their own circuits, Show final working products.
- Field-trip: Observing, discussing

12. Course outline

Week	**Subjects**	**Descriptions**
1	Electronic circuits (schematic) design with Capture CAD software	- Learn how to use Capture CAD software to design an electronic circuit schematic
2	PCB design with CAD software Layout	- Learn how to use CAD software Layout to design a PCB from the schematic
3	Recognize, measuring, testing electronic components.	- With given electronic components, student need to recognize the name and pins configuration, measure the components' parameters, test the function of the components.
4	Practical project #1: Develop a medical device PCA which demanded from industry (Ex: ECG signal generator circuits)	- Study the provided circuit functions. - Sketch design - Schematic design - Layout design
5	Practical project #1: (cont.)	- PCB development - PCA making - Testing
6	Practical project #2: Develop a medical device PCA which demanded from industry (Ex: Wireless micro phone)	- Study the provided circuit functions. - Sketch design - Schematic design - Layout design
7	Practical project #2: (cont.)	- PCB development - PCA making

		- Testing
8	Final Exam / Project presentation	- Present two projects' results. Each student has to build a basic project individually. - Guest reviewers from industry will be invited for evaluating (if possible).

13. Course Assessment:

13.1. Grading:

- Attendance: 10%
- Lab works (attitude, skills, lab results): 30%
- Lab report: 30%
- Final exam/ Project presentation: 30%

13.2. Assessment Plan

No.	Assessment tasks	Assessment crit	Level of cognitive Domain												Weigh (%)
			Applying			Analyzing			Evaluating			Creating			
			MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	
1	**- Lab:** Assignment 2	Know how to design the schematic of electronic circuits.					x			x			x		20
2	**- Lab:** Assignment 3	Know how to make the PCB design using Orcard.					x			x			x		20
3	**- Lab:** Assignment 1	Know how to choose electronic components corresponding to their applications, power/voltage supply, and their specifications.		x				x						x	10
4	**- Lab:** Project 1,2	Know how to make an electronic circuits in Lab using tools in BME department's labs.						x			x			x	40

No.	Assessment tasks	Assessment crit	Level of cognitive Domain												Weigh (%)
			Applying			Analyzing			Evaluating			Creating			
			MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	
5	**- Lab:** Project Final / Final Exam	Know how to make a fully workout electronic circuits for BME design.			x			x			x			x	10
	Total														100

Note: MCQ: Multiple choice questions ; **WQ**: Writing questions; **P**: Presentation

14. Student responsibility & Policies:

- *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 problem and group assignment.
- *Attendance:* Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

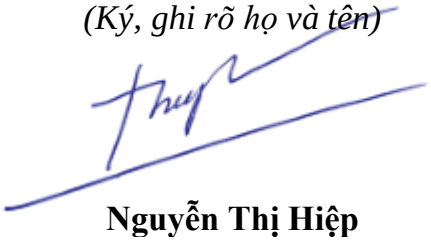
15. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM017IU - Medical Design (Thiết kế y tế)

1. General Information

- Course Title:
  + Vietnamese: Thiết kế y tế
  + English: Medical Design
- Course ID: BM017IU
- Course type:
  - □ General
  - □ Specialization
  - □ Skills
  - □ Fundamental
  - □ Others
  - □ Project/Internship/Thesis
- Number of credits: 1
  + Lecture: 0
  + Laboratory: 1
- Prerequisites: Practice 3: Electronic Design
- Parallel Courses:

2. Course Description

Students will practice designing medical devices/equipment. In the first half of this course, students will learn different types of motors (step motors, servo motors, and DC motors) and how to control these motors. In the second half of this course, students will learn and practice using microcontrollers (for example ESP32) to collect and process data from biomedical sensors. This course requires students to work on a group project to design and build a medical device or equipment. Ideas and requirements for these projects come from the industrial partner and they are also involved in the evaluation of the report.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Students will be able to use basic motors and sensors, and apply these components to the designing and fabrication of medical devices/equipment.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(f) An understanding of professional and ethical	I, T, U

	responsibility in the practice of biomedical engineering	
G1.2	(k) An ability to use the techniques, skills, and modern engineering tools necessary for biomedical engineering practice	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	0	0%
	Homework	0	0%
A2. Midterm assessment	Midterm exam	0	0%
A3. Final assessment	Final Exam	0	0%
	Project report	0	0%
Laboratory			
B1. Process assessment	Attendance	8	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Introduction to motors	G1.1, G1.2	Attendance, Lab report
2	Controlling DC motor	G1.1, G1.2	Attendance, Lab report
3	Controlling step motor	G1.1, G1.2	Attendance, Lab report
4	Controlling servo motor	G1.1, G1.2	Attendance, Lab report
5	Microcontroller ESP32	G1.1, G1.2	Attendance, Lab report
6	Microcontroller ESP32	G1.1, G1.2	Attendance, Lab report
7	Microcontroller ESP32	G1.1, G1.2	Attendance, Lab report
8	Final project presentation	G1.1, G1.2	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

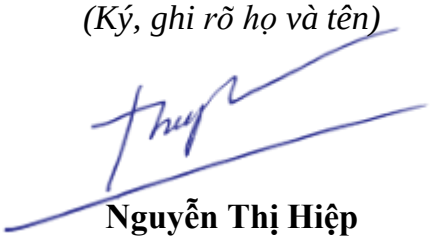
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Tran Le Giang
- Email: tlgiang@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM069IU - Project 2 (Đồ án 2)

1. General Information

- Course Title:
  + Vietnamese: Đồ án 2
  + English: Project 2
- Course ID: BM069IU
- Course type:
  - ☐ General
  - ☐ Specialization
  - ☐ Skills
  - ☐ Fundamental
  - ☐ Others
  - ☑ Project/Internship/Thesis
- Number of credits: 1
  + Lecture: 0
  + Laboratory : 1
- Prerequisites: Research 2B, Academic English II
- Parallel Courses:

2. Course Description

Students will do biomedical engineering project. They will have chance to apply what they have learned in previous semesters in designing, performing experiment, collecting and analyzing experimental data. Moreover, student also improve their presenting, writing skills in scientific manner. In addition, students can work on projects that are suggested or ordered by the industrial partner. The enterprises also participate in the assessment of students' project results.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals (Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to independently design experiment	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Analyze and interpret experimental results and based on that to draw conclusion	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	An ability to present experimental results in a scientific manner	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	An ability to prepare a well-structuredscientific report	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(B) An ability to design and conduct experiments, as well as to analyze and interpret biomedical and health data	I, T, U
G1.2	(E) An ability to identify, formulate, and solve biomedical engineering problems	I, T, U
G1.3	(G) An ability to communicate effectively	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Experimental design	G1.1, G2.1	Attendance, Lab report
2	Data collection and interpretation	G1.1, G2.1	Attendance, Lab report
3	Trouble-shooting for experiment	G1.1, G2.1	Attendance, Lab report
4	Graphic presentation of experimental result	G1.1, G2.1	Attendance, Lab report
5	Writing a scientific report	G1.1, G2.1	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Pham Thi Thu Hien
- Email: ptthien@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM020IU – Internship (Thực tập).

1. General Information
   - Course Title:
     + Vietnamese:Thực tập
     + English: Internship
   - Course ID: BM020IU
   - Course type:
     - ☐ General
     - ☐ Specialization
     - ☐ Skills
     - ☐ Fundamental
     - ☐ Others
     - ☑ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 0
     + Laboratory : 3
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

In BME program, students are required to spend at least 2 months during their 4 year study to become Biomedical Engineers. Internships are opportunities for students of BME department International University to learn about and apply biomedical engineering principles outside the classroom in the laboratory, work place and/or field. During the internship, the faculty mentor will assign the student responsibilities that have been previously agreed upon and approved by the BME department chair. These duties will vary depending on the particular discipline. The student will work under the guidance and direction of an internship mentor at the site. This individual will be an employee of the internship site.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	- Gaining practical, on-the-job experience	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	- Development of professional and personal confidence, responsibility, and maturity	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	- Understanding of the realities of the work world	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	- Acquisition of human relations skills	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	- Opportunity to examine a career choice closely and make professional contacts	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G6	- Opportunity to test the ideas learned in the classroom out in the work place	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G7	- Opportunity to make contacts with potential employers	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

G8	- Enhancement of classroom experiences	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G9	- Learning what careers to pursue or not to pursue	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G10	- Development of skills that are difficult to learn and practice in the classroom	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G11	- Possible earnings to help offset college expenses	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

NA

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

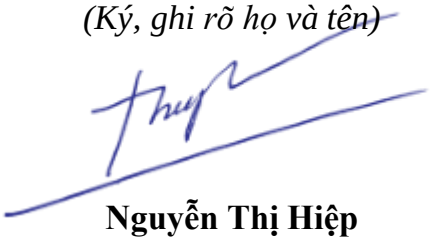
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM004IU - Thesis research (Luận văn tốt nghiệp) .

1. General Information
   - Course Title:
     + Vietnamese:Luận văn tốt nghiệp
     + English: Thesis research
   - Course ID: BM004IU
   - Course type:
     - ☐ General
     - ☐ Specialization
     - ☐ Skills
     - ☐ Fundamental
     - ☐ Others
     - ☑ Project/Internship/Thesis
   - Number of credits: 10
     + Lecture: 0
     + Laboratory : 10
   - Prerequisites: Pre-thesis
   - Parallel Courses:
2. Course Description

Thesis is a semester-long course taken at the senior year following the success of the pre-thesis work. This is an independent work, students are expected to spend about 30 h/per week. Students work on a specific research topic whose plan has been developed in detail during the pre-thesis. Students and advisors meet to discuss together as much as needed. The work can be the design of a medical device or the experiments to discover the effects of certain factors on a scientific issue. For an unsatisfactory work, students must prolong the time until completion. In an unavoidable situation, students may require to change the topic or the advisor. The course culminates in a written thesis report and a working device, if applied. Students also defend their results in an oral presentation and a demonstration of working device, if applied in front of a Department faculty committee, in due form, during the exam week.

3. Textbooks and Other Required Materials

   Textbooks: As needed

   Reference Materials: Published scientific articles and technical documents

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	After finishing this course students acquire knowledge and comprehension of the research process. They know how to identify a scientific issue, apply their knowledge to solve a scientific problem. They learn how to communicate their scientific findings to the greater scientific community using manuscript, poster and oral presentation. They feel confident enough about their scientific discoveries to discuss and defend their findings and how they related to the greater scientific community.	(1)-(7)	4.0-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Searching the literature relevant to the topic; Differentiating between primary, secondary and tertiary sources of information; Producing a critical review of the literature relevant to the topic to be studied.	I,T,U
G1.2	Formulating a hypothesis; Carrying out the investigations; Collecting, collating and analyzing data from their investigations.	I,T,U
G1.3	Drawing valid conclusions from the analysis of the data; Discussing the relevance of the conclusions in the context of the literature relating to that topic.	I,T,U
G1.4	Reporting the findings of the investigation by manuscript; oral presentation; poster. Orally describe, discuss and defend their work.	I,T,U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

This is an independent, original and personal course.

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

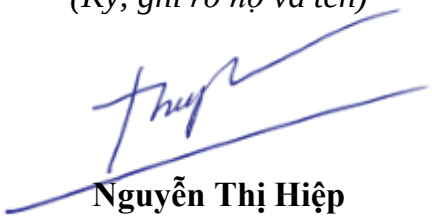
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM060IU - Digital Systems (Hệ thống số), BM061IU - Digital Systems Lab (Thực hành hệ thống số)

1. General Information
   - Course Title:
     + Vietnamese:Hệ thống số
     + English: Digital Systems, Digital Systems Lab
   - Course ID: BM060IU-BM061IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course provides the student to understand about digital system in order to design digital circuits or systems. This course represents the following parts: Binary arithmetic, Boolean algebra, K-maps, Combinational Logic Circuit, Flip-Flops, Digital Arithmetic, Counters and Registers, Memory Devices, AD-DA Conversions and PLD.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	To calculate different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	To understand the different switching algebra theorems and apply them for logic functions.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	To apply the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	To describe the following combinational circuits: buses, encoders/decoders, (de)multiplexers, exclusive-ORs,	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	comparators, arithmetic-logic units; and then to be able to build simple applications.		
G5	To construct the different latches and flip-flops.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G6	To derive the state-machine analysis or synthesis and to perform simple projects with a few flip-flops.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G7	To compute sequential circuits, like counters and shift registers, and to perform simple projects with them.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G8	To describe types of memory ICs.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	a. an ability to apply knowledge of mathematics, science, and engineering to solve biomedical engineering problems. (a1)	I, T, U
G1.2	c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (c3)	I, T, U
G1.3	e. an ability to identify, formulate, and solve biomedical engineering problems. (e3)	I, T, U
G1.4	k. an ability to use the techniques, skills, and modern engineering tools necessary for biomedical engineering practice. (k2)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Number Systems and Codes	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Logic Gates and Boolean Algebra	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Combinational Logic Circuits	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Flip-Flops and Related Devices	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Digital Arithmetic: Operations and Circuits	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Counters and Registers	G1, G2	Lecture, discussion	Homework
8	Chapter 8: MSI Logic Circuits	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Integrated-Circuit Logic Families	G1, G2	Lecture, discussion	Homework
10	Chapter 10: Memory, PLD, CPLDs and FPGAs	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

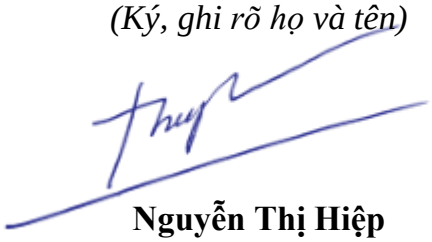
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Pham Thi Thu Hien
- Email: ptthien@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM062IU - Micro-electronic Devices (Thiết bị vi điện tử)

1. General Information
   - Course Title:
     + Vietnamese:Thiết bị vi điện tử
     + English: Micro-electronic Devices
   - Course ID: BM062IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: BM053IU – Principles of Electricity in Biomedical Engineering/ Edusoft: none
   - Parallel Courses:
2. Course Description

The course is an introduction to microcontrollers including basic architecture, programming and applications of MCS-51 family and other MCS platforms.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Upon completion of the course, students will understand the basics of microcontroller-based system as well as their applications. Students will also be equipped with detailed knowledge about microcontrollers' hardware structures and be able to write codes for their applications. Prerequisite: Electronic Circuits II and Digital System	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Knowing the fundamentals and applications of microprocessors and microcomputers (outcome a,j).	I, T, U
G1.2	Understanding the architectures, instruction sets, and applications of 8051 microcontroller family and other platforms (outcome a,j).	I, T, U
G1.3	Implementing basic applications of microcontrollers, such as	I, T, U

	input/output, analog-digital conversion (ADC), digital-analog conversion (DAC), motor speed control and data acquisition using different microcontroller platforms (outcome c,k).	

