BME2105: INTRODUCTION TO BIOMEDICAL ENGINEERING

Effective Term
Semester B 2022/23

Part I Course Overview

Course Title
Introduction to Biomedical Engineering

Subject Code
BME - Biomedical Engineering
Course Number
2105

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
MBE2105 Introduction to Biomedical Engineering

Exclusive Courses
Nil

Part II Course Details

Abstract

This course aims to present a broad but rigorous overview of the field of biomedical engineering to undergraduate students in this major. The course will focus on the common theme of engineering analysis and design of biological systems. Students will learn about biotechnology fundamentals, basic human physiology, and knowledge of healthcare and wellness, with an emphasis on engineering and problem solving approaches.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Introduce basic concepts of biomedical engineering and their connection with the spectrum of human activity.		x		
2	Describe the basic working principles of different systems in human body and the healthcare related problems.			x	
3	Explain engineering systems in biomedical area by introducing appropriate scientific, technological and managemental elements in healthcare related practices/industries.			x	
4	Evaluate the professional, ethical and social responsibilities related to issues in biomedical engineering.		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	Lecture	Explain key concepts related biomedical engineering.	1, 2, 3, 4	3 hrs/week
2	Tutorial	Recap and expand the materials taught in lectures. Guiding homework will be provided for students to complete the group project.	1, 2, 3, 4	1 hr/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Midterm Test	1, 2, 3, 4	30	
2	Group Project	2, 3, 4	30	
3	Assignment	1, 2, 3	10	

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

2

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. Midterm Test

Criterion

Ability to explain in details and with accuracy about the important concepts and theory of different biomedical engineering system.

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

Criterion

Ability to utilize the materials taught in lectures to analyze and develop a novel biomedical engineering system.

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. Assignment

Criterion
Ability to explain in details and with accuracy about the important concepts and theory of different biomedical engineering system.

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
4. Examination

Criterion
Ability to explain in details and with accuracy about the important concepts and theory of different biomedical engineering system.

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

- Bioengineering
- Biomedical Engineering
- Biomaterials
- Cell and Tissue Engineering
- Biomechanics
- Biomedical Imaging
- Artificial Organs
- Genetic Engineering
- Biological Systems
- Healthcare Industry
- Medical Device Management
- Professional Ethics for Biomedical Engineer

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	W. Mark Saltzman. Biomedical Engineering: Bridging Medicine and Technology. Part of Cambridge Texts in Biomedical Engineering. Publication Date: June 29, 2009.
2	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).