METROLOGY AND MACHINETOOLS

B. Tech .III Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
23ME504	Core	3	1	0	3	30	70	100
ContactClasses:48	TutorialClasses:16	Practical Classes: Nil				TotalClasses:64		

COURSEOVERVIEW:

Machine tool is fundamental subject for mechanical auto-mobile and aeronautical engineering branchs. The purpose of the course is to learn about the machine like lathe, shaping slotting, planning, drilling, grinding etc..

COURSEOBJECTIVE:

1. Acquire the knowledge of engineering metrology and its practice which is having increasing importance industry.
2. Specifically make the student to improve applications aspects in the measurements and control process of manufacture.
3. Impart the fundamental aspects the metal cutting principles and their applications in the studyingbehavior of various machining processes.
4. Train in knowing the fundamentals parts of various machine tools and their kinematic scheme.
5 .Discuss various principles of jigs and fixtures which will be used to hold and guide the work piece and Cutting tools in various machine tools

COURSEOUTCOME:

C01. Compare non-traditional machining classification, materials application in material removal process.

CO2: Summarize the principle and processes of abrasive jet machining

CO3: Understand the principles processes and application of thermal metal removal processes

CO4: Identify the principles, processes and application of EDM

CO5: Estimated machining times for machining operations on machine tools

SYLLABUS

UNIT-I

Metal cutting :Introduction elements of cutting process process-geometryofsingle Point tools .Chips formation types of chips. Engine lathe- principle of working, types of lathe, Specifications.Taperturning-latheattachmentscapstanandturretlathe-singlespindleandmulti-Spindle Automatic lathes –tool layouts.

UNIT–II

Drillingandboringmachines-principlesofworking,specifications;typesandoperations performed; twist drill. Types of boring machines and applications shaping, slotting and planning machines - principles of working machining calculations.

UNIT–III

Milling machines -principles of working - types of milling machines- geometry of milling cutters methods of index . grinding- theory of grinding - classification of grinding machines. Types of abrasives,bonds.Selectionofgrindingwheel.Lappinghoningandbroaching machines ,comparison and constructional features, machining time calculations

UNIT–IV

Limits,fitsandtolerances-typesoffits-unilateralandbilateraltolerancesystem,holeand shaft basis system . interchangeability and selective assembly.

LIMITGUAGES**:**Taylor'sprinciple,designofGOandNO-GOgauges,measurementof an Anglesusingbevelprotractorandsinebar.Measurementofflatnessusingstraightedges,Surface

UNIT–V

Surface roughness measurement :Roughness, waviness, CLA ,RMS ,RZ values .methods of measurement of surface finish, talysurf. Screw thread measurement, gear measurement; machine tool alignment test on lathe, milling and drilling machines. coordinate measuring machines: types of applications of CMM.

TEXTBOOKS:

1. Machine tool practices/Kibbe, JohneNeely,T.White,Rolando.Meyer/Person

2. Engineering Metrology/R.K.Jain/Khanna Publishers

REFERENCEBOOKS:

1.Principles of machine tools,Bhattacharyya A and Sen.G,C/New Central Book Agency.

2.Fundamentals of Dimensional metrology/Connie Dotson/Thomson.

3.Fundamentals of Metals Machining and Machine Tools/Geoffrey Booth royd / McGraw Hill.

4.PrinciplesofEngineeringmetrology/RegaRajendra/JaicoPublishers.

5.Metrologyandmeasurement/Be woor and Kulkarni/Tata McGraw Hill.