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction	G1, G2	Lecture, discussion	Homework
2	Introduction to numeral systems, ASCII code and Boolean operations	G1, G2	Lecture, discussion	Quiz
3	Architecture of the 8051 micro-controller	G1, G2	Lecture, discussion	Homework
4	Assembly language programming	G1, G2	Lecture, discussion	Quiz
5	Timer	G1, G2	Lecture, discussion	Homework
6	Serial port	G1, G2	Lecture, discussion	Quiz
7	Interrupt	G1, G2	Lecture, discussion	Homework
8	Review	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

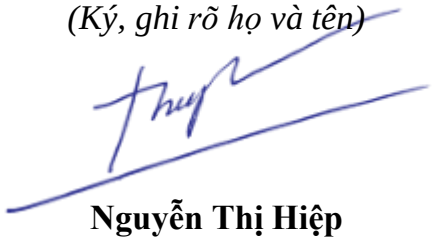
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM063IU - Micro-electronic Devices Laboratory (Thực hành thiết bị vi điện tử)

1. General Information
   - Course Title:
     + Vietnamese:Thực hành thiết bị vi điện tử
     + English: Micro-electronic Devices Laboratory
   - Course ID: BM063IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 1
     + Lecture: 0
     + Laboratory : 1
   - Prerequisites: BM053IU – Principles of Electricity in Biomedical Engineering/edusoft: none
   - Parallel Courses:
2. Course Description

The course the lab session to apply the knowledge learnt in the in the Micro-electronic Devices class with the focus on basic architecture, programming and applications of MCS-51 family and other MCS platforms.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Upon completion of the course,students will understand the basics of microcontroller-based system as wellas their applications via the hand on programing on different microcontroller platforms. Studentswill also be equipped with detailed knowledge about microcontrollers' hardware structures and be able to write codes for their applications. Prerequisite: Electronic Circuits II and Digital System	(1),(2),(3),(4), (5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Implementing basic applications of microcontrollers, such as	I, T, U

	input/output, analog-digital conversion (ADC), digital-analog conversion (DAC), motor speed control and data acquisition using different microcontroller platforms (outcome c,f,k)	

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Lab 1: Introduction 8051 Kit, AVR, and working with I/O ports	---	Attendance, Lab report
2	Lab 2: Introduction to Arduino platform	---	Attendance, Lab report
3	Lab 3: Programming using Arduino platform	---	Attendance, Lab report
4	Lab 4: Working with LED array using 8051 Kit	---	Attendance, Lab report
5	Lab 5: Working with 7-segment LED display using 8051 Kit	---	Attendance, Lab report
6	Lab 6: Working with timer and interrupts using ATMEGA162	---	Attendance, Lab report
7	Lab 7: Working Serial port using ATMEGA162	---	Attendance, Lab report
8	Lab 8: Final/ Project	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

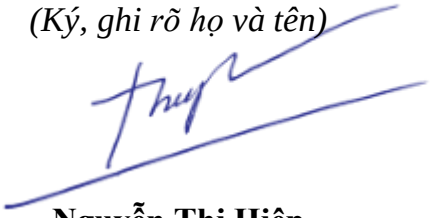
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM089IU - Electronic Devices for Biomedical Design (Thiết bị điện tử cho Kỹ thuật Y Sinh)

1. General Information
   - Course Title:
     + Vietnamese:Thiết bị điện tử cho Kỹ thuật Y Sinh
     + English: Electronic Devices for Biomedical Design
   - Course ID: BM089IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: BM053IU – Principles of Electricity in Biomedical Engineering/ Edusoft: none
   - Parallel Courses:
2. Course Description

Fundamentals of semiconductor devices and microelectronic circuits, characteristics of p-n, Zener diodes, and analog diode circuits. Principles of MOSFET and BJT operation, biasing, transistor analysis at midband frequencies.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to define and analyze the four basic amplifiers models (voltage, current, transconductance and transresistance). Solve the amplifier's transfer functions and gain.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	An ability to understand in depth the op amp as a circuit building block and its terminal characteristics for applications.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	An ability to understand the essence of the diode function, grasp the techniques for the analysis of diode circuits through modeling the diode characteristics, use diodes for various applications, including in design of rectifier circuits.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	An ability to analyze the BJT terminal characteristics, utilize the	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	circuit models to perform the rapid first-order analysis of BJT circuits and to design single-state BJT amplifiers.		
G5	An ability to develop a high degree of familiarity with the MOSFET: its physical structure and operation, terminal characteristics, circuit models, single - stage amplifier configurations and basic circuit applications, analyze and design the basic discrete MOSFET circuits.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U
G1.2	(b) an ability to design and conduct experiments, as well as to analyze and interpret data	I, T, U
G1.3	(e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.4	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment

1	Chapter 1: Introduction. Analog and digital signals, amplifiers, circuit models for amplifiers, network theorems.	G1, G2	in class	A1.1
2	Chapter 2: Operational Amplifiers, Ideal Op Amp, inverting & non-inverting configurations, Op Amp circuits, non-ideal performance.	G2, G3	in class	A1.1 A1.2
3	Chapter 3: Diodes, Ideal diode, terminal characteristics, analysis of diode circuits, small signal analysis.	G1, G3	in class	A1.1
4	Chapter 4: PN junction under reverse-bias, PN junction under forward bias, zener diodes.	G1, G2	in class	A1.1 A1.2
5	Chapter 5: Diode applications, diode circuit design.	G2, G3	in class	A1.1
6	Chapter 6: Bipolar Junction Transistors; Physical structures and models of operation, PNP & NPN transistors.	G1, G3	in class	A1.1 A1.2
7	Chapter 7: DC analysis, BJT as an amplifier.	G1, G2	in class	A1.1
8	Chapter 8: Single stage amplifier configurations; BJT in cut-off and saturation; BJT circuit applications and circuit design.	G2, G3	in class	A1.1 A1.2
9	Chapter 9: Field-Effect Transistors.	G1, G3	in class	A1.1
	Midterm exam			A2.1
10	Chapter 10: Structure and physical operation of enhancement-type and depletion type MOSFET.	G1, G2	in class	A1.1 A1.2
11	Chapter 11: FET circuit in DC.	G2, G3	in class	A1.1
12	Chapter 11: Cont.	G1, G3	in class	A1.1
13	Chapter 12: FET as an amplifier, biasing circuits and biasing design; Basic configuration of single-stage FET amplifiers.	G1, G2	in class	A1.1 A1.2
14	Chapter 13: Basic configuration of single-stage FET amplifiers; FET circuit design.	G2, G3	in class	A1.1
15	Chapter 14: CMOS and CMOS Applications.	G1, G3	in class	A1.1

	Final exam			A3.2

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	Introduction and Laboratory Equipment	G3, G4	B1.1
2	RC Circuits and Operational Amplifier	G3, G4	B1.1 B1.2
3	Semiconductor Junction Diode	G3, G4	B1.2
4	Bipolar Junction Transistors: I-V Characteristics and Biasing	G3, G4	B1.1 B1.2
5	Bipolar Junction Transistors: Amplifier Topologies	G3, G4	B1.1 B1.2
6	MOSFET Transistors	G3, G4	B1.2
7	Review		B1.2
8	Final exam		B2.1

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Pham Thi Thu Hien
- Email: ptthien@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM033IU - Information Technology in the Health Care System (Công nghệ thông tin trong hệ thống chăm sóc sức khỏe), BM070IU - Information Technology in the Health Care System lab (Thực hành công nghệ thông tin trong hệ thống chăm sóc sức khỏe).

1. General Information
   - Course Title:
     + Vietnamese:Công nghệ thông tin trong hệ thống chăm sóc sức khỏe
     + English: Information Technology in the Health Care System & Laboratory
   - Course ID: BM033IU-BM070IU
   - Course type:

☐ General	☐ Fundamental
☑ Specialization	☐ Others
☐ Skills	☐ Project/Internship/Thesis

   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Applied Informatics/ Edusoft: None
   - Parallel Courses:
2. Course Description

This course will teach students how to analyze and apply various management programs and technology systems currently available to health care professionals. Lectures and tutorials will offer experiential learning opportunities. The tutorials will introduce the knowledge and software toolsets that will be used by the students to design an original health care delivery system application. Knowledge will include those used by professionals to design information healthcare system, automated decision support system and healthcare standards.

3. Textbooks and Other Required Materials

   Textbooks:

   Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	We will show how information technologies (IT) shape the health care trends in future. Students will learn how IT enhances medical care through: 1) improve the way to manage healthcare information in large scale, 2) network-integrated decision support tools for clinicians, 3) opportunities for e-health delivery over the network and 4) standardize information transfers among healthcare centers.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Know how to apply the roles of information technology in healthcare system. (Program outcome: (a,h))	I, T, U
G1.2	Know the fundamentals of network protocol. (Program outcome: (a,c,k))	I, T, U
G1.3	Be introduced recent trends in clinical decision support system (CDSS) and telemedicine. (Program outcome: (i,c,j,h))	I, T, U
G1.4	Experience a real healthcare information system. (Program outcome: (b,h))	I, T, U
G1.5	Apply the fundamentals of database to create, access and manage a database system. (Program outcome: (a,e,c,k))	I, T, U
G1.6	Apply electronic healthcare records and related international standards. (Program outcome: (c,j))	I, T, U
G1.7	Evaluate the importances and supports of smartphones and embedded sensors within healthcare context. (Program outcome: (c,k,h))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Information technology and healthcare professionals	G1, G2	Lecture, discussion	Homework
2	Communication networks	G1, G2	Lecture, discussion	Quiz
3	Network protocol and open systems interconnection (OSI) model	G1, G2	Lecture, discussion	Homework
4	TCP/IP protocol and IP address	G1, G2	Lecture, discussion	Quiz
5	Database, MySQL and PHP	G1, G2	Lecture, discussion	Homework
6	Smartphone programming and embedded system in health care	G1, G2	Lecture, discussion	Quiz
7	Health information system (HIS) and introduction to Care2x	G1, G2	Lecture, discussion	Homework
8	Electric healthcare record and health level seven international (HL7) standard, version 2.x	G1, G2	Lecture, discussion	Quiz
9	Electric healthcare record and health level seven international (HL7) standard, version 3.x	G1, G2	Lecture, discussion	Homework
10	Clinical decision support system (CDSS)	G1, G2	Lecture, discussion	Quiz
11	Telemedicine	G1, G2	Lecture, discussion	Homework
12	Convergence informatics: The future of clinical innovation	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Network and IP Address	---	Attendance, Lab report
2	Database, MySQL and PHP	---	Attendance, Lab report
3	Database, MySQL and PHP	---	Attendance, Lab report
4	Smartphone programming and Biosensors	---	Attendance, Lab report
5	Care2x	---	Attendance, Lab report
6	HL7	---	Attendance, Lab report
7	CDSS	---	Attendance, Lab report
8	Final examination	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

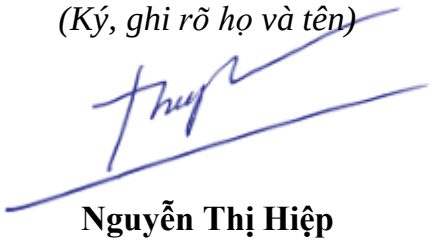
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ngo Thanh Hoan
- Email: nthoan@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM075IU - Biomedical Photonics (Quang học y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Quang học y sinh & Thí nghiệm quang học y sinh
     + English: Biomedical Photonics & Biomedical Photonics Laboratory
   - Course ID: BM075IU-BM076IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course introduces some of the basic concepts of applying light in biomedical applications. This course is especially tailored for engineers who have no prior knowledge in biomedical sciences. The course first introduces some basic concepts in biomedical sciences so that students can be familiar with the techniques and the terminologies used in the field. Subsequently, the course would consider biological tissues as an optical material with some unique properties different from other conventional material, such as semiconductors, when light interacts with it. Several important research topics including microscopy, optical detection techniques, and optical disease detection techniques will be discussed. Engineering students who take this course would allow them to quickly get into the field of biomedical engineering that highly interdisciplinary knowledge and skills are required.

