REFERENCE BOOKS
1. **"Process and Materials of Manufacturing"**, Roy A Lindberg, 4th Ed.Pearson Edu. 2006.
2. **"Manufacturing Technology"**, SeropeKalpakjian, Steuen. R. Sechmid,Pearson Education Asia, 5th Ed. 2006.
3. **"Principles of metal casting"**, Rechard W. Heine, Carl R. LoperJr., Philip C. Rosenthal, Tata McGraw Hill Education Private Limited Ed.1976.

MACHINE TOOLS AND OPERATIONS
B.E, III/IV Semester, Mechanical Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course Code	17ME35 B / 45B	CIE Marks	40
Number of Lecture Hours/Week	04	SEE Marks	60
Total Number of Lecture Hours	50(10 Hours per Module)	Exam Hours	03

Credits – 04

Course Objectives:

- **To introduce students to different machine tools in order to produce components having different shapes and sizes.**
- **To enrich the knowledge pertaining to relative motion and mechanics required for various machine tools.**
- **To develop the knowledge on mechanics of machining process and effect of various parameters on economics of machining.**

Module - 1

MACHINE TOOLS
Introduction, Classification, construction and specifications of lathe, drilling machine, milling machine, boring machine, broaching machine, shaping machine, planning machine, grinding machine [**Simple sketches showing major parts of the machines**]

Module - 2

MACHINING PROCESSES
Introduction, Types of motions in machining, turning and Boring, Shaping, Planning and Slotting, Thread cutting, Drilling and reaming, Milling, Broaching, Gear cutting and Grinding, Machining parameters and related quantities.
[Sketches pertaining to relative motions between tool and work piece only]

Module - 3

CUTTING TOOL MATERIALS, GEOMETRY AND SURFACE FINISH
Introduction, desirable Properties and Characteristics of cutting tool materials, cutting tool geometry, cutting fluids and its applications, surface finish, effect of machining parameters on surface finish.
Machining equations for cutting operations: Turning, Shaping, Planing, slab milling, cylindrical grinding and internal grinding, Numerical

Problems

Module - 4

MECHANICS OF MACHINING PROCESSES
Introduction, Chip formation, Orthogonal cutting, Merchants model for orthogonal cutting, Oblique cutting, Mechanics of turning process, Mechanics of drilling process, Mechanics of milling process, Numerical problems.

Module - 5

TOOL WEAR, TOOL LIFE: Introduction, tool wear mechanism, tool wear equations, tool life equations, effect of process parameters on tool life, machinability, Numerical problems

ECONOMICS OF MACHNING PROCESSES: Introduction, choice of feed, choice of cutting speed, tool life for minimum cost and minimum production time, machining at maximum efficiency, Numerical problems

Course outcomes:

- **Explain the construction & specification of various machine tools.**
- **Describe various machining processes pertaining to relative motions between tool & work piece.**
- **Discuss different cutting tool materials, tool nomenclature & surface finish.**
- **Apply mechanics of machining process to evaluate machining time.**
- **Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.**

TEXT BOOKS:
1. Fundamentals of metal cutting and Machine Tools, B.L. Juneja, G.S. Sekhon and Nitin Seth, New Age International Publishers 2nd Edition, 2003
2. All about Machine Tools, Heinrich Gerling, New Age International Publishers revised 2nd Edition, 2006

REFERENCE BOOKS
1. Fundamental of Machining and Machine Tools, Geoffrey Boothroyd and Winston A. Knight, CRC Taylor& Francis, Third Edition.
2. Metal cutting principles, Milton C. Shaw, Oxford University Press, Second Edition,2005.