BME3102: HUMAN QUANTITATIVE PHYSIOLOGY

Effective Term
Semester A 2025/26

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 Biomedicine (BD)

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
Nil

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	Demonstrate a mindset in 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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Students will develop an understanding 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 ("-" for nil entry)	Allow Use of GenAI?
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.	Yes
2	Mid-term Test	1, 2, 3	40	1 hour	No

Continuous Assessment (%)
60

Examination (%)
40

Examination Duration (Hours)
2

Minimum Continuous Assessment Passing Requirement (%)
30

Minimum Examination Passing Requirement (%)
30

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.