3. Textbooks and Other Required Materials

   Textbooks:

   Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	To define the fundamentals of Light and Matter, their interactions.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	To define the fundamentals of Lasers, Laser Technology and Nonlinear Optics.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	To apply the fundamentals and applications of Photobiology.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	To demonstrate the fundamentals of microscopy and fluorescence dyes and know their applications.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	To apply some nonlinear microscopy techniques such as CARS, FLIM, FCS, PALM, STED.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

G6	To define the fundamentals of optical coherence tomography.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G7	To describe some basic concepts in biomedical sciences and know some applications of biological tissues.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G8	To apply several important research topics including microscopy, optical detection techniques, and optical disease detection techniques.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G9	To define the fundamental and know how to use of some optical biosensors.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	a. an ability to apply knowledge of mathematics, science, and engineering to solve biomedical engineering problems. (a3)	I, T, U
G1.2	g. an ability to communicate effectively. (g1)	I, T, U
G1.3	j. a knowledge of contemporary issues. (j2)	I, T, U
G1.4	k. an ability to use the techniques, skills, and modern engineering tools necessary for biomedical engineering practice. (k1)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Fundamentals of Light and Matter	G1, G2	Lecture, discussion	Quiz

3	Chapter 3: Basics of Biology	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Fundamental of Light-Matter Interactions	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Lasers, Laser Technology and Nonlinear Optics	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Photobiology	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Biological Imaging Spectroscopy	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Biochips and Microarrays: Tools for New Medicine	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Microscopy and fluorescence dyes	G1, G2	Lecture, discussion	Homework
10	Chapter 10: Optical coherence tomography	G1, G2	Lecture, discussion	Quiz
11	Chapter 11: Optical disease diagnostic techniques: autofluorescence, vibrational spectroscopy	G1, G2	Lecture, discussion	Homework
12	Chapter 12: Optical Biosensors	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Pham Thi Thu Hien
- Email: ptthien@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM058IU - Biomedical Image Processing (Xử lý ảnh y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Xử lý ảnh y sinh
     + English: Biomedical Image Processing
   - Course ID: BM058IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biosignal Processing/Edusoft: None
   - Parallel Courses:
2. Course Description

The goal of this course is to introduce techniques to enhance biomedical images to help physicians in diagnosis and treatment. This subject also introduces the principle of tomography techniques such as X-ray, CT, MRI and PET/CT. Moreover, it provides students essential knowledge of digital image processing including image acquisition, image formation, linear system, low-level image processing, image enhancement in frequency domain, pattern recognition, etc. A series of exercises and labs also provide students practical experience in working with biomedical image data.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to understand types of medical images and how they are different from other digital images.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	An ability to process images by methods such as filter, transforms, enhancement, edge detection and others.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	An ability to write Matlab codes for processing biomedical images with the aforementioned methods.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

G1.1	Understand medical imaging and biomedical images (Program outcome: (a), (b), (e), (k)).	I, T, U
G1.2	Understand methods to enhance medical images (Program outcome: (a), (b), (k)).	I, T, U
G1.3	Understand supported methods to develop computer aided diagnosis programs (Program outcome: (b), (k)).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to biomedical image processing	G1, G2	Lecture, discussion	Homework
2	Digital image acquisition	G1, G2	Lecture, discussion	Quiz
3	Image enhancement in spatial domain	G1, G2	Lecture, discussion	Homework
4	Image enhancement in frequency domain: Fourier transform	G1, G2	Lecture, discussion	Quiz
5	Image enhancement in frequency domain: Filters	G1, G2	Lecture, discussion	Homework
6	Morphological image processing	G1, G2	Lecture, discussion	Quiz
7	Image restoration	G1, G2	Lecture, discussion	Homework
8	Image segmentation	G1, G2	Lecture, discussion	Quiz
9	Object classification and recognition	G1, G2	Lecture, discussion	Homework
10	Medical image registration	G1, G2	Lecture, discussion	Quiz

11	Computed tomography	G1, G2	Lecture, discussion	Homework
12	Revision	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Enhance image in spatial domain (1)	---	Attendance, Lab report
2	Enhance image in spatial domain (2)	---	Attendance, Lab report
3	Enhance image in frequency domain	---	Attendance, Lab report
4	Morphological image processing	---	Attendance, Lab report
5	Medical image restoration	---	Attendance, Lab report
6	Medical image segmentation	---	Attendance, Lab report
7	Medical image classification	---	Attendance, Lab report
8	Medical image registration	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM072IU - Computational Model in Medicine (Mô hình tính toán trong Y Khoa).

1. General Information
   - Course Title:
     + Vietnamese:Mô hình tính toán trong y khoa
     + English: Computational Model in Medicine
   - Course ID: BM072IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Applied Informatics/ Edusoft: none
   - Parallel Courses:
2. Course Description

The computer modeling and simulation of the heart and the circulation, gas exchange in the lungs, control of cell volume, the renal counter-current multiplier mechanism, and muscle mechanics, mechanisms of neural control, genetics, epidemics and dispersal.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Revise biology knowledge of physiological functions of human body.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Understand how to model a physiological process using mathematics.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Able to use computer to simulate the process of physiological systems.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Extract meaning information from a large source of medical data.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Analyze real medical data and compare them with simulated data.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U

G1.2	(b) an ability to design and conduct experiments, as well as to analyze and interpret data	I, T, U
G1.3	(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	I, T, U
G1.4	(e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.5	(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	I, T, U
G1.6	(i) a recognition of the need for, and an ability to engage in life-long learning	I, T, U
G1.7	(j) a knowledge of contemporary issues	I, T, U
G1.8	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to computational model in medicine	G1, G2	Lecture, discussion	Homework
2	The heart and circulation modeling: The heart and circulation; Volume, flow and pressure; (Part 1)	G1, G2	Lecture, discussion	Quiz
3	The heart and circulation modeling: Mathematical model of circulation; Computer simulation of blood flow (Part 2)	G1, G2	Lecture, discussion	Homework

4	Gas exchange in the lungs: The lungs; Gas transport in the lungs; Compute solution for the O2 transport equation	G1, G2	Lecture, discussion	Quiz
5	Cell volume and electrical properties of cell membranes: Simple model of cell volume control; The movement of ion across cell membranes	G1, G2	Lecture, discussion	Homework
6	The renal countercurrent mechanism: The transport of Na+ and H2O along the renal tubules	G1, G2	Lecture, discussion	Quiz
7	Muscle mechanism: The force and velocity; Cross bridge dynamics; Computer simulation of cross bridge attachment and detachment	G1, G2	Lecture, discussion	Homework
8	Neural system: Neural system; Model neural networks	G1, G2	Lecture, discussion	Quiz
9	Population dynamics: Bacterial cultures, age structures; Microbial ecology; Nonlinear reproduction; Controlling populations	G1, G2	Lecture, discussion	Homework
10	Genetics: Population genetics	G1, G2	Lecture, discussion	Quiz
11	Epidemics	G1, G2	Lecture, discussion	Homework
12	Applications	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Revise the physiological functions of lung, heart, circulation, etc.	---	Attendance, Lab report
2	Model heart and circulation	---	Attendance, Lab report
3	Model the lung functions	---	Attendance, Lab report
4	Model cell volume and electrical properties of cell membranes	---	Attendance, Lab report
5	Understand and model neural networks	---	Attendance, Lab report

6	Simulate muscle mechanisms (force and velocity)	---	Attendance, Lab report
7	Model bacterial population and validate with real data	---	Attendance, Lab report
8	Apply data mining to extract genetic information	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

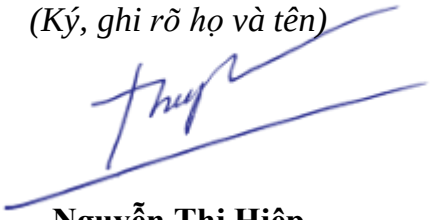
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ngo Thi Lua
- Email: ntlua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM073IU - Medical Imaging (Hình ảnh y khoa)

1. General Information
   - Course Title:
     + Vietnamese:Hình ảnh y khoa
     + English: Medical Imaging
   - Course ID: BM073IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biosignal Processing/ Edusoft: none
   - Parallel Courses:
2. Course Description

Physical and computational principles of different medical imaging modalities (including computed tomography, nuclear, magnetic resonance, ultrasound, and optical imaging) are discussed with the focus on image formulation and reconstruction. Hardware designs and clinical applications are also mentioned.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand the basic principles of different imaging modalities.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Know the pros, cons and practical applications of each modality.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Possibly have hand-on experiment with imaging data collection.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand the medical image characteristics (Program outcome: a).	I, T, U
G1.2	Understand principles of X-Ray, Computed Tomography, Ultrasound and MRI devices (Program outcome: a)	I, T, U
G1.3	Understand the clinical applications of different imaging modalities (Program outcome: b,c)	I, T, U
G1.4	Understand how to use mathematics to design an image reconstruction model. (Program outcome: a,e)	I, T, U
G1.5	Understand how to operate different imaging devices in medical fields (Program outcome: a,e,d)	I, T, U

G1.6	Know how to use Matlab to analyze medical images. (Program outcome: e,k)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	General image characteristics and data acquisition	G1, G2	Lecture, discussion	Homework
2	Fourier transform and image reconstruction	G1, G2	Lecture, discussion	Quiz
3	X-ray planar radiography	G1, G2	Lecture, discussion	Homework
4	X-ray and computed tomography	G1, G2	Lecture, discussion	Quiz
5	Nuclear medicine:	G1, G2	Lecture, discussion	Homework
6	Ultrasound imaging:	G1, G2	Lecture, discussion	Quiz
7	Magnetic Resonance Imaging:	G1, G2	Lecture, discussion	Homework
8	Final Reviews	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Fourier transform	---	Attendance, Lab report
2	Image reconstruction	---	Attendance, Lab report
3	X-Ray acquisition	---	Attendance, Lab report
4	CT acquisition	---	Attendance, Lab report
5	Ultrasound imaging	---	Attendance, Lab report
6	Ultrasound imaging	---	Attendance, Lab report

7	Analyze MRI images	---	Attendance, Lab report
8	Examinations	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

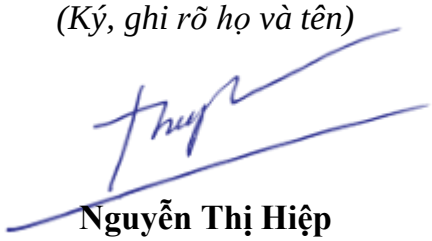
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM074IU - Brain - Computer Interface (Giao diện não - máy)

1. General Information
   - Course Title:
     + Vietnamese:Giao diện não - máy
     + English: Brain - Computer Interface
   - Course ID: BM074IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biosignal Processing/ Edusoft: none
   - Parallel Courses:
2. Course Description

In this course, students will learn about the basic function and structure of brain, the function of each part of the brain. In addition, students will be practiced on devices to learn how to interface between Brain-Computer. Collecting signals and analyzing them are also mentioned.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to understand structure of human brain.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	An ability to learn how to use medical devices to measure the brain signals.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	An ability to analyze the data and get the useful information from the signal.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	An ability to learn methods for calculating and analyzing signals.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	An ability to do statistical analysis of signals.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G6	An ability to do real experiments of Brain-Computer interface.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) an ability to apply knowledge of mathematics, science, and engineering	I, T, U

G1.2	(b) an ability to design and conduct experiments, as well as to analyze and interpret data	I, T, U
G1.3	(e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.4	(i) a recognition of the need for, and an ability to engage in life-long learning	I, T, U
G1.5	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Brain structure	G1, G2	Lecture, discussion	Homework
2	Theory of brain elements and function	G1, G2	Lecture, discussion	Quiz
3	Learning, remember, sleep and cognition of the brain	G1, G2	Lecture, discussion	Homework
4	Practice of brain tissue	G1, G2	Lecture, discussion	Quiz
5	Brain - Computer Interface system and methods	G1, G2	Lecture, discussion	Homework
6	Invasive Brain - Computer Interface system	G1, G2	Lecture, discussion	Quiz
7	Software and Hardware for Brain - Computer Interface	G1, G2	Lecture, discussion	Homework
8	Applications	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment

1	Signal processing in brain computer interface	---	Attendance, Lab report
2	ERP processing	---	Attendance, Lab report
3	BCILAB toolbox (part 1)	---	Attendance, Lab report
4	BCILAB toolbox (part 2)	---	Attendance, Lab report
5	Complex brain process	---	Attendance, Lab report
6	Machine learning for brain computer interface (part 1)	---	Attendance, Lab report
7	Machine learning for brain computer interface (part 2)	---	Attendance, Lab report
8	Examinations	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

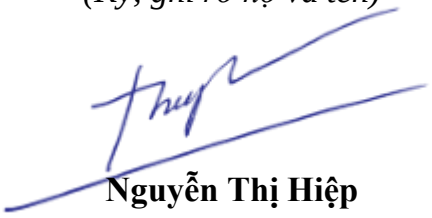
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ha Thi Thanh Huong
- Email: htthuong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM071IU - Computer Aided Diagnosis (Chuẩn đoán hỗ trợ bằng máy tính)

1. General Information
   - Course Title:
     + Vietnamese:Chẩn đoán hỗ trợ bằng máy tính
     + English: Computer Aided Diagnosis
   - Course ID: BM071IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biosignal Processing/ Edusoft: none
   - Parallel Courses:
2. Course Description

This course is an introduction to diagnostic imaging and an overview of how computerized analysis of medical images has been employed to assist physicians in detecting or classifying lesions and screening for differential diagnosis. Topics include typical pathological abnormal patterns of various diagnostic imaging modalities with an emphasis on ECG, Ultrasound, and CT scan. Lab activities focus on interpreting ECG, CT scan and performing an Ultrasound exam.

3. Textbooks and Other Required Materials

   Textbooks:

   Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Recognizing a normal ECG and sectional medical images	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Analyzing common and typical lesions on ECG and selected diagnostic imaging modalities	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Evaluating the impacts and limitations of different computer-aided diagnostic imaging modalities	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	I, T, U
G1.2	(d) an ability to function on multi-disciplinary teams	I, T, U
G1.3	(f) an understanding of professional and ethical responsibility	I, T, U

G1.4	(e) an ability to identify, formulate, and solve engineering problems	I, T, U
G1.5	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction: Historical Review, Current Status and Future Potential of Computer-Aided Diagnosis	G1, G2	Lecture, discussion	Homework
2	Normal ECG	G1, G2	Lecture, discussion	Quiz
3	Sectional Anatomy	G1, G2	Lecture, discussion	Homework
4	Medical Images of the Head	G1, G2	Lecture, discussion	Quiz
5	Medical Images of the Chest	G1, G2	Lecture, discussion	Homework
6	Medical Images of the Abdomen	G1, G2	Lecture, discussion	Quiz
7	Computer-Aided Diagnosis in ECG and Ultrasound	G1, G2	Lecture, discussion	Homework
8	Computer-Aided Diagnosis for Brain Lesions	G1, G2	Lecture, discussion	Quiz
9	Computer-Aided Diagnosis for Lung Nodules	G1, G2	Lecture, discussion	Homework
10	Computer-Aided Diagnosis for Breast Cancer	G1, G2	Lecture, discussion	Homework

11	Computer-Aided Diagnosis for Osteoporosis	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Lab 1: Interpreting ECG	---	Attendance, Lab report
2	Lab 2: Interpreting Brain Images	---	Attendance, Lab report
3	Lab 3: Interpreting Lung Images	---	Attendance, Lab report
4	Lab 4: Interpreting Mammography	---	Attendance, Lab report
5	Lab 5: Interpreting Abdominal Images	---	Attendance, Lab report
6	Lab 6: Interpreting Breast Tumors	---	Attendance, Lab report
7	Lab 7: Interpreting Bone Scans	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

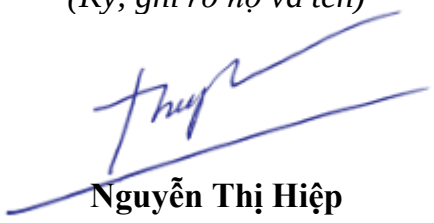
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ngo Thi Lua
- Email: ntlua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM077IU - Pharmaceutical Engineering 1 (Kỹ thuật dược 1)

1. General Information
   - Course Title:
     + Vietnamese:Kỹ thuật dược 1
     + English: Pharmaceutical Engineering 1
   - Course ID: BM077IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Chemistry for BME/ Edusoft: none
   - Parallel Courses:
2. Course Description

