MNE8117: MICRO SYSTEMS TECHNOLOGY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Micro Systems Technology

Subject Code
MNE - Mechanical Engineering
Course Number
8117

Academic Unit
Mechanical Engineering (MNE)

College/School
College of Engineering (EG)

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
MNE6005 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 ("-" for nil entry)	Allow Use of GenAI?
1	Assignment (2)	1, 2, 3, 4	50	-	No
2	Mini-project Report (one per group)	1, 2, 3, 4	20	-	No

3	Mini-project Presentation (one per group)	1, 2, 3, 4	30	-	Yes

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) Moderate

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) Moderate

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) Moderate

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),ISNB 0-9616721-8-8
4	Understanding Fabless IC Technology, Jeorge Hurtarte, Evert Wolsheimer, Lisa Tafoya, Fabless Semiconductor Association, Elsevier