

GE1320: ENGINEERING YOUR HEALTH

Effective Term

Semester B 2022/23

Part I Course Overview

Course Title

Engineering Your Health

Subject Code

GE - Gateway Education

Course Number

1320

Academic Unit

Biomedical Engineering (BME)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

GE Area (Primary)

Area 3 - Science and Technology

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course will introduce topics about recent advances that are closely related to healthcare and wellness, which have been extremely helpful for improving the quality of life of human beings. The course contents include living systems, personal health and healthcare delivery in relation to basic concepts and tools of science and engineering as best suited to students' individual interests. Specific examples will be used to illustrate how these basic concepts can be utilized to help understand, evaluate and restore functions of human body. The course is suitable for students from all majors, and will broaden their horizon in recognition of science and engineering knowledge for maintaining a healthy life style. This course aims to present an overview of the field in applying basic science and engineering knowledge to find ways to improve the quality of life of human beings, such as efficient diseases detection, prevention and treatment with novel methods. Students will learn about biotechnology fundamentals, basic human body working principles, and knowledge about healthcare and wellness. The primary objective is to help student understand the human body and healthcare issues that are closely related to basic concepts and tools of science and engineering, and to broaden their horizon in recognition and appreciation of science and engineering knowledge for maintaining a healthy life style.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)		
1	Describe the basic working principles of major system in human body, and explain healthcare related problems, especially those multidisciplinary areas involving engineering, biotechnology and medicine.		x	
2	Explain the engineering systems in biomedical area that reflects scientific and technological progress in healthcare industry.		x	
3	Evaluate the professional, ethical and social responsibilities related to issues in biomedical engineering practice.		x	
4	Identify potential problems and novel solutions to promote human health.	x		x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Health fundamentals	Lectures: Describe important functions of the human body and explain the reasons of related diseases and healthcare problems.	1, 2, 3	9
2	From science and engineering to healthcare	Lectures: Illustrate the application of basic principles of science and engineering to study human body and to understand the basic operation of instruments currently used for medical therapies.	1, 2, 3	9
3	Design project (team work)	Group research project: Students will be grouped to conduct team-based research projects on topics related to healthcare industry (project starts in week 9, with the project requirements provided by the instructor).	1, 2, 3, 4	To be conducted with TLA 5.
4	Professional and ethical education	Lectures: Use examples to explain the different ethical issues that are relevant to the biomedical field. The legal, technological, social, and commercial aspects will be covered.	3	3
5	Communication	Presentation and discussion: Document through a written report and an oral presentation of an overview project performed as part of a team.	1, 2, 3, 4	6
6	Tutorial	Recap and expand the materials taught in lectures.	1, 2, 3, 4	1 hr/week

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	In-class Quizzes (individual)	1, 2, 3	30	3-4 quizzes over the semester.

2	Group Project and Report	3, 4	40	Group work with report submission and presentation.
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Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

1.5

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained

Assessment Rubrics (AR)**Assessment Task**

1.In-class Quizzes (individual)

Criterion

Ability to understand and explain key concepts in healthcare related systems.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2.Group Project and Report

Criterion

Ability to think out of the box and develop novel engineering systems for healthcare applications.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Examination

Criterion

Ability to understand and explain key concepts in healthcare related systems.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- Healthcare and wellness
- Engineering and Science
- Biomedical Engineering
- Quality of life
- Living systems
- Personal health
- Disease
- Bio-safety and security
- Ethical and social responsibility in healthcare

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	W. Mark Saltzman, Biomedical Engineering: Bridging Medicine and Technology, Cambridge University Press, 2009. (http://books.google.com.hk/books?id=4b4Mxsiw9gIC&hl=zh-TW&source=gbs_book_other_versions)
2	Rebecca Skloot, Henrietta Lacks' 'Immortal' Cells, New York : Crown Publishers, c2010. (RC265.6.L24 S55 2010)
3	John Denis Enderle, Joseph D. Bronzino, Susan M. Blanchard, Introduction to Biomedical Engineering, Academic Press, 2005. (http://books.google.com/books?id=_yV3DqIU-tkC&dq=isbn:0122386620)

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

4

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

2, 4

PILO 3: Demonstrate critical thinking skills

1

PILO 4: Interpret information and numerical data

1

PILO 5: Produce structured, well-organised and fluent text

3

PILO 6: Demonstrate effective oral communication skills

3

PILO 7: Demonstrate an ability to work effectively in a team

3

PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues

4

PILO 9: Value ethical and socially responsible actions

2

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

4

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

Group project including in-class presentation and written report.