

MNE8117: MICRO SYSTEMS TECHNOLOGY

Effective Term

Semester B 2024/25

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 DEC-A1 app.)		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) 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

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Assessment Task

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

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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, George Hurtarte, Evert Wolsheimer, Lisa Tafoya, Fabless Semiconductor Association, Elsevier