Subject Code: 01ME0812
Subject Name: Machine Tool Design
B. Tech. Year - IIII (Semester - 8)

Type of course : Under Graduate

Prerequisite : Machine Design.

Rationale : Understanding of Machine Tool Design.

Course Outcome :

After learning the course, the students will be competent

1. Student are able to understand the design consideration of Machine tool elements
2. Student are able to design the gearbox for machine tool
3. Student are able to design structural element of Machine tool
4. Student are able to design the guide-way for Machine tool

Teaching and Examination Scheme :

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks			Practical Marks		
Theory	Tutorial	Practical	C	ESE(E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

Content :

Sr. No.	Content	Total Hrs
1	**Introduction to Machine Tool Design:** General Requirement of Machine tool Design, Type of motion in Machine Tools, Parameter Defining for working motion of machine tool, Machine Tool Drives,	**10**
2	**Controlling the speed and feed rates** Aim of speed and feed rate controlling, Stepped controlling of speed, Design of Speed Gearbox, Design of feed gearbox, Special cases for gear box design, Determining the number of teeth of gear	**12**
3	**Design of Machine tool structure** Properties and material for of machine tool structure, Design criteria for machine tool structure, Static and dynamic stiffness, Basic design procedure of Machine tool structure, Design of beds, column, housings, base, table, cross rail, arms, saddles, and carriage, Design of Rams	**12**
4	**Design of guideways and power screws** Function of guideway, type of guide ways, Design of sideways, Guide way operating under liquid friction condition, Design of aerostatic sideways, Design of Antifriction guideway, Combination guideways, Protecting devices for slideways, Design of power	**10**

5	**Design of spindle and spindle support** Function of spindle unit and its properties, Material of spindle, Effect of machine tool compliance of machining accuracy, Design calculation of spindles and Selection of Bearings	**8**

Distribution of Theory Marks

R Level	**U** Level	**A** Level	**N** Level	**E** Level	**C** Level
10	**20**	**25**	**25**	**10**	**10**

Legends: R: Remember**; U:** Understand**; A:** Apply**; N:** Analyze**; E:** Evaluate**; C**: Create

List of Experiments :

1. Design of the gearbox for machine tool
2. Design of machine tool structure
3. Design of slide way for machine tool
4. Design of ball screw for machine tool
5. Selection of bearing spindle of machine tools
6. Design of spindle for machine tool

Open Ended Problems :

1. Design the speed gearbox and feed gearbox of lathe machine available in workshop

Reference books :

1. Machine Tools Handbook: design and operation by Joshi,P.H. Tata Mcgraw Hill Education Pvt. Ltd.
2. Technology of machine tools by Krar, Steve F. Mc Graw Hill(India) Pvt. Ltd.
3. All about Machine tools, 2nd Ed. by Gerling Heirinch New Age Publication (P) Limited
4. Machine Tool Design Handbook by CMIT, Tata McGraw Hill Education Pvt. Ltd.
5. Machine Tool Practices by Kibbe, Richard R PHI Learning Private Limited

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List of Open Base Software/learning website:

1. https://nptel.ac.in/courses/112106137/pdf/2_17.pdf