BME8125: MICRO SYSTEMS TECHNOLOGY

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Micro Systems Technology

Subject Code
BME - Biomedical Engineering
Course Number
8125

Academic Unit
Biomedical Engineering (BME)

College/School
College of Biomedicine (BD)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
MBE6005/BME6005 Micro Systems Technology

Exclusive Courses
Nil

Part II Course Details

Abstract
The aim of the course is to introduce the state-of-the-art knowledge of micro systems technologies for modern manufacturing. It will enable students to understand the basic principles and develop skills in the areas of micro

manufacturing, micro-electronic-mechanical systems (MEMS), sensors and actuators, micro electronics such as VLSI (very-large-scale-integration) and semiconductor manufacturing.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify the basic principles of micro systems technology and micro manufacturing.		x	x	
2	Apply micro manufacturing process for MEMS and sensor and actuator technologies.			x	x
3	Design a micro systems relating to basic mechanics and micro electronics of VLSI (very-large-scale-integration).			x	x
4	Investigate modern manufacturing and related business.			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	Introduction of key concepts	1, 2, 3, 4	2 hours/week for 11 weeks
2	Tutorial	Sample questions and case studies related to the assignments	1, 2, 3, 4	1 hour/week for 11 weeks
3	Mini-project	Mini-project covering various topics on micro systems technology and micro manufacturing	1, 2, 3, 4	3 hours/week for 2 weeks

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignment (2)	1, 2, 3, 4	50	
2	Mini-project Report (one per group)	1, 2, 3, 4	30	
3	Mini-project Presentation (one per group)	1, 2, 3, 4	20	

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

Assignment (2) (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

ABILITY to EXPLAIN in details and with the acquired engineering methods for ANALYZING and DESIGNING laboratory procedures for micro system 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

Mini-project Report (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

CAPACITY for SELF-DIRECTED LEARNING to COMPARE existing methods and DEVELOP new designs for micro system 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
Mini-project Presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
ABILITY to REPORT the literature survey and EVALUATE the result of different approaches

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
Assignment (2) (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
ABILITY to EXPLAIN in details and with the acquired engineering methods for ANALYZING and DESIGNING laboratory procedures for micro system applications

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Mini-project Report (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
CAPACITY for SELF-DIRECTED LEARNING to COMPARE existing methods and DEVELOP new designs for micro system applications

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Mini-project Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
ABILITY to REPORT the literature survey and EVALUATE the result of different approaches

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
N.A.

Reading List

Compulsory Readings

	Title
1	N.A.

Additional Readings

	Title
1	Crystal Fire: The Birth of the Information Age, W W Norton & Co Inc, 1998 Michael Riordan and Lillian Hoddeson ISBN-10: 0393318516 ISBN-13: 978-0393318517
2	Liu, C., Foundations of MEMS (2nd Edition), Prentice Hall, 2011 ISBN-10: 0132497360
3	Microchip Manufacturing Stanley Wolf Lattice Press (www.latticepress.com) ISBN 0-9616721-8-8
4	Understanding Fabless IC Technology Jeorge Hurtarte Evert Wolsheimer Lisa Tafoya, Fabless Semiconductor Association Elsevier