BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

SECOND SEMESTER 2020-2021
COURSE HANDOUT

Date: 015.01.2021

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No : MF F341
Course Title **:** DESIGN OF MACHINE TOOLS
Instructor-in-Charge **: Dr. Sharad Shrivastava**
Instructor(s) **: Dr. Sharad Shrivastava**
Tutorial/Practical Instructors:

1. Course Description: This course is built upon the premise that the students already has a fairly good knowledge of fundamental subjects like Manufacturing Processes, Engineering Materials, Design of Machine Elements etc. This course will mainly focused on fundamental principles of machine tool design. Also this course will provide exposure to the students on modern development of machine tools like NC/CNC machines.

2. Scope and Objective of the Course: The Course is intended to focus the student's attention on the concepts of design, analysis and features of different types of machine Tools, different machine elements to make a machine tool and new concepts in machine tool engineering.

The course covers introduction to machine tool drives and mechanisms- general principles of machine tool design,regulation of speed and feed rates, design of machinetool structures, design of guideways andpower screws, design of spindles and spindlesupports, dynamics of machine tools, control systemsin machine tools

The students are encouraged to select seminar topics of current interest and developments in the fields of technology of construction of Machine Tools and present them in the class apart from the regular classroom learning.

3. Text Books:NK Mehta," **Machine Tool Design and Numerical Control**', second Edition, Tata McGraw Hill book Company, (2011)

4. Reference Books:

R1 SK Basu, DK Pal,"**Design of Machine Tools**", Oxford & IBH Publication Co Pvt Ltd, New Delhi (1995)

R2 Gopal Chandra sen & Amitabha Bhattacharya,"**Principles of Machine Tools**", New Central Book agency, Calcutta,(1998)

R3 B.L. Juneja, G.S. Sekhon and Nitin Seth, "Fundamentals of Metal Cutting and Machine Tools", New Age International Publications, Delhi. 2010

R4 A.B. Chattopadhyay, "Machining and Machine Tools" Wiley-India (2011)

5. Course Plan:

Module No.	Lecture Session	Reference	Learning outcomes
1-2	Understanding the machine tools, their functions	Textbook/Reference books/ Lecture notes	Fundamentals of Machine Tool Design, Design Considerations, General requirements
3-6	Understanding the drive systems	Textbook/Reference books/ Lecture notes	Review of the mechanisms for transmission of motion, principles of Mechanical Drives
7-18	Understanding the gear box design		Design of Speed & Feed boxes and Ray diagrams
19-22	Understanding machine tool structural design		Design of machine Tool structures for forces, stresses, and deflection
28-30	Understanding the functions of guide-ways		Design of Machine Guide ways, and Power screws, Analysis of slides and Guides
31-33	Understanding the machine tool spindles and supports		Spindles and spindle supports, Bearings and load and deflection analysis
34-37	Overview of all machine tool vibrations		Dynamics of Machine Tools, Vibrations and dynamic rigidity
38-40	Understanding control systems employed		Machine Tool control Systems

6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	90 Min.	30		CB
Comprehensive Examination	3 h	40	8/5 FN	CB/OB
TUTORIALS/QUIZ	50 MIN	30		OB

7. Chamber Consultation Hour:To be announced in the class.

8. Notices: All notices concerning the course will be displayed on the mechanical engineering department notice board and online on nalanda.

9. Make-up Policy: Make-up will be permitted only in genuine cases with prior permission. No make-up for class room assignments/Tutorials/quizzes.

10. Note (if any):

Instructor-in-charge

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