BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
First Semester 2016-2017
Course Handout (Part II)

02.08.2016

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

Course No. : MF F313
Course Title : METAL FORMING AND MACHINING
Instructor-in-Charge : Gajanand Gupta
Instructor (Practicals) : T. C. Bera

1. Course Description:

Metal forming: introduction, metal forming machines, metal forming process analysis and design. Machining: introduction, metal cutting machine tools, mechanics of metal cutting, other aspects of machining processes, grinding and finishing operations, non-conventional machining processes and processing of plastics.

2. Scope and Objective of the Course:

This course is designed to enrich theoretical, analytical as well as practical knowledge about common metal forming and metal cutting techniques used in manufacturing. Non-traditional machining processes are also covered in the present course.

3. Text Books:

i) **B.L. Juneja**, **"Fundamentals of Metal Forming Processes",** New Age International Publications, Delhi. Reprint 2013.

ii) **B.L. Juneja, G.S. Sekhon and Nitin Seth**, **"Fundamentals of Metal Cutting and Machine Tools",** New Age International Publications, Delhi. Reprint 2015

4. Reference books

i) **A. Ghosh and A. K. Mallik, "Manufacturing Science",** East-West Press Private Limited

ii) **S. Kalpakjian and S.R. Schmid**, **"Manufacturing Processes for Engineering Materials",** Pearson Publications, Fifth Edition

iii) **A.B.Chattopadhyay, "Machining and Machine Tools",** Wiley India, New Delhi, 2012.

5. Course Plan:

Lect. No.	Topic	Objective(s)	Chapter(s)
01	Introduction to machining	To be familiar with machining process and machine tools.	TB2, RB1
02-03	Various machining	To study the various motions in different machining process	TB2, RB1

	processes		
04-05	Geometry of cutting tools	To study influence of single point cutting tool geometry on metal machining.	TB2, RB1
06-08	Mechanism of machining Processess	To understand the mechanics of machining and chip formation	TB2, RB1
09	Heat generation in metal cutting and cutting fluid	To analyze role of cutting fluids	TB2, RB1
10-12	Tool life and machinability	To understand the tool wear and effects of different parameters on machinability	TB2, RB1
13-14	Grinding and other abrasive machining processes	To study abrasive machining process	TB2, RB1
15	Surface finish and surface integrity	To get to know surface integrity in machining process	TB2, RB1
16-17	Economics of machining	How to make the process economic in terms of production cost and production rate	TB2, RB1
18-22	Non-traditional machining	Preface with non-traditional machining such as AJM, USM, ECM, EDM, IBM, LBM, PAM	TB2, RB1, RB3
23	Introduction to metal forming processes	To be familiar with metal forming process and machines	TB1, RB1
24	Mechanical properties and their control	To study the basic structure of metals and alloys, forming properties of metals and alloys.	TB1, RB1
25	Failure theory and yield conditions	To comprehend plastic deformation and failure criteria	TB1, RB1
26-32	Analysis and processes of Rolling, Forging, Wire & Tube drawing,	To understand the various forming process and analysis	TB1, RB1, RB2
33	Numerical problems on rolling, forging, drawing	To realize the various forming processes.	
34-38	Analysis and processes of deep drawing, bending, extrusion, sheet metal working.	To study these forming processes	TB1, RB1, RB2
39-40	Numerical problems on deep drawing, bending, extrusion, sheet metal working	To realize these forming processes.	

6. Lab Practical:

Various experimentations about metal forming and machining will be conducted in practical classes and list of experiments will be given separately.

7. Evaluation Scheme:

Components	Duration	Weightage (%)	Date	Remarks
Mid Semester Test	90 min.	30	4/10 10:00 - 11:30 AM	**Closed Book**
Quiz		10		**Closed Book**
Lab Experiments		25		**Viva Voce**
Comprehensive Examination.	3 hrs.	35	3/12 FN	**Open/Closed Book**

8. Chamber Consultation Hours:

To be announced in the class.

9. Notices:

All notices related to this course will be put on the Mechanical Engineering Department notice board only.

10. Make-up Policy:

Make-up will be granted ONLY in genuine cases with prior permission. There will be no make-up for quiz.

Instructor- in-Charge
MF F313