This course emphasizes the primary engineering aspects of the pharmaceutical processes through methodologies, both applied and fundamental of dosage form design, to analyze and scale up manufacturing pharmaceutical processes involving liquid and dispersed-phase systems including solution, suspensions, transdermal systems, etc.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The students will be able tocomprehend principles of dosageform design and the fundamentals ofthe unit operations typically associated with drug manufacturing processes of liquid, dispersed phase systems regarding their manufacture and design aspects.	(1),(2),(3),(4), (5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	A knowledge of physicochemical principles to study and understand the design and preparation of dosage form (Program outcome: (b))	I, T, U
G1.2	Use of methods to determine physicochemical properties of drug substances, stability in formulation development (Program outcome: (k))	I, T, U
G1.3	An ability to design and prepare pharmaceutical liquid and dispersed-phase systems (Program outcome: (c))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Dissolution andSolubility	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Solution properties	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Rheology	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Surface andinterfacial phenomena	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Dispersed systems	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Kinetics andproduct stability	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Preformulation	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Design and manufacture liquid and dispersed-phase systems	G1, G2	Lecture, discussion	Quiz

8. Course Policy

Student responsibility: Students are expected to spend at least 8 hours per week for selfstudying. This time should be made up of reading, working on exercises and problem andgroup assignment. Attendance: Regular on-time attendance in this course is expected. It iscompulsory that 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 on-goingassessment 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Phuoc Vinh
- Email: npvinh@medvnu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM078IU - Pharmaceutical Engineering 2 (Kỹ thuật dược 2)

1. General Information
   - Course Title:
     + Vietnamese:Kỹ thuật dược 2
     + English: Pharmaceutical Engineering 2
   - Course ID: BM078IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Chemistry for BME/ Edusoft: none
   - Parallel Courses:
2. Course Description

This course emphasizes the primary engineering aspects of the pharmaceutical processes through methodologies, both applied and fundamental of dosage form design, to analyze and scale up manufacturing pharmaceutical processes involving solids processing, such as solids characterization, blending, milling, granulation, tableting, coating, and others.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Upon successful completion of this course, the students will be able to comprehend the drug manufacturing processes of solid phase systems regarding their manufacture and design aspects.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understanding the principles and use of instrumentation methods in drug manufacturing processes of solid phase systems (Program outcome: (k))	I, T, U
G1.2	An ability to design and prepare pharmaceutical solid dosage forms (Program outcome: (c))	I, T, U
G1.3	Identification of particle properties, characterization of powder flow and improvement of powder flow-ability (Program outcome: (e))	I, T, U
G1.4	An ability to analyze, interpret solid state properties (Program	I, T, U

	outcome: (b))	
G1.5	Understanding of influence of particle size in drug manufacturing processes of solid phase systems (Program outcome: (l))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Properties of solid state	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Analytical techniques in solid state characterization	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Particle size science and powder technology	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Granulation	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Drying	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Powders and granules	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Tablets and compaction	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Coating of tablets and multiparticulates	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Suppository	G1, G2	Lecture, discussion	Homework
10	Chapter 10: Hard and soft gelatin capsules	G1, G2	Lecture, discussion	Quiz

8. Course Policy

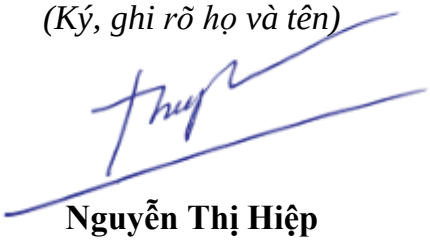
Student responsibility: Students are expected to spend at least 8 hours per week for self studying. This time should be made up of reading, working on exercises and problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Nguyen Phuoc Vinh
   - Email: npvinh@medvnu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM079IU - Principle of Pharmacokinetics (Nguên lý dược động học)

1. General Information
   - Course Title:
     + Vietnamese:Nguyên lý dược động học
     + English: Principle of Pharmacokinetics
   - Course ID: BM079IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Chemistry for BME/ edusoft: none
   - Parallel Courses:
2. Course Description

The course is intended to provide the students with basic principles of pharmacokinetics including drug transport, various routes of drug administration, and drug absorption, distribution, metabolism, and elimination. Mathematical pharmacokinetic models are also presented.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The students will master knowledge of pharmacokinetics and apply it to the development of drug delivery systems.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand the basic princples of pharmacokinetics and apply it to develop drug formulation (Program outcomes: (b), (l), (m))	I, T, U
G1.2	Understand the influence of drug administration on treatment effectiveness and predict how drug concentration in the body will be influenced by changes in the way the agent is delivered (Program outcomes: (a))	I, T, U
G1.3	Demonstrate an understanding and assess factors which affect the absorption, distribution, metabolism and excretion of drugs (Program outcomes: (a))	I, T, U
G1.4	Select the appropriate dosage form and dosing regimen based on pharmacokinetic principles (Program outcomes: (a), (b))	I, T, U

G1.5	Gain an understanding of the importance of drug diffusion, drug permeation and drug transport (Program outcomes: (a), (m))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Basic principles of pharmacokinetics	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Drug administration and drug effectiveness	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Diffusion and drug distribution	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Diffusion in biological systems	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Drug permeation through biological barriers	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Drug transport by fluid motion	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

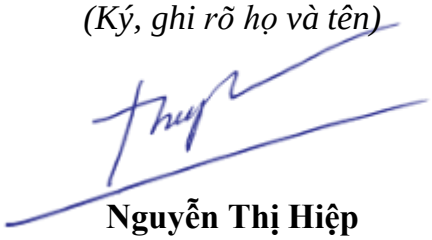
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM080IU - Nanotechnology for Drug Delivery Systems (Công nghệ nano cho hệ vận chuyển thuốc)

1. General Information
   - Course Title:
     + Vietnamese:Công nghệ nano cho hệ vận chuyển thuốc
     + English: Nanotechnology for Drug Delivery Systems
   - Course ID: BM080IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Chemistry for BME/ edusoft: none
   - Parallel Courses:
2. Course Description

Since nanoparticulate drug delivery systems present very small size, they are promising in targeted therapy of diseased tissue, organ and hence, leading to the increased drug concentration at those places through biological barriers to increase the effectiveness of the treatment. The course depicts nanoparticles and technologies applied to targeted drug delivery to diseased cells.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	To learn and understand basic and advanced concepts of nanotechnology for applications in drug delivery.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	An ability to evaluate of the nanoparticulate drug delivery systems (Program outcome: (b))	I, T, U
G1.2	Understanding of various methods of nanotechnological drug delivery systems (Program outcome: (k))	I, T, U
G1.3	An ability to design and manufacture of nanoparticulate drug delivery systems (Program outcome: (c))	I, T, U
G1.4	An ability to identify and apply nanotherapeutics in related disease (Program outcome: (e))	I, T, U

G1.5	A knowledge of recent trends and emerging technologies in the area of nanoparticulate drug delivery systems (Program outcome: (j))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: nanoparticulate drug delivery systems - an overview	G1, G2	Lecture, discussion	Homework
2	Chapter 2: nanotechnology in preparation of controlled release drug delivery systems and enhanced stability of drug structure and activity	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: targeted nanoparticles for drug delivery	G1, G2	Lecture, discussion	Homework
4	Chapter 4: dentrimer as nanoparticular drug carriers	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: liposomes for drug delivery and targeting	G1, G2	Lecture, discussion	Homework
6	Chapter 6: nanoparticle and targeted systems for cancer diagnosis and therapy	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: nanotherapeutics for skin diseases	G1, G2	Lecture, discussion	Homework
8	Chapter 8: nanoparticies for oral vaccination	G1, G2	Lecture, discussion	Quiz

9	Chapter 9: nanoparticies: therapeutic approaches for bacterial diseases	G1, G2	Lecture, discussion	Homework
10	Chapter 10: nanoparticie therapy in parasites diseases	G1, G2	Lecture, discussion	Homework
11	Chapter 11: nanocarriers in the therapy of inflammatory disease	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

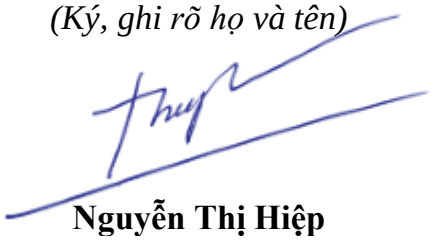
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM081IU - Drug Delivery Systems (Hệ vận chuyển thuốc)

1. General Information
   - Course Title:
     + Vietnamese:Hệ vận chuyển thuốc
     + English: Drug Delivery Systems
   - Course ID: BM081IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Chemistry for BME/ edusoft: none
   - Parallel Courses:
2. Course Description

In this class, the students will be introduced the concept of drug delivery systems providing pharmaceutical agents at target site, technology, regulartory considerations and applications of each system. The course is also intended to provide the students about design of controlled release drug delivery systems.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	The students will be able to comprehend various drug delivery systems for improving clinical efficacy as well as reducing drug side effects.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	A knowlegde of necessaries and roles of drug delivery systems (Program outcome: (e))	I, T, U
G1.2	Understading of roles of polymers in drug delivery (Program	I, T, U

	outcome: (b))	
G1.3	An understanding of specialized structures in human body to develop drug delivery systems (Program outcome: (l))	I, T, U
G1.4	An ability of design and fabrication of drug delivery systems (Program outcome: (c))	I, T, U
G1.5	An ability to modify active pharmaceutical agents to increase their biological activity (Program outcome: (k))	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: An Overview of drug delivery systems	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Controlled drug delivery systems	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Polymers in drug delivery	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Implant drug delivery	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Drug modification	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Transdermal drug delivery	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Intranasal and ocular drug delivery	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Oral drug delivery	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Site-specific drug delivery	G1, G2	Lecture, discussion	Homework

10	Chapter 10: Protein delivery	G1, G2	Lecture, discussion	Homework
11	Chapter 11: Gene delivery/therapy	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

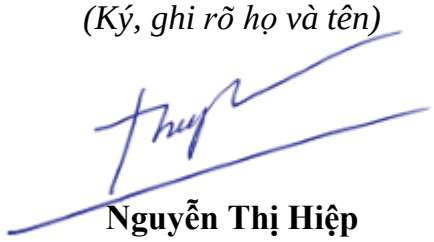
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Vong Binh Long
- Email: vblong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM010IU - Biosignal Processing (Xử lý tính hiệu y sinh)

1. General Information
   - Course Title:
     + Vietnamese:Xử lý tín hiệu y sinh
     + English: Biosignal Processing
   - Course ID: BM010IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: BM064IU - Applied Informatics
   - Parallel Courses:
2. Course Description

The course provides students fundamentals knowledge to process and analyze biosignals. The knowledge of Fourier transform, signal sampling, analog to digital conversion, stochastic signal processing are covered in the class. The course also provides insight to different characteristics of typical biological signals including Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG)

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Comprehend main characteristics of typical biological signals.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Utilize mathematical tools to analyze digital bio-signals.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Represent, process and analyze biomedical digital signals using Matlab	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(a) An ability to apply knowledge of mathematics, science, and engineering to solve biomedical engineering problems	I, T, U
G1.2	(c) An ability to design a system, component, or process to	I, T, U

	meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
G1.3	(k) An ability to use the techniques, skills, and modern engineering tools necessary for biomedical engineering practice	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Electrical activities of cell, biomedical signals, digital signals, data acquisition	G1, G2	Lecture, discussion	Homework
2	Digital filtering	G1, G2	Lecture, discussion	Quiz
3	Z-transforms	G1, G2	Lecture, discussion	Homework
4	Discrete Fourier transform (DFT)	G1, G2	Lecture, discussion	Quiz
5	Filter design and Review	G1, G2	Lecture, discussion	Homework
6	Filter design	G1, G2	Lecture, discussion	Quiz
7	Wavelet transform	G1, G2	Lecture, discussion	Homework
8	Random process and nonlinear signal processing	G1, G2	Lecture, discussion	Quiz
9	Electrocardiogram (ECG),	G1, G2	Lecture, discussion	Homework
10	Electroencephalogram (EEG) and other signals	G1, G2	Lecture, discussion	Homework

11	Review	G1, G2	Lecture, discussion	Quiz

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

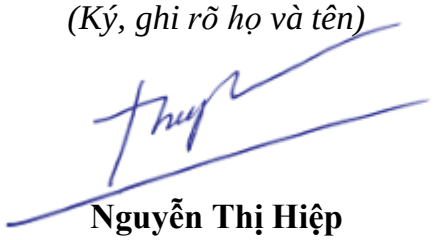
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM083IU - Applications of Biomaterials in Regenerative Medicine (Ứng dụng vật liệu sinh học trong y học tái tạo)

1. General Information
   - Course Title:
     + Vietnamese:Ứng dụng vật liệu sinh học trong y học tái tạo
     + English: Applications of Biomaterials in Regenerative Medicine
   - Course ID: BM083IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course is the basis for the student in biomedical engineering. It equips students with the basic knowledge about the types of tissues in the human body. This course will introduce some kind of tissue in the human body, including: heart, liver, lungs, stomach, eyes, bones, blood vessels, etc.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	This subject will introduce to students the general in structure of specific human organs. The common disease and the ability to regenerate in medicine	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Student will understand the structure, the composition and the cell types for specific-organ (Program outcome: f).	I, T, U
G1.2	Student will learn how to choose materials for designing, synthesizing, characterizing, and testing scaffold for specific-organ (Program outcome: e,m).	I, T, U
G1.3	Understanding immune/inflammatory response of implanted materials (Program outcome: f).	I, T, U

G1.4	Student will understand the functions of some organs (Program outcome: f).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction in general	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Skin	G1, G2	Lecture, discussion	Quiz
3	Chapter 4: blood vessel	G1, G2	Lecture, discussion	Homework
4	Chapter 5: Introduction to liver and kidney structure: pathology and treatment using biomaterials	G1, G2	Lecture, discussion	Quiz
5	Chapter 6: Introduction to stomach and intestines structure: pathology and treatment using biomaterials	G1, G2	Lecture, discussion	Homework
6	Chapter 7: Introduction to bones, skulls and teeth structure: pathology and treatment using biomaterials	G1, G2	Lecture, discussion	Quiz
7	Chapter 8: Introduction to and joint structure: pathology and treatment using biomaterials	G1, G2	Lecture, discussion	Homework
8	Chapter 9: Introduction to bladder: pathology and treatment using biomaterials	G1, G2	Lecture, discussion	Homework

9	Chapter 10: Translation of New Tissue Engineering Materials to Clinical Application	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Week 1: Learning how to prepare and use tools for a operation process	---	Attendance, Lab report
2	Week 2: Suturing a laceration using a pig's skin model	---	Attendance, Lab report
3	Week 3: Grafting a artificial skin using a mice model	---	Attendance, Lab report
4	Week 4: Grafting a artificial skin using a mice model	---	Attendance, Lab report
5	Week 5: Grafting a artificial skin using a mice model	---	Attendance, Lab report
6	Week 6: Ex vivo a scaffold for muscle regeneration	---	Attendance, Lab report
7	Week 7: Ex vivo a scaffold for bone regeneration	---	Attendance, Lab report
8	Week 8: Exam	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

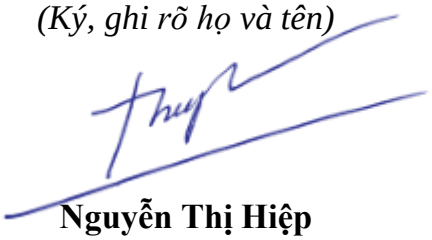
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Thi Hiep
- Email: nthiep@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM084IU - Biocompatibility and Biodegradation of Biomaterials (Tương thích sinh học và phân hủy sinh học của vật liệu sinh học).

