22MEHO301	PRECISION ENGINEERING					
PREREQUISITES		**CATEGORY**	**L**	**T**	**P**	**C**
		PE	**3**	**0**	**0**	**3**

COURSE OBJECTIVES:

1. Explain the need and progress of precision engineering.
2. To know about the principle and working of different methods of precision machining.
3. To understand about micromachining.
4. To know about Laser devices and machine vision.
5. To understand about SEM and 3D surface topography.

UNIT I	INTRODUCTION	9	0	0	9

Introduction to Precision Engineering, Need for precision manufacturing, Four Classes of Achievable Machining Accuracy – Normal, Precision, High-precision, Ultra precision Processes and Nanotechnology

UNIT II	PRECISION MACHINING	9	0	0	9

Overview of Micro- and Nano- machining, Conventional micro machining techniques - micro turning, micro-milling, micro-grinding, Ultra-precision diamond turning, SPDT Single point diamond turning.

UNIT III	MICRO MACHINING	9	0	0	9

Micro electrical discharge machining, Photochemical machining, Electro chemical micromachining, Laser beam micromachining, Electron beam micromachining, Focused Ion Beam micromachining, etc

UNIT IV	LASER AND OPTICS	9	0	0	9

Micro electrical discharge machining, Photochemical machining, Electro chemical micromachining, Laser beam micromachining, Electron beam micromachining, Focused Ion Beam micromachining.

UNIT V	MEASUREMENT AND CHARACTERISATION	9	0	0	9

Measurement of Typical Nanofeatures, Surface metrology - 3D surface topography - Need, Measurement – Chromatic confocal Microscopy, Interferometry, Non-optical Scanning Microscopy – Scanning electron Microscopes, Scanning probe microscopes, Parameters for characterizing 3D surface topography.

TOTAL (45L): 45 PERIODS

TEXT BOOKS:

1. Jain, V.K., Introduction to micromachining, Narosa publishers, 2018
2. Venktesh V.C., Sudin Izman, Precision Engineering, Tata Mc.Graw Hill Publishing Company, New Delhi 2007.

REFERENCES:

1. David Dornfeld, Dae-Eun Lee, Precision Manufacturing, Springer, 2008
2. Kevin Harding, "Handbook of Optical Dimensional Metrology, Series: Series in Optics and optoelectronics", Taylor & Francis, 2013
3. Murty, R.L., Precision Engineering in Manufacturing, New Age publishers, 2005.

COURSE OUTCOMES: Upon completion of this course, the students will be able to:		**Bloom Taxonomy Mapped**
CO1	Impart knowledge progress of precision engineering	Understand
CO2	Identify principle and working of different methods of precision machining	Understand
CO3	Apply knowledge on micromachining	Apply
CO4	Define the uses of Laser devices and machine visi	Remember
CO5	To handle SEM .	Apply

COURSE ARTICULATION MATRIX

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	0	1	0	0	1	0	0	0	0	2	1	2	2
CO2	1	3	1	1	0	0	1	0	0	0	0	2	0	1	1
CO3	3	3	1	1	2	0	1	0	0	0	0	3	0	1	3
CO4	3	2	1	2	2	0	1	0	0	0	0	3	2	1	3
CO5	2	3	0	3	1	0	1	0	0	0	0	3	0	1	2
Avg	**2.2**	**2.6**	**0.6**	**1.6**	**1.0**	**0.0**	**1.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.6**	**0.6**	**1.2**	**2.2**

3/2/1 – indicates strength of correlation (3 – high, 2- medium, 1- low)