

DESIGN OF MACHINE TOOLS
Semester II (Production Engineering) SUB CODE: MEPR204
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
4	0	2	6	5	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is

- To learn various concepts related to designing of various machine tool parts
- To have practical purview of various elements of machine tool structure, spindle, power screw.

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEIGTAGE
1	1,7	1 st 2 nd 3 rd	20
2	2	4 th 5 th 6 th	20
3	3	7 th 8 th 9 th	20
4	4,5	10 th 11 th 12 th	20
5	6	13 th 14 th 15 th	20

Total hours (Theory): 60, Total hours (Practical): 30, Total hours: 90

DETAILED SYLLABUS

Chap . No.	Topic
1	Machine Tool Drive: Working and auxiliary motion in machine, Machine tool drives, Hydraulic transmission, Mechanical transmission, General requirements of machine tool design, Layout of machine tools.
2	Regulation of Speed and Feed Rates: Aim of speed feed regulation, stepped regulation of speed, design of speed box, Design of feed box, Special cases of gear box design, regulation of speed and feed rates.
3	Design of Machine Tool Structure: Fundamentals of machine tool structures and their requirements, Design criteria of machine tool structure, Static and dynamic stiffness, Design of beds and columns, Design of housing models, Techniques in design of machine tool structure.
4	Design of Guide-ways and power Screws: Function and type of guide-ways, design of slide-ways, Protecting devices for slide-ways, Design of power screws. Design of antifriction recirculation ball type lead screw, linear motion.
5	Design of Spindles and Spindle Supports: Materials for spindles, Design of spindles, Antifriction bearings, Sliding bearings.
6	Dynamics of Machines Tools: General procedure of assessing dynamic stability of EES, Cutting processing, Closed loop system, Dynamic characteristics of cutting process, Stability analysis.
7	Machine tool testing

LIST OF PRACTICALS

Sr. No.	Practical Content
1	DESIGN OF SPEED BOX OF LATHE
2	DESIGN OF FEED BOX OF LATHE
3	DESIGN OF MACHINE TOOL BED FOR MILLING,GRINDING
4	ASSESSMNET OF DYNAMIC STABILITY OF GRINDING
5	TOOL LAYOUT OF MACHINE TOOL VIZ.LATHE,MILLING,GRINDING,DRILLING
6	DESIGN OF HOUSING OF LATHE,MILLING,GRINDING
7	DESIGN OF GUIDE-WAYS OF LATHE,MILLING,GRINDING
8	DESIGN OF POWER SCREWS OF CNC MACHINE
9	DESIGN OF SPINDLES FOR MILLING MACHINE,LATHE
10	MACHINE TOOL TESTING OF VARIOUS MACHINE TOOLS

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.

STUDENTS LEARNING OUTCOMES:

At the end of the course

The students will gain an experience in the implementation of design procedure for various machine tool parts like spindle, power screw, bed etc.

Reference Books:

1. Machine Tool Design- N.K. Mehta Tata McGraw Hill
2. Design Principles of Metal Cutting Machine tool- F.Koenigsberger-Pergamon press
3. Machine Tool design Handbook CMTI Bangalore
4. Sen and Bhattacharya, "Principles of Machine Tools", New Central Book Agencies, 1975.
5. Boothroyd,G., "Fundamentals of Metal Machining and Machine Tools", Mc Graw Hill,1985.
6. Acherkan, "Machine Tool Design", Vol 2 & 3, MIR Pub, 1973.