1. General Information
   - Course Title:
     + Vietnamese:Tương thích sinh học và phân hủy sinh học của vật liệu sinh học
     + English: Biocompatibility and Biodegradation of Biomaterials
   - Course ID: BM084IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:

2. Course Description

Students will learn and understand the biocompatible and biodegradable measure of biomaterials. Students will learn and practice in the laboratory about interaction of cells and biomaterials (using MTT, SEM, confocal, etc.) and interaction of implanted biomaterials in animal (using H&E, MT staining).

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	This course will show students how to evaluate the biocompatibility of biomaterials and the process of decomposition of biomaterials.	(1)-(7)	4.0-4.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Student will understand and combine raw materials to increase the biocompatible or biodegradable biomaterials (Program outcome: a,b).	I, T, U
G1.2	Student will learn the methods that used to evaluate the biocompatible or biodegradable biomaterials (Program outcome: a,b,f,m,l).	I, T, U
G1.3	Student will understand immune/inflammatory response of implanted materials (Program outcome: b).	I, T, U
G1.4	Student will understand some technical invitro and invivo (Program outcome: b).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Course Overview and Introduction	G1, G2	Lecture, discussion	Homework
2	Chapter 2: In vitro Biocompatibility of Biomaterials	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: In vitro Biodegradation of biomaterials	G1, G2	Lecture, discussion	Homework
4	Chapter 4: In vivo Biocompatibility of Biomaterials	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: In vivo Biodegradation of biomaterials	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Evaluation of the biocompatibility and degradation of biomaterials on animal using Histological stains (hematoxyline and eosin, Masson's Trichrome, …)	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Fabrication of a scaffold for tissue regeneration	---	Attendance, Lab report
2	Degradation of a sponge	---	Attendance, Lab report
3	Cell culture	---	Attendance, Lab report
4	Cell seeding	---	Attendance, Lab report
5	Cell proliferation	---	Attendance, Lab report

8. Course Policy

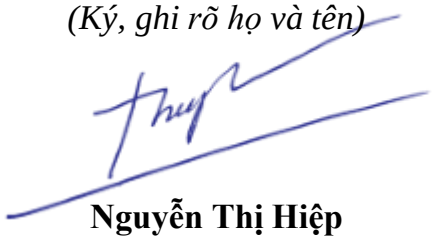
Student responsibility: Students are expected to spend at least 8 hours per week for self studying. This time should be made up of reading, working on exercises and problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Nguyen Thi Hiep
   - Email: nthiep@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM085IU - Characterization and Properties of Biomaterials (Đặc tính và tính chất của vật liệu sinh học)

1. General Information
   - Course Title:
     + Vietnamese:Đặc tính và tính chất của vật liệu sinh học
     + English: Characterization and Properties of Biomaterials
   - Course ID: BM085IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This is a course for students majoring in biological materials. It equips students with the knowledge of how to determine the required properties and characteristics of biomaterials. Case studies and specific applications will be investigated. According to the specific damages to be repaired, the biomaterials must be fabricated to match the required properties and characteristics.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	This course introduces the characterization and properties of biomaterials in general and focuses on some specific applications.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Student can able to fabricate a scaffold which its properties satisfy to a specific organ using differential methods (Program outcome: k).	I, T, U
G1.2	Student can choose a mechanical measurement for specific application (Program outcome: k).	I, T, U
G1.3	Student learns the structural morphology for specific fabricated methods (Program outcome: b,l,i).	I, T, U

G1.4	Student learns cell culture for specific cell types (Program outcome: l,m).	I, T, U
G1.5	Determining cell types in order to culture cell on scaffolds for specific application (Program outcome: l,m).	I, T, U
G1.6	Understanding anti-microbial test for biomaterials, hemocompatible test,.. (Program outcome: l,m).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Courseintroduction	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Characterizationand Properties of Biomaterials for heart and artery applications	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Characterizationand Properties of Biomaterials for lung applications	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Characterizationand Properties of Biomaterials for skin applications	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Characterizationand Properties of Biomaterials for eyes applications	G1, G2	Lecture, discussion	Homework
6	Chapter 6: Characterizationand Properties of Biomaterials for kidney applications	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: Characterizationand Properties of Biomaterials for boneapplications	G1, G2	Lecture, discussion	Homework

8	Chapter 8: Characterizationand Properties of Biomaterials for cartilage,ligaments applications	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: Characterizationand Properties of Biomaterials for intestinesapplications	G1, G2	Lecture, discussion	Homework
10	Chapter 10: Characterizationand Properties of Biomaterials for stomach applications	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Cell culture with differentcell types	---	Attendance, Lab report
2	Measure scaffold strengthusing tensile strength, compressive strength	---	Attendance, Lab report
3	Measure and analyze swelling, water absorption	---	Attendance, Lab report
4	Do anti-microbial tests, hemocompatible test	---	Attendance, Lab report

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Thi Hiep
- Email: nthiep@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM086IU - Methods and Process in Fabrication of Scaffold (Phương pháp và qui trình xây dựng scaffold).

1. General Information
   - Course Title:
     + Vietnamese:Phương pháp và qui trình xây dựng scaffold
     + English: Methods and Process in Fabrication of Scaffold
   - Course ID: BM086IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: None
   - Parallel Courses:
2. Course Description

This course will introduce students to some common methods to fabricate the biomaterials that are used worldwide. During the course, students will create their own new materials according to their purposes.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	This course will teach and allow students to practise methods and processes to create scaffolds. Students will understand methods for fabricating a scaffold	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understanding morphology of each methods and its application in tissue regeneration (Program outcome: k).	I, T, U
G1.2	Ability to operate machines (electrospining, freeze dryer,...) (Program outcome: a).	I, T, U
G1.3	Ability to combine methods for a complex scaffold. (Program outcome: b).	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			

A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Introduction in general	G1, G2	Lecture, discussion	Homework
2	Chapter 2: Electrospining method	G1, G2	Lecture, discussion	Quiz
3	Chapter 3: Hydrogel method	G1, G2	Lecture, discussion	Homework
4	Chapter 4: Water/oil/water, micelle method	G1, G2	Lecture, discussion	Quiz
5	Chapter 5: Sponge replica method	G1, G2	Lecture, discussion	Homework
6	Chapter 6: soil-gel method	G1, G2	Lecture, discussion	Quiz
7	Chapter 7: salt/gas leaching method	G1, G2	Lecture, discussion	Homework
8	Chapter 8: Extrusion method	G1, G2	Lecture, discussion	Quiz
9	Chapter 9: printing 3-D method	G1, G2	Lecture, discussion	Homework
10	Chapter 10: slurry/ evaporation method	G1, G2	Lecture, discussion	Quiz

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Read articles	---	Attendance, Lab report
2	Submit proposal	---	Attendance, Lab report
3	Approval proposal	---	Attendance, Lab report
4	Making scaffold	---	Attendance, Lab report

8. Course Policy

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 problem and

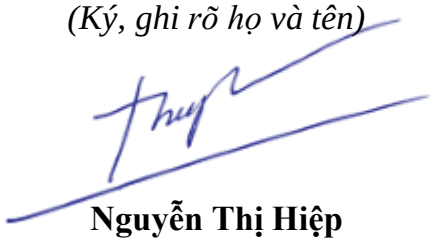
group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination. Missed tests: Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Nguyen Thi Hiep
   - Email: nthiep@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM092IU - Cell/Tissue – Biomaterial interaction (Tương tác sinh học mô/tế bào)

1. General Information
   - Course Title:
     + Vietnamese:Tương tác sinh học mô/tế bào
     + English: Cell/Tissue – Biomaterial interaction
   - Course ID: BM092IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biology/ Biology for BME/ Edusoft: None
   - Parallel Courses:
2. Course Description

A crucial concept to understand about the tissue-biomaterial interface is that a lot of things happen there. The environment inside the body is chemically, electrically, and mechanically active, and the interface between an implanted biomaterial and the body is the location of a variety of dynamic biochemical processes and reactions. This course will introduce students to the molecular level events that happen at the tissue-implant interface, explore selected biological and physiological consequences of these events, methods to characterize interaction between cell/tissue and materials and specifically, design novel biomaterial that truly integrate with the body's natural tissues.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	An ability to describe molecular events happen at cell/tissue-material interface as well as biological and physiological consequences after implantation	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Apply techniques to characterize cell/tissue-material interaction	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Design novel biomaterials that truly integrate with body's natural tissues	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(A) An ability to apply knowledge of mathematics, science, and engineering to solve biomedical engineering problems	I, T, U

G1.2	(B) An ability to design and conduct experiments, as well as to analyze and interpret biomedical and health data	I, T, U
G1.3	(C) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	I, T, U
G1.4	(E) An ability to identify, formulate, and solve biomedical engineering problems	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Chapter 1: Molecular events at the interface of cell/tissue-implants	G1, G2	in class	A1.1
2	Chapter 1: Cont.	G1, G2	in class	A1.2
3	Chapter 2: Biological and physiological consequences after implantation	G2, G3	in class	A1.1
4	Chapter 2: Cont.	G2, G3	in class	A1.2
5	Chapter 3: Techniques to characterize protein/cell/tissue-material interaction	G3, G4	in class	A1.1
6	Chapter 3: Cont.	G3, G4	in class	A1.2
7	Chapter 3: Cont.	G3, G4	in class	A1.2
8	Chapter 4: Engineering biomaterials' surface	G1, G3	in class	A1.1
9	Chapter 4: Cont.	G1, G3	in class	A1.2
	Midterm exam			A2.1
10	Chapter 5: Biocompatibility	G2, G4	in class	A1.1
11	Chapter 5: Cont.	G2, G4	in class	A1.2

12	Chapter 5: Cont.	G2, G4	in class	A1.2
13	Chapter 6: Control of cellular behaviors on biomaterial	G1, G4	in class	A1.1
14	Chapter 6: Cont.	G1, G4	in class	A1.2
15	Chapter 6: Cont.	G1, G4	in class	A1.2
	Final exam			A3.2

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	Overview of medical laboratory	G1, G2	B1.1
2	Visit of medical laboratory in hospital	G1, G2	B1.1
3	Visit of physician office laboratory	G1, G2	B1.1
4	Blood collection, fractionation	G1, G2	B1.1
5	Microscopic observation of blood cells	G1, G2	B1.1
6	Case Study	G1, G2	B1.1
7	Lab Report	G1, G2	B1.2
8	Final Examination		B1.3

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Huynh Chan Khon
- Email: hckhon@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM093IU - Tissue engineering I (Kỹ thuật mô 1)

1. General Information
   - Course Title:
     + Vietnamese:Kỹ thuật mô 1
     + English: Tissue engineering I
   - Course ID: BM093IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biology/ Biology for BME/ edusoft: none
   - Parallel Courses:
2. Course Description

Tissue engineering encompasses several disciplinary fields of knowledge to enable the regeneration of malfunctioning tissues or even whole organs. There are three main components in tissue engineering: scaffolds, cells, and signal. This course is the first part of the 2-semester course on Tissue engineering which introduces students to the basic knowledge of those three main components of tissue engineering. The following course (Tissue engineering II) will focus on the clinical applications.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Ability to discuss challenges in Tissue Engineering and propose potential solutions to overcome	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

	those challenges		
G2	Be able to describe the basis of growth and differentiation, cellular interactions and activities for tissue formation	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Apply modern techniques in solving problems in Tissue Engineering, in growing functional tissue under in vitro and in vivo conditions	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Presenting and defending opinions on ideas, information, experimental results…	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	(A) An ability to apply knowledge of mathematics, science, and engineering to solve biomedical engineering problems	I, T, U
G1.2	(B) An ability to design and conduct experiments, as well as to analyze and interpret biomedical and health data	I, T, U
G1.3	(C) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	I, T, U
G1.4	(E) An ability to identify, formulate, and solve biomedical engineering problems	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment

1	Chapter 1: Challenges in imitating Nature/Tissue Engineering	G1, G2	in class	A1.1
2	Chapter 2: The basis of growth and differentiation	G2, G3	in class	A1.1 A1.2
3	Chapter 2: Cont.	G2, G3	in class	A1.1 A1.3
4	Chapter 3: In vitro synthesis of tissue and organ	G1, G3	in class	A1.1 A1.2
5	Chapter 3: Cont.	G1, G3	in class	A1.1 A1.3
6	Chapter 4: In vivo synthesis of tissue and organ	G2,G3	in class	A1.1
7	Chapter 4: Cont.	G2,G3	in class	A1.1 A1.3
8	Chapter 5: Gene therapy	G1, G2	in class	A1.1
9	Chapter 5: Cont.	G1, G2	in class	A1.1 A1.3
	Midterm exam			A2.1
10	Chapter 6: Application of stem cell in Tissue Engineering and Regenerative Medicine	G2, G4	in class	A1.1
11	Chapter 6: Cont.	G2, G4	in class	A1.1 A1.3
12	Chapter 6: Cont.	G2, G4	in class	A1.1 A1.2
13	Chapter 7: Protein engineering in Tissue Engineering	G1, G4	in class	A1.1
14	Chapter 7: Cont.	G1, G4	in class	A1.1 A1.3
15	Chapter 7: Cont.	G1, G4	in class	A1.1 A1.2
	Final exam			A3.2

Laboratory

Week /Class	Content	Learning outcomes	Assessment
1	Overview of tissue engineering	G2, G3	B1.1
2	Microscope Observation: Cell growth and division	G2, G3	B1.1
3	Cell culture	G2, G3	B1.1
4	Cell culture (Cont.)	G2, G3	B1.1
5	Western Blotting	G2, G3	B1.1
6	PCR	G2, G3	B1.1
7	Lab Report	G2, G3	B1.2
8	Final Examination		B1.3

