MANUFACTURING METHODS IN PRECESSION ENGINEERING

CourseCode		**Year**		**Semester**	
Course Category	HONORS	**Branch**	ME	**Course Type**	Theory
Credits	3	**L – T – P**	3 – 0 – 0	**Prerequisites**	Production Technology, Metal Cutting and Machine tools, Measurements and metrology
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	**Skill**	**BTL**	**Units**
CO1	Illustrate various precision manufacturing methods and documentation for precision equipment	Understand Communication	L2	1
CO2	Explain Various accuracies required in machines and errors in numerical positioning	Apply, Communication	L3	2
CO3	Apply standards and applications of Lasers in Precision measuring systems.	Apply, Communication	L3	3
CO4	Identify various in-process or In-situ process measurement and Optical features of measurement	Apply, Communication	L3	4
CO5	Select various Nano positioning systems and Servo positioning systems in Precision manufacturing.	Apply, Communication	L3	5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3										1	2	3	1
CO2	3	2								1	1	2	3	1
CO3	3	2			2	1	1			1	1	2	3	1
CO4	3	2	1			1	1			1	1	2	3	1
CO5	3	2	1		2	1	1			1	1	2	3	1

Syllabus

UNIT	**Contents**	**Mapped COs**
I	**Introduction to manufacturing and precision engineering:** Introduction to manufacturing process, precision engineering and conventional and unconventional machining process, micromachining, Precision machining and finishing operations. Methods of measurements during machining and during assembly **Assembly and tolerancing:** Documentation for manufacture of precision equipment	**CO1**
II	**Concepts of accuracy:** Introduction - concept of accuracy of machine tools, spindle and displacement accuracies, Accuracy of numerical	**CO2**

	control systems, Errors due to numerical interpolation, Displacement measurement system and velocity lags	
III	**Precision measuring systems**: Units of length, legal basis for length measurement, traceability, Processing system of nanometer, accuracies - LASER light source - LASER interferometer, LASER alignment telescope - LASER micrometer-on-line and in-process, measurements of diameter and surface roughness using LASER - Micro holes and topography measurements,	**CO3**
IV	**In processing or in situ measurement**: Introduction, In processing or in situ measurement of position of processing point-Post process and on-machine measurement of dimensional features and surface, mechanical and optical measuring systems.- Straightness and flatness measurement – Optoelectronic Measurement Systems in Metrology, Optoelectronic devices contact and noncontact types.	**CO4**
V	**Nano positioning systems for Nano accuracy & repeatability:** Guide systems for moving elements - Servo control systems for tool positioning, Computer aided digital and ultra-precision position control.	**CO5**

Learning Resources
Text books
1. M. V. Suryaprakash ,"Precision Engineering" Narosapublications. 2. V C Venkatesh ," Precision Engineering" McGRAW HILLPublications 3. HiromuNakazawa"Principlesofprecisionengineering"OxfordUniversityPress
ference books
1.Kalpakjian,"Manufacturingengineering&technology",Addison–Wesley,2ndEdition 2.Debitson A., "Hand book of precisionengineering" 3.J.A.McGeough,"Advancedmethodsofmachining",ChapmanandHall,London,1988 4.Jain V. K., "Introduction to micromachining", NarosaPublishers 5.G.Chryssolouris,"Lasermachining–theoryandpractice",SpringerVerlag,NewYork,1991