Year & Sem: E2S2	Course Code: ME2201	Course Name: **Metal Cutting and Machine Tools**	No. of Credits: 4	L	T&PS	P
				2	2	0

Unit I: Metal Cutting: Tool geometry, mechanism of chip formation. Mechanics of machining. Cutting temperature causes, effects, estimation, measurement and control. Cutting fluid applications, Failure modes, wear and life of cutting tools. Cutting tool materials. Role of geometrical and process parameters and cutting fluid on Machinability. Economy of Machining.

Unit II: Machine tools: Concept and definition machine tools. History of developments of machine tools. Concept of producing geometrical surfaces by generatrix and directrix. **Lathe :** Introduction, Kinematic systems and structures of conventional Lathe, types of lathes, size of lathe, parts of a lathe, Lathe accessories and Lathe attachments, lathe operations. **Capstan and Turret Lathes:** Introduction, Difference between capstan and turret lathes principal parts of capstan and turret lathes, capstan and turret mechanism (turret indexing mechanism and bar feeding mechanism)

Unit-III: Drilling : Introduction, Kinematic systems and structures of conventional Drilling Machine, Types of Drilling machines, upright drilling machine parts, radial drilling machine parts, drilling machine operations. **Boring:** Introduction, Types of Boring machines, Principal parts of Horizontal boring machine, vertical boring machine and Jig boring machine

Unit-IV: Shaper, Planner, Slotter : Introduction, Kinematic systems and structures of conventional Shaper, Planner and Slotter,Types of shapers, principal parts of a shaper, shaper size, shaper mechanisms, Crank and slotted link mechanism, Whit worth quick return mechanism, Hydraulic shaper mechanism, Shaper Operations. Introduction to planner, types of planning machines, parts of a planning machine, table drive mechanism, open and cross belt drive. Planer operations. Introduction to Slotter, Slotter size, parts of a Slotting machine. Slotter operations.

Unit-V: Milling Machines : Introduction, Kinematic systems and structures of conventional Milling Machine,Types of Milling machines, principal parts of a milling machine, milling machine operations (Plain milling, face milling, side milling, straddle milling, angular milling, gang milling, form milling, profile milling, end milling, milling keyways, grooves and slots and gear cutting). Dividing heads – Plain or Simple dividing head, Universal dividing head. Indexing methods, Direct or Rapid indexing, Plain or simple indexing, Compound indexing, Differential indexing. Electromechanical and hydraulic drives and control of machine tools

Unit-VI: Grinding and surface finishing Machines : Introduction, Mechanics of Grinding ,Kinds of Grinding, Types of Grinding machines, Grinding wheel specifications, Glazing and loading in wheels, Dressing and trueing of grinding wheels. Honing, Honing machines, Lapping, Lapping machine sand super finishing, Economy of Grinding. Principles of zigs and fixture, work holding devices, industrial automation, basics of CNC and DNC.

References/Text Books:

1. A. B. ***Chattopadhyay[II0II]***, Machining And Machine Tools , Wiley India Pvt Ltd
2. W.A.J. Chapman[I99V] ,Workshop Technology – Vol I, Vol II, Vol III- , CBS Publisher.
3. P.N. Rao [II00VI], *Manufacturing Technology Metal cutting and Machine tools* , TMH Publishers, New Delhi.
4. Kalpak Jian, Schmid [II009], *Manufacturing processes for Engineering Materials.* Pearson, New Delhi

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.