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

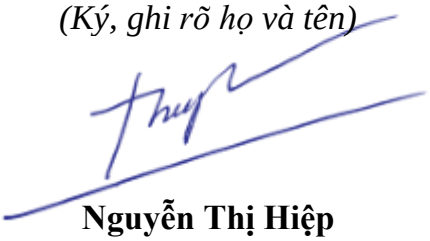
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Huynh Chan Khon
- Email: hckhon@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM094IU - Principle of clinical tests and instrumentation (Nguyên lý và thiết bị xét nghiệm lâm sàng)

1. General Information
   - Course Title:
     + Vietnamese:Nguyên lý và thiết bị xét nghiệm lâm sàng
     + English: Principle of clinical tests and instrumentation
   - Course ID: BM094IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: Biology/ Biology for BME*Edusoft: none
   - Parallel Courses:
2. Course Description

The laboratory plays a crucial role in healthcare because it provides physicians and other health professionals with information to: (1) detect disease or predisposition to disease; (2) confirm or reject a diagnosis; (3) establish prognosis; (4) guide patient management; and (5) monitor efficacy of therapy. Therefore, a fundamental understanding of the principles of laboratory tests and instrumentation used in clinical laboratories is essential. This course will provide students an overview of medical laboratory, principle of a wide range of analytical tests and instrumentations ranging from haematology to molecular pathology.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understanding of laboratory tests used in clinical diagnosis	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G2	Get familiar with clinical laboratory instrumentation as related to Biomedical engineering and future career needs.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %

Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Clinical laboratory	G1, G2	in class	A1.1
2	Pre-analysis: sample collection, transport, and processing	G1, G2	in class	A1.1 A1.3
3	Pre-analysis (Cont.)	G1, G2	in class	A1.1 A1.2
4	Principle of instrumentation	G1, G2	in class	A1.1
5	Principle of instrumentation	G1, G2	in class	A1.1 A1.3
6	Clinical laboratory automation, point-of-care and physician office laboratories	G1, G2	in class	A1.1
7	Haematology	G1, G2	in class	A1.1 A1.3
8	Haematology (Cont.)	G1, G2	in class	A1.1 A1.2
9	Haemostasis and Thrombosis	G1, G2	in class	A1.1 A1.3
	Midterm exam			A2.1
10	Clinical chemistry	G1, G2	in class	A1.1
11	Clinical microbiology	G1, G2	in class	A1.1 A1.3
12	Clinical microbiology (Cont.)	G1, G2	in class	A1.1 A1.2
13	Immunology, Immunopathology	G1, G2	in class	A1.1
14	Molecular pathology	G1, G2	in class	A1.1 A1.3
15	Molecular pathology (cont.)	G1, G2	in class	A1.1 A1.2
	Final exam			A3.2

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	Overview of medical laboratory	G1, G2	B1.1
2	Visit of medical laboratory in hospital	G1, G2	B1.1
3	Visit of physician office laboratory	G1, G2	B1.1
4	Blood collection, fractionation	G1, G2	B1.1
5	Microscopic observation of blood cells	G1, G2	B1.1
6	Case Study	G1, G2	B1.1
7	Lab Report	G1, G2	B1.2
8	Final Examination		B1.3

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Huynh Chan Khon
- Email: hckhon@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

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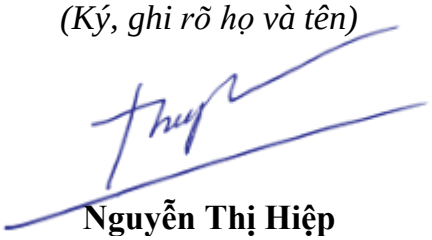


Nguyễn Thị Hiệp

BM012IU - Engineering Challenges in Medicine II (Thách thức kỹ thuật trong Y khoa 2).

1. General Information
   - Course Title:
     + Vietnamese:Thách thức kỹ thuật trong Y khoa 2
     + English: Engineering Challenges in Medicine II
   - Course ID: BM012IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 3
     + Lecture: 3
     + Laboratory : 0
   - Prerequisites: BM011IU - Engineering Challenges in Medicine I
   - Parallel Courses:
2. Course Description

Engineering Challenges in Medicine (ECM) exposes students to technical issues encountered by physicians in hospitals that prevent them to advance in medical diagnosis and treatment. In this course, physician instructors will demonstrate pathophysiology, advantages and disadvantages of current medical management of common diseases, and ask students to propose their own solutions to overcome these challenges. ECM II covers the value of a diagnostic test, interpretation of basic laboratory tests and common diseases of the respiratory, renal, digestive, endocrinal systems, and cancers.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials:

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	ECM II aims to familiarize students with medical management for cancers and common diseases of the respiratory, renal, digestive, endocrinal systems so that students can develop skills to identify medical challenges and propose their own solutions for innovation or creation.	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Explain and illustrate pathophysiology of some common diseases (a, l)	I, T, U

G1.2	Interpret some common lab test results (m) in some common diseases	I, T, U
G1.3	Assess the value of a diagnostic test using its sensitivity and specificity (a, l, m, e)	I, T, U
G1.4	Identify and analyze pros and cons in medical diagnosis, treatment and prevention of common diseases (e, m)	I, T, U
G1.5	Address common challenges in medical management and suggest solutions (a, l, m, e)	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homeworks	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction: Overview of medicine and the role of biomedical engineering in medical management; Treatment	G1, G2	Lecture, discussion	Homework
2	Infectious Diseases: Tuberculosis and Antibiotic resistance; Dengue Fever and Malaria; Hepatitis	G1, G2	Lecture, discussion	Quiz
3	Digestive Disease: Helicobacter Pylori and Peptic Ulcer; Appendicitis, Gallbladder Stone and Laparoscopy	G1, G2	Lecture, discussion	Homework
4	Prevention: Preventive medicine and Vaccines	G1, G2	Lecture, discussion	Quiz

8. Course Policy

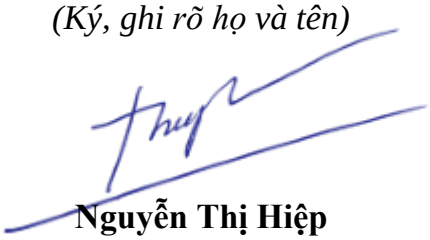
Student responsibility: Students are expected to spend at least 8 hours per week for self studying. This time should be made up of reading, working on exercises and problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that students attend at 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 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.)

9. Course Coordinator/Lecturer
   - School/Department: Biomedical Engineering
   - CourseCoordinator/Lecturer: Dao Thi Thanh Binh
   - Email: binh.daothanh@gmail.com

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM095IU - Medical Instrumentation (Thiết bị ye tế)

1. General Information

- Course Title:
  - Vietnamese: *Thiết bị Y tế*
  - English: *Medical Instrumentation*
- Course ID: BM095IU
- Course level: ☒ Undergrad ☐ Master ☐ Both
- Course type: ☐ General ☐ Fundamental ☐ Specialization (required) ☒ Specialization (elective) ☐ Project/Internship/Thesis ☐ Others: ……..
- Number of credits: 4
  - Lecture: 3
  - Laboratory: 1
- Prerequisites: Principles of EE 1, Biosignal Processing
- Parallel Courses: Nil
- Course it replaces: Nil
- Course standing in curriculum: Technical elective

2. Course Description

This course covers the basic and advanced principles, concepts, and operations of medical sensors and devices. The origin and nature of measurable physiological signals are studied, including chemical, electrochemical, optical, and electromagnetic signals. The principles and devices to make the measurements, including design of electronic instrumentation, will be rigorously presented. This will be followed by realistic design and experimentation with amplifiers for biopotential measurements. There are laboratories session to give students hands on experience with electronic components, sensors, and biopotential measurements. The final part of this course will cover emerging frontiers of cellular and molecular instrumentation.

3. Textbooks and Other Required Materials

Textbooks:

1. Webster, Medical Instrumentation Application and Design, Wiley, 4th edition, 2009
2. Khandpur, Biomedical Instrumentation, McGraw Hill, 2005

Reference Materials:

1. Schreiner, Bronzino, Peterson, Medical Instruments and Devices: Principles and Practices, CRC Press, 1st Edition, 2015
2. Dubin, Rapid Interpretation of EKGs, Cover Publishing, 2000

4. Course Goals

- Learn several signals that can be measured from the human body. Specific examples include temperature, electrical, and pressure signals.
- Understand how noise from the environment, instruments and other physiologic systems can create artifacts in instrumentation and be able to design components to condition the signals.
- Understand theory and design on signal conditioning (wheatstone bridges;

amplifiers, filters). Design filters necessary to condition and isolate a signal. Understand how signals are converted from analogue to digital and stored in a computer or presented on an output display.

- Review the cardiac, respiratory and muscular physiological systems... Study the designs of several instruments used to acquire signals from living systems. Integrate information learned about biomedical signals, sensors and instrumentation design.
- Digital Filters. Understand principles of digital filter design and applied to signals used in laboratory sessions.

5. Learning Outcome

Learning outcome codes	Course learning outcome descriptions	Program Learning outcomes after ABET
G1	Describe the origin of biopotentials and explain the role of biopotential electrodes	(a)
G2	Design and operate biopotential amplifiers	(a)
G3	Inspect common biomedical signals and distinguish characteristic features	(b,c)
G4	Identify common signal artifacts, their sources and formulate strategies for their suppression	(a,e)
G5	Outline the design of some medical devices, eg. cardiac pacemakers, neurostimulators and defibrillators	(a,e,d)
G6	Explain and contrast measurement principles for blood flow, pressue and volume as well as respiratory variables...	(e,k)
G7	Define and discuss biochemical sensors	
G8	Identify, explain and judge patient safety issues related to biomedical instrumentation	

ABET learning outcomes:

a. an ability to apply knowledge of mathematics, science, and engineering

b. an ability to design and conduct experiments, as well as to analyze and interpret data

c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. an ability to function on multidisciplinary teams

e. an ability to identify, formulate, and solve engineering problems

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

6. Course Assessment

Assessment component	Assessment form	Percentage %
Lecture		
A1. Process assessment	A1.1 Quiz	10%

	A1.2 Homework	20%
A2. Midterm assessment	A2.1 Mid-term Exam	30%
A3. Final assessment	A3.1 Final exam	40%
Laboratory		
B1. Process assessment	B1.1 Participations	10%
	B1.2 Lab report	60%
B2. Final assessment	B2.1 Final exam	30%

7. Course Outline

Lecture:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Fundamentals of medical instrumentation	G1	in class	A1.1
2	Bioelectronic Signals and Electrodes	G1	in class	A1.1 A1.2
3	Physiological Transducers	G1	in class	A1.1 A1.2
4	Recording Systems	G1	in class	A1.1 A1.2
5	Patient Monitoring Systems	G2, G3	in class	A1.1 A1.2
6	Arrhythmia and Ambulatory Monitoring Instruments	G2, G3	in class	A1.1 A1.2
7	Fetal Monitoring Instruments	G2, G3	in class	A1.1 A1.2
8	Biomedical Telemetry and Telemedicine	G2, G3	in class	A1.1 A1.2
	Midterm exam			A2.1
9	Oximeters + Blood Flowmeters			
10	Pulmonary Function Analyzers	G2, G3	in class	A1.1 A1.2
11	Clinical Laboratory Instruments + Blood Gas Analyzers + Blood Cell Counters	G7	in class	A1.1 A1.2
12	Laser Applications in Biomedical Field	G5, G6	in class	A1.1 A1.2
13	Ophthalmic Imaging Systems	G5, G6	in class	A1.1 A1.2
14	Haemodialysis Machines	G5, G6	in class	A1.1 A1.2
15	Patient Safety	G8	in class	A1.1 A1.2
	Final exam			A3.1

Laboratory

Week/ Class	Content	Learning outcomes	Assessment
1	ECG Lab 1	G4, G5, G6	B1.1, B1.2
2	ECG Lab 2	G4, G5, G6	B1.1, B1.2
3	PPG/SpO2 Lab 1	G4, G5, G6	B1.1, B1.2
4	PPG/SpO2 Lab 2	G4, G5, G6	B1.1, B1.2
5	Project – day 1	G4, G5, G6	B1.1, B1.2
6	Project – day 2	G4, G5, G6	B1.1, B1.2
7	Project – day 3	G4, G5, G6	B1.1, B1.2
8	Project presentation	G4, G5, G6	B2.1

8. Course Policy

- 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 problem and group assignment.
- Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- Course Coordinator/Lecturer: Le Ngoc Bich
- Email: lnbich@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)

Nguyễn Thị Hiệp

BM100IU - Principles of Neuroengineering (Nguyên Lý Kỹ Thuật Thần Kinh).

1. General Information
   - Course Title:
     + Vietnamese:Nguyên Lý Kỹ Thuật Thần Kinh
     + English: Principles of Neuroengineering
   - Course ID: BM100IU
   - Course type:
     - ☐ General
     - ☐ Fundamental
     - ☑ Specialization
     - ☐ Others
     - ☐ Skills
     - ☐ Project/Internship/Thesis
   - Number of credits: 4
     + Lecture: 3
     + Laboratory : 1
   - Prerequisites: AE1, Biology for BME, Human Anatomy and Physiology
   - Parallel Courses: Biosignal Processing
2. Course Description

Covers how to innovate technologies for brain analysis and engineering, for accelerating the basic understanding of the brain, and leading to new therapeutic insight and inventions. Focuses on using physical, chemical and biological principles to understand technology design criteria governing ability to observe and alter brain structure and function. Topics include optogenetics, noninvasive brain imaging and stimulation, nanotechnologies, stem cells and tissue engineering, and advanced molecular and structural imaging technologies. Design projects by students.

3. Textbooks and Other Required Materials

Textbooks:

Reference Materials: Lecturer will provide references based on each specific topic.

