

BME3102: HUMAN QUANTITATIVE PHYSIOLOGY

Effective Term

Semester B 2023/24

Part I Course Overview

Course Title

Human Quantitative Physiology

Subject Code

BME - Biomedical Engineering

Course Number

3102

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

Relevant Courses in Math, Biology, Organic Chemistry

Precursors

Nil

Equivalent Courses

MBE3102 Human Quantitative Physiology

Exclusive Courses

Nil

Part II Course Details

Abstract

To develop an understanding of the physiology of the major systems of the human body from both a biological and a quantitative perspective through an engineering approach based on mathematical models and analysis.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the basic physiology of the major systems of the human body.	x	x	
2	Apply engineering approach to analyze and model vital functions of human body quantitatively.		x	x
3	Establish an engineering perspective to solve physiological problems.			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	Introduction of key concepts of the basic physiology of the major systems of the human body and engineering approach to analyze and solve physiological problems.	1, 2, 3	3 hrs/week

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Assignments	1, 2, 3	20	Each student is required to submit an individual solution for each assignment. Students are encouraged to discuss the homework assignments, but the submitted solutions must reflect individual effort.
2	Mid-term Test	1, 2, 3	40	1 hour

Continuous Assessment (%)

60

Examination (%)

40

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. Assignments

Criterion

Describe the concepts and principles and provide solutions to related analytical problems.

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. Mid-term Test

Criterion

Capability of applying the concepts introduced in lectures for analysis of results from biomedical measurements.

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

Capability of applying the concepts introduced in lectures for analysis of results from biomedical measurements.

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

- Human Physiology
- Quantitative Analysis
- Biological Modelling
- Biological Systems
- Nervous System
- Renal System
- Circulatory System
- Respiratory System
- Human Anatomy
- Quantitative Analysis

Reading List

Compulsory Readings

Title	
1	W.F. Boron and E.L. Boulpaep, “Medical Physiology” , Elsevier, 2004, ISBN: 1416023283.
2	J. Keener and J. Sneyd, “Mathematical Physiology” , Springer, 1998, ISBN: 0387983813.

Additional Readings

Title	
1	P. Nelson, “Biological Physics” , Freeman and Company, 2004, ISBN: 0716743728.