BME8009: RESEARCH METHODOLOGY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Research Methodology

Subject Code
BME - Biomedical Engineering
Course Number
8009

Academic Unit
Biomedical Engineering (BME)

College/School
College of Biomedicine (BD)

Course Duration
Non-standard Duration

Other Course Duration
To be completed normally in 1 academic year or 2 semesters

Credit Units
0-2

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
MBE8009 Research Methodology

Exclusive Courses
BME8002M Research Seminar

Part II Course Details

Abstract

This course aims to provide MPhil/PhD students with

a. the fundamental elements of research methodology which include problem definition, literature review, quantitative and qualitative methods, research tools and research reporting;

b. formal forums for the research students to

- broaden their knowledge and expertise;
- present their research findings and discuss their learning experiences with their peers and academic staff; and
- develop a strong research mindset and scholarship.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Discuss the fundamentals of research methodology and tools		x		
2	Formulate a research framework for the selected MPhil/PhD research topic		x	x	
3	Critique relevant literature relating to the selected MPhil/PhD research topic		x	x	
4	Apply the research methodology and tools in the development of the research proposal			x	x
5	Communicate with fellow peers regarding their own or others' research findings and experience scholarly and logically.			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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Class Participation	Class activities are made up of lectures and research seminars from other students.	1, 2, 3, 4	39 hours (total)

2	Groupwork	Group work is used as a platform for reflective and interactive learning among the students and instructors or research supervisors. Activities include presentation, group discussion and critique of fellow students' research design and methodology in general and their thesis proposals development in particular. Each student is required to submit a portfolio (as defined each semester) of brief write-ups and reflections of the research seminars attended and presented.	2, 3, 4	12 hours (total)
3	Research Seminars	Each student is required to attend a minimum of 12 hours of seminars; each student is also required to present at least once the research progress or results to peers and faculty in class.	3, 4, 5	22 hours (total)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Continuous Assessment	1, 2, 3, 4, 5	100	-	No

Continuous Assessment (%)

100

Examination (%)

0

Additional Information for ATs

The portfolio is a collection of critiques and reflections of the research seminars attended. Students are also encouraged to include documented evidence of his/her learning from the lectures and groupwork in the portfolio.

Assessment Rubrics (AR)

Assessment Task

Tests (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Evidence of an understanding of the fundamentals of various research topics/subjects that are broadly related to biomedical engineering and techniques that are relevant to solve problems to provide creative solutions.

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
Groupwork (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Evidence of reflective and interactive learning among the students in a group setting. Quality of presentation, group discussion, and critique of fellow students' research design and methodology in general. Quality of the submitted portfolio of brief write-ups and reflections of the research seminars attended.

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
Research Seminar (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Quality of presentation about the research progress or results, as presented to peers and faculty in class.

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
Tests (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Evidence of an understanding of the fundamentals of various research topics/subjects that are broadly related to biomedical engineering and techniques that are relevant to solve problems to provide creative solutions.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Groupwork (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Evidence of reflective and interactive learning among the students in a group setting. Quality of presentation, group discussion, and critique of fellow students' research design and methodology in general. Quality of the submitted portfolio of brief write-ups and reflections of the research seminars attended.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Research Seminar (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Quality of presentation about the research progress or results, as presented to peers and faculty in class.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Literature search, research design, research methodology, quantitative and qualitative methods, research writing and presentation, research seminars

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Experimental Methods for Engineers, McGraw-Hill Series in Mechanical Engineering, 8th Edition, Jack Holman.
2	Professional and Technical Writing/Presentations, Wikibooks: https://en.wikibooks.org/wiki/Professional_and_Technical_Writing/Presentations.
3	Online Resources: Online learning material is provided via the University computer network.