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand the essential theory and principles of neuroengineering, design for neural technology	(1),(2)	3.0-4.0
G2	Compile, present and defense a research proposal in the field of Neural engineering.	(3),(6)	3.0-4.0
G3	Synthesize information related to a Neural engineering topic, present them and lead a discussions related to that topic.	(4), (5)	3.0-4.0

Note: The Program Outcomes

(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;

(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;

(3) an ability to communicate effectively with a range of audiences;

(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	Understand the essential theory and principles of neuroengineering, design for neural technology	I, T, U
G2.1	Recognize ethical and professional responsibilities in neural engineering.	I, T, U
G3.1	Compile, present and defense a research proposal in the field of Neural engineering.	I, T, U
G4.1	Synthesize information related to a Neural engineering topic, present them and lead a discussions related to that topic.	I, T, U

Note: I (Introduce), T (Teach), U (Utilize)

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Participation	15	10%
	Paper discussion	1	15%
A2. Midterm assessment	Midterm exam	1	15%
A3. Final assessment	Final Exam	1	40%
	Written proposal and presentation	1	20%
Laboratory			
B1. Process assessment	Participation	8	60%
	Lab report	8	40%

7. Course Outline

Lecture:

Week/Class	Content	Learning outcomes	Teaching and learning activities	Assessment

1	Overview of the class. Introductions. Circuit elements of the nervous system. Neurons, glia, blood vessels. Channels, receptors. Genes and cell types.	G1	Lecture, discussion	Homework
2	Modalities of signaling, ionic, gap junctional, ephaptic, synaptic/chemical, second messenger, diffusible, gaseous. Analog electrical signaling. New mechanisms. In-vitro systems for molecular/cellular neuroscience. State-of-the art of neuronal cell culture technology; Slices on a chip; patch clamp chips; multi-electrode array.	G1	Lecture, discussion	Quiz
3	Macroscopic circuits and microscopy circuits. How these past conclusions were influenced by past technologies, and what is unknown or uncertain.	G1, G2	Lecture, discussion	Homework
4	Paper discussion: minibrain-on-a-chip a novel tool to expedite understanding of human neuronal activity	G3	Lecture, discussion	Quiz
5	Noninvasive mapping and measurement. PET, photoacoustic, MEG, EEG, fMRI, infrared imaging, x-rays. Physical principles of noninvasive brain interfacing.	G1, G2	Lecture, discussion	Homework
6	Invasive mapping and measurement. Electrodes, nanoprobes, nanoparticles, optical imaging and optical microscopy, endoscopy, multiphoton microscopy, light scattering, bioluminescence, electron microscopy.	G1, G2	Lecture, discussion	Quiz
7	Application of genetic tools in diagnosing, mapping and measuring the nervous system	G1, G2	Lecture, discussion	Homework

8	Paper discussions – cutting-edge and low-cost tools for mapping and measurement.	G3	Lecture, discussion	Quiz
Midterm exam				
9	Macrocircuit control. Magnetic, electrical, ultrasonic, chemical, pharmacological/pharmacogenetic, thermal.	G1, G2	Lecture, discussion	Homework
10	Microcircuit control. DBS, infrared optical stimulation, optogenetics, nanoparticle-mediated control, uncaging, signaling control.	G1, G2	Lecture, discussion	Quiz
11	Circuit assembly. Development, 3-D brain building, tissue engineering, stem cells, gene therapy and viral/transgenic technologies, extracellular matrix.	G1, G2	Lecture, discussion	Homework
12	Paper discussion: cutting-edge and low-cost tools for controlling and constructing a nervous system	G3	Lecture, discussion	Quiz
13	Building blocks of future tools I. Barcoding, quantum-measurement nanoparticles, DNA origami, robotics, nanorobots, automation of neuroscience, splicing, mechanosensation, immune cells, prions, newborn neurons, post-transcriptional/translational modification.	G1, G2	Lecture, discussion	Homework
14	Principles of designing future tools. Top-down vs. bottom-up design approaches, architecting tools, interdisciplinary collaboration principles, tools for science vs. tools for the clinic, "blind spots" in technology development.	G1, G2	Lecture, discussion	Quiz
15	Proposal presentation and demo	G2, G3	Discussion	Presentation

Laboratory

Week/Class	Content	Learning outcomes	Assessment
1	Sensory systems: standard assessment	G1,G2	Attendance, Lab report

2	Reverse engineering a cochlear implant Modeling cochlear implant design and signal processing	G1,G2	Attendance, Lab report
3	Recording neuronal activity at the cellular level Interpreting and analyzing cellular neuronal activity: pClamp based analysis	G1,G2	Attendance, Lab report
4	Whole brain structural imaging: MRI, CT and X-ray system (Field Trip to Medics lab)	G1,G2	Attendance, Lab report
5	Analyzing MRI and fMRI data for brain diseases diagnosis	G1,G2	Attendance, Lab report
6	EEG recording – wired systems: Alice5 and Biosemi	G1,G2	Attendance, Lab report
7	EEG recording wireless system: EPOC+, WEEG EEG analysis	G1,G2	Attendance, Lab report
8	fNIRS: device design, signal collection and analysis	G2,G2	Attendance, Lab report

Guidelines:

- *Paper Presentation and Discussion:* Teams of 1-2 students will be assigned a set of 2-3 papers to present on a particular class day (using slides and whiteboard) for in-class discussion. 2-3 days before the presentation day, you will need to create a discussion post on our class MIRO page to initiate discussion about your topic.
- *Guidelines for Paper Presentation:* Use the following format to structure your presentation:
  - Introduction and background: First few slides should discuss the problem being addressed by the paper and prior work on the topic;
  - Methods: Describe the methods used for experiments and analysis of data;
  - Results: Present the results reported by the authors, e.g., by going over figures/tables (for longer papers, you do not need to go over every figure/table -- pick results you think are the most interesting);
  - Summary/Conclusion and Discussion of Strengths/Weaknesses/Future Work: Summarize the contributions of the paper, assess its strengths/weaknesses, and speculate on how the results could be extended/improved.
  - Feel free to copy and paste into your presentation figures from either the online version of the paper or from the PDF file (as a last resort, use PrntScr or screengrab). You can also use figures from the web or other papers with proper attribution.
- *Discussion Board:* Before each class involving paper discussion, students must read the assigned papers and should post to the MIRO page of our class their opinions,questions, and brief critical analyses of the assigned papers. Students are also encouraged to respond to critical analyses or questions of other students that are alreadyposted on the board.

- *Lab report:* After each or a few of the sessions, you will be required to write up a lab report. Students will work in group of 2-3 for the lab sessions.
- *Final Proposal:* There will be a final proposal which will involve applying the principles and technologies in class to address a neuronal disorder or condition.Students will need to submit both the written proposal and defense it in front of class. This is an individual assignment.

8. Course Policy

- Attendance and participation: Be on time, focus and actively participate during class time. Regular on-time attendance in this course is expected. It is compulsory that students attend at least 90 % of the course to be eligible for the final presentation. If you show up more than 5 minutes late, your attendance of that class is not counted. Youwill get full score for your participation only if you contribute to discussions during class.
- No late submission of any class assignment is allowed. If you submit your assignment late, it will not be graded and will be considered as "no submission", which is equal to zero grade for that assignment. Why? Because you need to develop a good task managing skill and a respect for deadline. If you have emergency situation, you can inform the lecturers about it and negotiate for a new deadline, but you will need to be really convincing and sincere.
- Pay close attention to and strictly follow all announcements and instructions of the teaching team. They can come via blackboard, email and facebook group, as well as directly from your lecturers and TAs.
- If you have questions or feedback, please do tell the teaching team. Maximize your learning efficiency by going to TA office hours and be very enaged during class and lab sessions.
- No plagiarism is allowed. If you copy information (more than a whole phrase in a sentence) from your classmates, from online source, from other papers without citing them, that is considered plagiarism. This is an unacceptable practice in our class and for your future career. Please use your own writing.
- 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 problem and group assignment.
- Missed tests: Students are not allowed to miss the final presentation. There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, may students re-take the tests.)

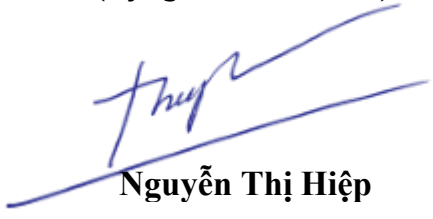
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Hà Thị Thanh Hương
- Email: htthuong@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM099IU - Stem Cell Technology (Công Nghệ Tế Bào Gốc)

1. General Information

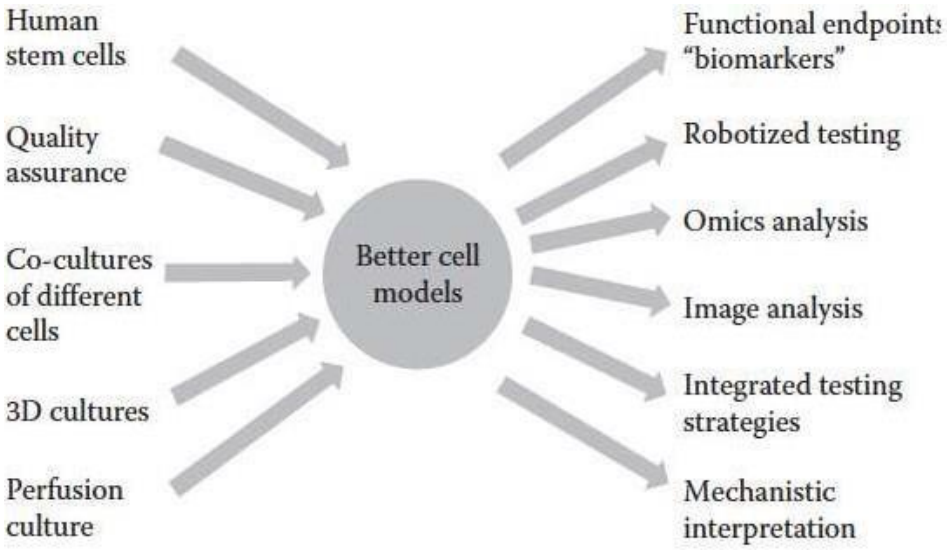
- Course title:
  + Vietnamese: Công Nghệ Tế Bào Gốc
  + English: Stem Cell Technology
- Course ID: BM099IU
- Course type:

☐	General	☐	Fundamental
☑	Specialization (required)	☒	Specialization (elective)
☐	Project/Internship/Thesis	☐	Others: ……..

- Number of credits: 4
  + Lecture: 3
  + Laboratory: 1
- Prerequisite: Biology for BME/ Edusoft : none

2. Course description

Stem cells, tissue engineering and regenerative medicine are fast moving fields with vastly transformative implications for the future of health care and capital markets. Stem cells, which located in many tissues and organs in human body, are presented as miracle cells that can do anything. When administered to a patient with some serious diseases they will rebuild the damaged tissues and make the patient recover and live longevity. Understanding of stem cell characteristics, intrinsic regulations, and functions helps generating novel therapies for many acute and chronic diseases as well as developing the new strategies for tissue engineering. This course will focus on the science of stem cells to explore the characteristics, functions, pathologies, and applications of stem cells in tissue engineering and regenerative medicine.



3. Textbooks and References

1. Jonathan M. W. Slack. 2018. The Science of Stem Cells. John Wiley & Sons,

Inc. ISBN 9781119235231
2. Sean V. Murphy and Anthony Atala. 2017. Regenerative Medicine Technology - On-a-Chip Applications for Disease Modeling, Drug Discovery and Personalized Medicine. CRC Press (Taylor & Francis Group). ISBN 9781498711913
3. Federico Calegari and Claudia Waskow. 2014. STEM CELLS - From Basic Research to Therapy. CRC Press (Taylor & Francis Group). ISBN 978-1-4822-1984-5
4. Gustav_Steinho. 2016. Regenerative Medicine – from Protocol to Patient. Third edition, Springer. ISBN 978-3-319-27610-6

4. Course goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Understand stem cell biology and the important regulation factors on stem cells	(1), (6), (7)	3.0 - 3.5
G2	Understanding stem cells for applying in Tissue engineering and Regenerative medicine	(1), (6), (7)	3.0 - 3.5
G3	Be able to discuss about the challenges in Stem cell aplications and propose potential solutions to overcome those challenges	(1), (6), (7)	3.0 - 3.5
G4	Apply modern techniques and analyze the results in stem cell isolation, culture, and differentiation.	(1), (6), (7)	3.0 - 3.5

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	I,T,U
G1.2	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	I,T,U
G1.3	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	I,T,U

5. Course assessment

Assessment component	Assessment form	Percentage %
Lecture		
A1. Process assessment	A1.1 Participations	10%
	A1.2 Assignments or Presentations	20%
A2. Midterm assessment	A2.1 Mid-term Exam	30%
A3. Final assessment	A3.1 Final exam	40%

Laboratory		
B1. Process assessment	B1.1. Participations	30%
	B1.2. Lab report	35%
B2. Final assessment	B2.1 Final examination	35%

6. Course outline

a. LECTURE:

Week/ Class	Content	Learning outcomes	Teaching and learning activities	Assessment
1	Introduction to Stem cell Technology	G1, G2, G3, G4	in class	A1.1 A1.2
2	Isolation and Classification of Stem Cells	G1, G2, G3, G4	in class	A1.1 A1.2
3	Isolation and Classification of Stem Cells (Cont.)	G1, G2, G3, G4	in class	A1.1 A1.2
4	Characterization of Stem Cells	G1, G2, G3, G4	in class	A1.1 A1.2
5	Imaging and Tracking Stem Cells	G1, G2, G3, G4	in class	A1.1 A1.2
6	Immunomodulation of Stem Cells	G1, G2, G3, G4	in class	A1.1 A1.2
7	Two-Dimensional vs. Three-Dimensional Stem Cell Culture	G1, G2, G3, G4	in class	A1.1 A1.2
8	Stem Cell Division and Differentiation	G1, G2, G3, G4	in class	A1.1 A1.2
9	Biomaterial as Stem Cell Niche	G1, G2, G3, G4	in class	A1.1 A1.2
	Midterm exam			A2.1
10	Stem Cells in wound healing	G1, G2, G3, G4	in class	A1.1 A1.2
11	Stem Cells for transplantation	G1, G2, G3, G4	in class	A1.1 A1.2
12	Stem Cells: On-a-chip for Disease Models	G1, G2, G3, G4	in class	A1.1 A1.2
13	Stem Cells for Drug Development	G1, G2, G3, G4	in class	A1.1 A1.2
14	Personalized Medicine	G1, G2, G3, G4	in class	A1.1 A1.2
15	Stem Cell Banking	G1, G2, G3, G4	in class	A1.1 A1.2
	Final exam			A3.1

b. LABORATORY

Week/Class	Content	Learning outcomes	Assessment
1	Overview of stem cells	G1, G2, G3, G4	B1.1
2	Material preparation	G1, G2, G3, G4	B1.1
3	Demo for stem cell isolation	G1, G2, G3, G4	B1.1
4	Oil red O Staining for Adipogenic differentiation	G1, G2, G3, G4	B1.2
5	Absorbance measurements for quatifying the adipogenic differentiation	G1, G2, G3, G4	B1.1
6	Stem cell wound healing model in vitro	G1, G2, G3, G4	B1.1
7	Analyze the results of the wound healing model in vitro	G1, G2, G3, G4	B1.2
8	Final Examination	G1, G2, G3, G4	B2.1

7. Course policy

- 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 problem and group assignment.
- Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

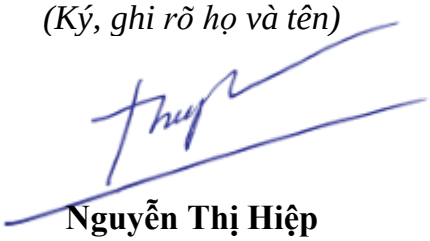
8. Course coordinator/lecturer:

- School of Biomedical Engineering
- Course Coordinator/Lecturer: Trịnh Như Thuỳ, Ph.D
- Email: tnthuy@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM103IU - Advanced Artificial Intelligence for Healthcare (Trí tuệ nhân tạo nâng cao trong y tế)

1. General Information

- Course Title:
  + Vietnamese:Trí tuệ nhân tạo nâng cao trong y tế
  + English: Advanced Artificial Intelligence for Healthcare
- Course ID: BM103IU
- Course type:
  - ☐ General
  - ☐ Fundamental
  - ☑ Specialization
  - ☐ Others
  - ☐ Skills
  - ☐ Project/Internship/Thesis
- Number of credits: 4
  + Lecture: 3
  + Laboratory: 1
- Prerequisites: AI in healthcare
- Parallel Courses: Biosignal Processing

2. Course Description

This course provides AI fundamental algorithms such as random forest, decision tree, support vector machine (SVM), boosting, Adaboost, XGBoost, artificial neural network (ANN), convolutional neural network, recurrent neural network. The real signal processing problems applied in healthcare are introduced such as applying SVM or randomforest, ANN to predict the EEG, blood pressure, or heart rate. This course also introduces the computer vision problems that can apply in healthcare such as segmentation, and object detection. There are lab activities in which students work on programing to build practical schemes.

