Birla Institute of Technology & Science, Pilani
Instruction Division
Second Semester 2015-2016
Course Handout (Part II)

Dated: 13/01/2016

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 : **ABHIJEET K. DIGALWAR**
Instructor : **Girish Kant**

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 & Objective: 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 machine tool structures, design of guideways and power screws, design of spindles and spindle supports, dynamics of machine tools, control systems in 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 Book:

T1 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

Lecture No.	Learning objectives	Description	Reference * Chap./Sec. # (Book)
1-6	Understanding the machine tools, their functions	Fundamentals of Machine Tool Design, Design Considerations, General requirements	Ch 1 T1
7-10	Understanding the drive systems	Review of the mechanisms for transmission of motion, principles of Mechanical Drives	Ch 1 T1
11-20	Understanding the gear box design	Design of Speed & Feed boxes and Ray diagrams	Ch 2, T1
21-25	Understanding machine tool structural design	Design of machine Tool structures for forces, stresses, and deflection	Ch 3 T1
26-28	Understanding the functions of guide-ways, power screws	Design of Machine Guide ways, and Power screws, Analysis of slides and Guides	Ch 4,T1
29-30	Understanding the machine tool spindles and supports	Spindles and spindle supports, Bearings and load and deflection analysis	Ch 5 T1
31-32	Overview of all machine tool vibrations	Dynamics of Machine Tools, Vibrations and dynamic rigidity	Ch 6 T1
33-35	Understanding control systems employed	Machine Tool control Systems	Ch 7 T1
36-40	Understanding the CNC/DNC machine tools	Numerical control of Machine Tools, NC,DNC Machining Centres	Ch 8,9 T1

6. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage	Date, Time & Venue	Nature of Component
1	**Mid Sem Test**	**90 min**	**30**	16/3 9:00 - 10:30 AM	**CB***
2	**Surprise Tests/ Quizzes / Assignments/ Projects and seminars**	**-**	**30**	**Dates to be announced in the class**	
3	**Comprehensive Examination**	**3Hrs**	**40**	7/5 FN	**CB/OB**

*OB = Open Book, CB = Closed book, LS = Literature survey and study

NO MAKEUP

7. Chamber Consultation Hours: Friday 12 to 1 PM

8. Notices: All Notices will be displayed in the Mech.Engg. Deptt. notice board only.

Instructor in Charge

MEG 532