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

Dated: 03/08/2015

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 : **ME G532**
Course Title : **Machine Tool Engineering**
Instructor in charge : **Girish Kant**
E-Mail : **girish@pilani.bits-pilani.ac.in**

1. Course Description: Machine tool drives and mechanisms, Principles of machine tool design, Regulation of speed and feed rates, Design of machine tool structures (Bed, Columns, Housings, base and tables, cross rail, arms, saddle, carriage and Rams), Design of Power screws and guideways, Design of spindle and spindle supports, Dynamics of Machine tools, Control systems in machine tools, Numerical control of Machine tools.

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 Design principles of Machine Tools, stiffness, and rigidity of the construction elements, their combined behavior under load, design of stepped and step-less drives and electric and hydraulic drives, electric/mechanical/ hydraulic drives, bearings and slide-ways, machine tool controls, dynamics, and recent developments in machine tool design.

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**', third edition, Tata McGraw Hill Pvt. Ltd, New Delhi, 2012

4. Reference Books:

R1 Gopal Chandra sen & Amitabha Bhattacharya,"**Principles of Machine Tools**", New Central Book agency, Calcutta, 1998
R2 P H Joshi, "**Machine Tools Handbook Design and Operation**", Tata Mcgraw-hill pvt. Ltd, New Delhi, 2010
R3 A.B. Chattopadhyay, "**Machining and Machine Tools**" Wiley-India, 2011
R4 SK Basu, DK Pal,"**Design of Machine Tools**", Oxford & IBH Publication Co Pvt Ltd, New Delhi, 1995

5. Course Plan

Lecture No.	Learning objectives	Description	Reference * Chap./Sec. # (Book)
1-8	Understanding the machine tools Their functions and drive systems	Fundamentals of Machine Tool Design, Design Considerations, General requirements, Review of the mechanisms for transmission of motion	Ch 1 T1
9-20	Understanding the gear box design	Design of Speed & Feed boxes and Ray diagrams	Ch 2 T1 Ch 3 R1
21-23	Understanding machine tool structural design	Design of machine Tool structures for forces, stresses, and deflection	Ch 3 T1 Ch 5 R1
24-26	Understanding the functions of guide-ways, Power screws	Design of Machine Guide ways, and Power screws, Analysis of slides and Guides	Ch 4 T1 Ch 13 R1
26-29	Understanding the machine tool spindles and supports	Spindles and spindle supports, Bearings and load and deflection analysis	Ch 5 T1 Ch 5 R1
30-36	Understanding the CNC/DNC machine tools	Numerical control of Machine Tools, NC, DNC Machining Centres	Ch 8 & 9 T1
36-38	Overview of acceptance test for machine tools	Object and procedure for acceptance test, instruments, sequence, Standard acceptance test charts	Ch 9 R1
39-40	Overview of all machine tool vibrations	Dynamics of Machine Tools, Vibrations and dynamic rigidity	Ch 6 T1 Ch 6 R1
41-42	Understanding control systems employed	Machine Tool control Systems	Ch 7 T1 Ch 8 R1

6. Evaluation Scheme:

S. No	Evaluation Component	Duration	Weightage	Date, Time & Venue	Remarks
1	Mid Semester Test	-	30	9/10 10:00 - 11:30 AM	Close book
2	Project	-	30	Dates to be announced in the class	-
3	Comprehensive Examination	3 Hrs	40	10/12 AN	Partial open and close book

7. Chamber Consultation Hours: Monday, 5:00 P.M.

8. Notices: All Notices will be displayed in the Mechanical Engineering Department notice board only.

Instructor in Charge
MEG 532