3. Textbooks and Other Required Materials

Textbooks:

[5] Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, The MIT Press, 2016 (free online: http://www.deeplearningbook.org/)

[6] Hands-on Machine Learning with Scikit-Learn & Tensorflow, Aurelien Geron, O'Reilly, 2017.

[7] Information Technologies in Biomedicine, Ewa Pietka, Jacek Kawa, Springer 2008

Reference Materials:

- Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, The MIT Press, 2016 (free online: http://www.deeplearningbook.org/)
- Hands-on Machine Learning with Scikit-Learn & Tensorflow, Aurelien Geron, O'Reilly, 2017.
- Information Technologies in Biomedicine, Ewa Pietka, Jacek Kawa, Springer 2008

4. Course Goals

Goals(Gx)	Descriptions	Program Outcomes	Level of Competence
G1	Recognizing problems that can apply AI	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

G2	Have ability to formulate the problems	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G3	Analyzing and solve the problems using AI tools	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G4	Recognizing a normal biomedical signal and sectional medical images	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0
G5	Evaluating the impacts and limitations of different schemes	(1),(2),(3),(4),(5),(6),(7)	3.0-4.0

5. Course Learning Outcome (CLOs)

CLOs code (Gx.x)	CLOs Descriptions	Teaching Modes
G1.1	an ability to apply mathematics and AI tools to solve biomedical engineering problems	I, T, U
G1.2	an ability to design and conduct experiments, to analyze and interpret biomedical and health data, as well as to clean data to apply AI	I, T, U
G1.3	an ability to identify, formulate, and solve biomedical engineering problems	I, T, U
G1.4	a knowledge of contemporary issues related to health and biomedical engineering	I, T, U

6. Course Assessment

Assessment component	Assessment form	Frequency	Percentage %
Lecture			
A1. Process assessment	Quiz	2	10%
	Homework	2	10%
A2. Midterm assessment	Midterm exam	1	20-40%
A3. Final assessment	Final Exam	1	20-40%
	Project report	1	40-60%
Laboratory			
B1. Process assessment	Attendance	7	20%
	Lab report	7	30%
B2. Final assessment	Final Exam	1	50%

7. Course Outline

Lectures:

Week/ Class	Subject/Chapter	Content
1	Introduction	Course introduction
2	Linear algebra	Matrix multiplication Statistic models

3	Machine Learning (ML): Decision Tree ML: Random forest	Decision Tree algorithm Build a decision tree with sklearn.tree.DecisionTreeClassifier, sklearn.tree.DecisionTreeRegressor Applying decision tree classifying the ECG signal. Random forest algorithm Build a random forest with sklearn.ensemble.RandomForestClassifier. Applying random forest in classifying the activities measured from a sensor to predict blood pressure level.
4	ML: Support vector machine (SVM)	Linear SVM, Hard-margin, Soft-margin, Nonlinear SVM, SVM kernel SVM regression Building SVM with sklearn.svm.SVM Applying SVM in classifying the activities measured from a sensor to predict depressed patients.
5	ML: Support vector machine (SVM) (cont.)	Linear SVM, Hard-margin, Soft-margin, Nonlinear SVM, SVM kernel SVM regression Building SVM with sklearn.svm.SVM Applying SVM in classifying the activities measured from a sensor to predict depressed patients.
6	ML: Boosting, Adaboost	Boosting: Introduction, Algorithms, Classification Adaboost (Adaptive boosting) Building Adaboost with sklearn.ensemble.AdaboostClassifier Applying Adaboost in classifying the Alzheimer patients and controls.
7	ML: XGBoost	XGBoost: Algorithm Bayesian reasoning Applying Adaboost in classifying the EEG signal of schizophrenia patients.
Midterm exam		
8	Fieldtrip	Go to A2DS Inc., VinAI, or Robert Bosch Vietnam
9	Artificial Neural Network (ANN)	ANN Activation functions Backpropagation, update rules Loss function, optimizers Gradient descent, Stochastic gradient descent GridsearchCV Building an ANN for applying in classifying heart rate of subjects.

10	Convolutional Neural Network (CNN)	Convolution operation Pooling Flattening Fully connected layer Softmax Cross-entropy CNN Architectures: AlexNet, VGG, GoogLeNet, ResNet, etc Building a CNN for classifying skin diseases.
11	Recurrent Neural Network (RNN)	Recurrent Neural Networks: standard RNN, LSTM, GRU RNN applications Building a RNN for applying in predicting the activity of depressed patients.
12	CNN in Segmentation	CNN Architectures: FCN, SegNet, Unet, RelayNet, etc Applying the segmentation networks to segment the retinal blood vessel in fundus images.
13	Object Detection	Single Shot MiltiBox Detector (SSD) Multi-box concept Predict object position Scale problem Building object detection with SSD YOLO Applying YOLO to detect lung diseases in chest x-ray images.
14	Object Detection (cont.)	Single Shot MiltiBox Detector (SSD) Multi-box concept Predict object position Scale problem Building object detection with SSD Fast-RCNN Applying Fast-RCNN to detect lung diseases in chest x-ray images.
15	Visualizing and Understanding Feature	Visualizing and Understanding Feature
Final exam		

Laboratory

Week/ Class	**Subject/Chapter**	**Content**
1	Lab 1	Lab 1: Intro to Python (Numpy, Tensorflow, Keras, Sklearn, Pandas)
2	Lab 2	Lab 2: Intro to Python (Numpy, Tensorflow,

		Keras, Sklearn, Pandas)
3	Lab 3	Lab 3: Random Forest, Decision Tree, SVM, XGB for ECG, EEG signal classification
4	Lab 4	Lab 4: ANN, CNNs for ECG, EEG signal classification
5	Lab 5	Lab 5: CNNs for biomedical image segmentation
6	Lab 6	Lab 6: Object detection in biomedical images
7	Lab 7	Group project
8	Lab 8	Group project

8. Course Policy

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 problem and group assignment. Attendance: Regular on-time attendance in this course is expected. It is compulsory that 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 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.)

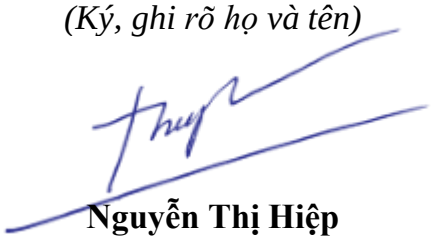
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Ngo Thi Lua
- Email: ntlua@hcmiu.edu.vn

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

BM104IU - Microfluidics (Vi luru)

1. General Information
   - Course Title:
   - Vietnamese: Vi luru
   - English: Microfluidics
   - Course ID: BM104IU
   - Course type:
     ☐ General ☐ Fundamental
     ☑ Specialization ☐ Others
     ☐ Skills ☐ Project/Internship/Thesis
   - Number of credits: 4 (3,1)
     + Lecture: 3
     + Laboratory: 1
   - Prerequisites: Mechanical design and manufacturing processes in BME (BM101IU)
   - Parallel Courses:
2. Course Description

Microfluidics is both the science which studies the behavior of fluids through microchannels, and the technology of manufacturing microminiaturized devices containing chambers and tunnels through which fluids flow or are confined. Microfluidics deal with very small volumes of fluids (10-9 to 10-18 L), using channels with dimensions from several to hundreds of micrometers, which can be expanded even to millimeters. The key concept related to microfluidics is to integrate in a simple micro-sized system operations that commonly solicits a whole laboratory. This multidisciplinary field embraces research in physics, chemistry, medicine, engineering, materials science, and biology supporting the design of various microfluidic devices (known as Lab-on-a-chip/Organ-on-a-chip devices for (portable)diagnostics, drug related studies such as disease modeling, drug discovery, and drug delivery, as well as regenerative medicine and tissue engineering. In this course, student will be introduced to: (1) Microfluidics (its definition and scientific aspects), (2) Fluid dynamic Theory to understand fluid behaviors at microscopic scale (3) Various microfarication techniques with focus on low-cost, simple techniques for microfluidics (4) Design of microfluidic devices for common biological/biomedical applications..

3. Textbooks and Other Required Materials

-Textbook: Fundamentals And Applications of Microfluidics, 3rd Edition (Integrated Microsystems) by Nam-Trung Nguyen (ISBN-13: 978-1-63081-364-2)
-Class notes
-Recommended reading materials given by instructor(s)

4. Course Goals:

- Understanding microfluidics, fluid behaviors at microscopic scale.
- Get familiar with the fabrication process to make the microfluidic device and applications of microfluidic devices in biomedical field

5. Course Learning Outcome (CLOs)

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

6. Course Assessment
   - One midterm exam: 25%
   - One final exam: 25%
   - Lab reports + Interview: 25%
   - Attendance + learning attitude: 5%
   - Presentation: 20%

7. Course Outline

Week	Title	Descriptions	Instructor
1	Introduction to microfluidics	Overview of microfluidics Advantages of microfluidics Relationships among MEMS, Nanotechnology, and Microfluidics Scientific aspects	Dr. HCKhon
2,3	Fluid Mechanics at small Scales	Scaling law Surface tension Laminar flow / Low Reynolds number flow Peclet number	Dr. NTQua
4,5	Computer aid designs (CAD) and Computational Fluid dynamic (CFD)	Design the microfluidic device using autocad Simulation the fluid flow in the microfluidic channel using Comsol software	Dr. NTQua
6,7	Fabrication method	Overview of methods Photolithography Micromachining for hard materials Soft-lithography, micromolding 3D printing Materials for microfluidics	Dr. NTQua
8	Soft-lithography	Soft-lithography procedure Low-cost alternatives	Dr. HCKhon
9,10	Control Fluid Flow in Microfludic Devices	External Flow Internal Flow: Micro pumps, Microvalves, Micromixing	Dr. NTQua, Dr. HCKhon
11,12	Point of care diagnostics	Lab-on-a-chip system Detecting and sensing device	Dr. NTQua, Dr. HCKhon
13,14	Organ-on-a-chip	Cells and molecular biology Biomedical and clinical	Dr. HCKhon
15	Student presentation		Dr. NTQua, Dr. HCKhon

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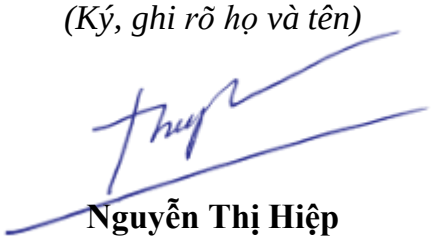
9. Course Coordinator/Lecturer

- School/Department: Biomedical Engineering
- CourseCoordinator/Lecturer: Nguyen Thanh Qua, Huynh Chan Khon
- **Email: ntqua@hcmiu.edu.vn, hckhon@hcmiu.edu.vn,**

Tp. Hồ Chí Minh, ngày 31 tháng 8 năm 2023

TRƯỞNG KHOA

(Ký, ghi rõ họ và tên)



Nguyễn Thị Hiệp

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 3:
BẢNG MÔ TẢ SỐ TÍN CHỈ THỰC TẬP CỦA CTĐT ĐƯỢC THỂ HIỆN CỤ THỂ THEO MÔN HỌC ĐỂ ĐẢM BẢO 8TC THỰC TẬP THEO QUY ĐỊNH TẠI THÔNG TƯ 17/2021/TT-BGDĐT

(Kèm theo Quyết định số 1033/QĐ-ĐHQT ngày 30 tháng 8 năm 2023 của Hiệu trưởng trường Đại học Quốc tế)

STT	Mã môn học	Tên môn học		Tín chỉ	Nhóm môn học
		Tiếng Việt	Tiếng Anh		
1	BM050IU	Thực hành 1: Kỹ thuật đảo ngược	Practice 1: Reverse Engineering	1	Thực tập, khóa luận/luận văn tốt nghiệp
2	BM067IU	Thực hành 2: Tế bào động vật và vi sinh vật	Practice 2: Animal Cells and Microbiologies	1	Thực tập, khóa luận/luận văn tốt nghiệp
3	BM052IU	Thực hành 3: Thiết kế mạch điện	Practice 3: Electronic Design	1	Thực tập, khóa luận/luận văn tốt nghiệp
4	BM017IU	Thiết kế y tế	Medical Design	1	Thực tập, khóa luận/luận văn tốt nghiệp
5	BM069IU	Đồ án 2	Project 2	1	Thực tập, khóa luận/luận văn tốt nghiệp
6	BM020IU	Thực tập	Internship	3	Thực tập, khóa luận/luận văn tốt nghiệp
		Tổng		**8**	