

B.E Semester: VII

Mechanical Engineering

Subject Name: Production Technology

A. Course Objective

- To present a problem oriented in depth knowledge of Production Technology.
- To address the underlying concepts, methods and application of production engineering.

B. Teaching / Examination Scheme

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
ME704	Production Technology	3	0	2	5	4	3	70	30	20	30	150

C. Detailed Syllabus

1 Metal Cutting:

Cutting Tool Material: - Desirable properties, names and their compositions, red hot hardness temperatures, permissible and economical cutting velocities, properties and applications.

Types of cutting tools: - Solid, brazed tipped and mechanically clamped inserts, types of inserts.

Tool geometry and Force analysis :-

Single point cutting tool, Drill, multiple point cutting tool and form tools, reference planes, ASA system, Orthogonal rake system and Maximum rake system, Tool signature and influence of each elements on machining

Theory of metal cutting:- Orthogonal and oblique cutting, mechanics of chip formation and types of chips produced, chip thickness ratio, shear plane angle and its effect, forces, coefficient of friction, shear strain, power in machining, Merchant circle diagram and its assumptions and use, chip breakers, tool dynamometers, tool wears and methods of tool failure, tool life, significance of temperature and sources of heat generation, temperature measurement, cutting fluids and their properties, economics of machining, machinability and its evaluation.

2 Design of press working tools:

Cutting operation, types of die cutting operation, piercing die design, blanking die design, compound die design, scrap strip layout for blanking, evolution of a blanking die.

3 Analysis of machine tools:

Working and auxiliary motions in machine tools.

Design and analysis of machine tool elements like bed, structure, slide-ways and guide ways and spindle, selection of material, static and dynamic stiffness, and dynamic rigidity. Drives in machine tools, stepped regulation of speed and feed, A.P. and G.P. series, layout of spindle speeds saw tooth diagram, structure, ray diagram and calculation of gear teeth and shaft diameter.

4 Semi Automats and Automats:

Capstan and turret lathes, classification of automats, specifications, tooling equipments, bar stock feeding methods, universal chucking equipments, tool layout for turret, capstan and automats, single spindle and multi spindle automats, bar type and chucking type machines their principles of working constructional details and tool setting, Design of cam for single spindle automat.

5 Transfer machines:

Introduction, product design for transfer machine selection, selection of transfer devices, classification,

function of in-line transfer machine, transfer methods in the in-line transfer machine like rotating bar, walking beam and pawl type, and transfer machine control systems.

6 **Modern machining Processes:**

Purpose, need and classification and aspects considered in selection of a process.

Principle, construction, working, process parameters and their influence on machining, selection of parameters and product applications of the following processes:

Ultrasonic machining, Abrasive jet machining, Water jet machining, Chemical machining, Electro chemical machining and grinding, Electro discharge machining, Plasma arc machining, Laser beam machining, Electron beam machining and Hot machining.

7 **Gear and Thread manufacturing:**

Gear manufacturing: - Classifications of methods, generating methods, gear hobbing, gear shaping and gear finish process and quality of gear.

Thread manufacturing:- Thread milling, thread grinding and thread rolling, Thread rolling machines and quality of thread.

8 **Jigs and Fixtures:-**

Usefulness and principles of jig-fixture design, principles of location, types of locators, types of clamping devices, types of bushes, selection of locators, clamps and bushes, types of jig, their relative merits, demerits and applications, materials for various elements of jig-fixture, design of milling, turning and boring fixtures, testing of jig-fixture and economics of jig-fixture.

9 **Tracer controlled Machine tools:-**

Introduction, mechanical copying machine, hydraulic tracing devices, electric tracing systems and automatic tracing.

D. Lesson planning

SR.NO	DATE/WEEK	UNIT NO	%WEIGHTAGE	TOPIC NO
1	1 ST , 2 ND , 3 RD	1	20	1
2	4 TH , 5 TH , 6 TH	2, 3	20	2, 3
3	7 TH , 8 TH , 9 TH	4, 5	20	4, 5
4	10 TH , 11 TH , 12 TH	6, 7	20	6, 7
5	13 TH , 14 TH , 15 TH	8, 9	20	8, 9

E. Instructional Method & Pedagogy

1. At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2. Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
3. Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4. One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5. Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6. Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7. The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
8. **Practical / Oral:** Term work shall be carried out to fulfill the practical credits related to course contents.

F. Students Learning Outcomes

- The student can identify different areas of Production Technology.
- Can find the applications of all the areas in day to day life.

G. Recommended Study Materials

1. Tool Design by Donaldson, McGraw Hill
2. Theory Of Metal Cutting By M.C.Shaw
3. A Text Book Of Production Engineering- by P.C. Sharma, S. Chand & Co. Ltd
4. Experimental Methods in Metal Cutting by Venkatesh.
5. Fundamentals Of Tool Design – American Society Of Tool Manufacturing
6. Manufacturing Science - by Amitabh Ghosh and Malik, Affiliated East West Publication
7. Production Technology by HMT
8. Production Engineering & Science- by P. C. Pandey & C. K. Singh , Standard Pub.