MANUFACTURING TECHNOLOGY

V Semester: ME

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AMEB16	**Core**	3	-	-	3	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

I. COURSE OVERVIEW:

Manufacturing Technology is an instructional program that prepares individuals to shape metal parts on machines such as lathes, grinders, drill presses, milling machines and shapers. This program includes instruction in safety, making computations related to work dimensions testing feeds and speeds of machines using precision measuring instruments. Metrology is highly valuable for the students and practitioners, specifically from mechanical and allied engineering stream. This course is designed to impart the knowledge about the various machining processes like turning, shaping, planning, drilling, milling and grinding and to develop measurement procedures, conduct metrological experiments.

II. OBJECTIVES:

The course should enable the students to:

I The fundamental concepts of the metal cutting principles to study the behavior of various machining processes.

II The importance of tool materials, cutting parameters, cutting fluids and tool wear mechanisms for optimized machining.

III The principles of linear and angular measuring instruments for accurate measurement of a given component.

IV The mechanics of machining process and optimization of various significant parameters in order to yield the optimum machining.

III. SYLLABUS:

After successful completion of the course, students should be able to:

CO 1 **Recognize** the importance of geometry of cutting tools, coolants and tool materials for the analysis of material behavior during manufacturing processes. — Remember

CO 2 **Explain** the operational principles of different lathe machines and various reciprocating machines for quality machining. — Understand

CO 3 **Explain** the working principles of Milling, drilling and surface grinding machines for manufacturing the components of their requirement. — Understand

CO 4 **Apply** the principles of limits, fits and tolerance while designing and manufacturing the components of their requirement. — Apply

CO 5 **Choose** an appropriate measuring instrument for accurate inspection of the dimensional and geometric features of a given component. — Apply

CO 6 **Apply** the various methods for the measurements of screw threads, surface roughness parameters and the working of optical measuring instruments. — Apply

IV. COURSE OUTCOMES:

MODULE-I	BASIC MECHANISM OF METAL CUTTING	Classes : 09

Elementary treatment of metal cutting theory, element of cutting process, geometry of single point tool and angles chip formation and types of chips, built up edge and its effects, chip breakers: Mechanics of orthogonal cutting, Merchant's force diagram, cutting forces, cutting speeds, feed, depth of cut, tool life, coolants, machinability, tool materials.

MODULE-II	MACHINE TOOL-I	Classes : 09

Engine lathe, Principle, specification, types, work and tool holding devices, Automatic lathes, classification: Single spindle and multi-spindle automatic lathes and its tool layouts; Shaping, slotting and planning machines, Principles of working, specification, operations performed, Kinematic scheme.

MODULE-III	MACHINE TOOLS-II	Classes: 09

Milling machine, classifications, specifications, working principles of milling machines; Geometry of milling cutters, methods of indexing , kinematic scheme of milling machines; Drilling and boring machines, principles of working, specifications, types, operations performed, twist drill; Kinematics scheme of the drilling and boring machines.

MODULE-IV	GEOMETRICAL DIMENSIONING AND TOLERANCES	Classes: 09

Systems of Limits and Fits: Introduction, normal size, tolerance limits, deviations, allowance, fits and their types, unilateral and bilateral tolerance system, hole and shaft basis systems, Interchangeability and selective assembly. Linear Measurement: Slip gauges, dial indicator, micrometers; Measurement of angles and tapers: Bevel protractor, angle slip gauges, spirit levels, and sine bar.

MODULE-V	MEASURING INSTRUMENTS	Classes : 09

Optical measuring instruments: Tool maker's microscope and its uses, collimators, optical projector, interferometer; Screw thread measurement: Element of measurement, errors in screw threads, measurement of effective diameter, angle of thread and thread pitch, profile thread gauges; Surface roughness measurement: Numerical assessment of surface finish: CLA, R.M.S Values, R_z values, methods of measurement of surface finish: profilograph, talysurf - ISI symbol for indication of surface finish.

Text Books:

1. Dr. R. Kesavan, Dr. R. Kesavan, "Machine Tools"Laxmi publications, 2nd Edition, 2016.
2. N. K Mehta, "Metal Cutting and Design of Cutting Tools, Jigs & Fixtures", McGraw-Hill Education, 1st Edition, 2014.
3. T.L. Chaudhary,"Metal Cutting and Mechanical Tool Engineering", Khanna Publishers, 5th Edition, 2001
4. R. K. Jain, "Engineering Metrology", Khanna Publishers, 21st Edition, 2013.

Reference Books:

1. B.L. Juneja, G.S. Sekhon, Nitin Seth "Fundamentals of Metal Cutting and Machine Tools ", New Age Publishers, 2nd Edition, 2014.
2. GeofreyBoothroyd, "Fundamentals of metal machining and machine tools", McGraw-Hill Education, 1st Edition, 2013.
3. S. Sirohi, H. C. Radha Krishna, "Mechanical Measurements", New Age Publishers, 3rd Edition, 2016.
4. M Mahajan "A Textbook of Metrology ", Dhanpatrai and Co ,2nd Edition, 2016.

Web References:

1. http://www.me.iitb.ac.in/~ramesh/courses/ME338/metrology1.pdf
2. http://www.mfg.mtu.edu/marc/primers/machtool/metrology.html3.
3. http://nptel.ac.in/courses/112106138.
4. https://en.wikipedia.org/wiki/Machine_tool.

E-Text Book:

1.http://www.faadooengineers.com/threads/8474-Engineering-Metrology-Measurements-ppt-ebook-pdf-
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2. http://www.yildiz.edu.tr/~meksi/index_dosyalar/MACHINE%20_TOOLS.pdf.