

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**First Semester 2015-2016**  
**Course Handout (Part II)**

03.08.2015

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 : KULDIP SINGH SANGWAN**

### **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 and processing of plastics are also covered in the present course.

### **3. Text Books:**

- i) **B.L. Juneja, "Fundamentals of Metal Forming Processes"**, New Age International Publications, Delhi. 2010.
- ii) **B.L. Juneja, G.S. Sekhon and Nitin Seth, "Fundamentals of Metal Cutting and Machine Tools"**, New Age International Publications, Delhi. 2010

### **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) **P. C. Pandey and H. S. Shan, "Modern Machining Processes"**, Tata McGraw-Hill, New Delhi, First Edition 1980.

### **5. Course Plan:**

<b>Lect. No.</b>	<b>Topic</b>	<b>Objective(s)</b>	<b>Chapter(s)</b>
01	Introduction to metal forming processes	To be familiar with metal forming process and machines	TB1, RB1
02	Mechanical properties and their control	To study the basic structure of metals and alloys, forming properties of metals and alloys.	TB1, RB1

03	Failure theory and yield conditions	To comprehend plastic deformation and failure criteria	TB1, RB1
04-10	Analysis and processes of Rolling, Forging, Wire & Tube drawing,	To understand the various forming process and analysis	TB1, RB1, RB2
11-12	Numerical problems on rolling, forging, drawing	To realize the various forming processes.	
13-17	Analysis and processes of deep drawing, bending, extrusion, sheet metal working.	To study these forming processes	TB1, RB1, RB2
18	Numerical problems on deep drawing, bending, extrusion, sheet metal working	To realize these forming processes.	
19	Introduction to machining	To be familiar with machining process and machine tools.	TB2, RB1
20	Cutting tool geometry	To study influence of cutting tool geometry on metal machining.	TB2, RB1
21-22	Mechanism of chip formation	To understand the mechanics of machining	TB2, RB1
23	Heat generation in metal cutting and cutting fluid	To analyze role of cutting fluids	TB2, RB1
24	Tool life and machinability	To understand the tool wear and effects of different parameters on machinability	TB2, RB1
25	Shaping and planing	To study the various motions in shaping and planing process	RB1
26	Turning and boring	To study the various motions Turning and boring process	TB2,
27	Drilling	To study the various drilling process	TB2,
28-29	Milling	To study the various milling process	TB2,
30	Multipoint machining	To study the various multipoint machining such as broaching, reaming.	RB1
31	Surface integrity	To get to know surface integrity in machined components	TB2, RB1
32	Economics of machining	How to make the process economic in terms of production cost and production rate	TB2, RB1
33-38	Non-traditional machining	Preface with non-traditional machining such as AJM, USM, ECM, EDM, IBM, LBM, PAM	TB2, RB1, RB3
39-40	Processing of plastics	To understand the types of plastic and their processing	RB2

## **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:**

<b>Components</b>	<b>Duration</b>	<b>Weightage (%)</b>	<b>Date</b>	<b>Remarks</b>
<b>Mid Semester Test</b>	90 min.	30	9/10 2:00 - 3:30 PM	<b>Open Book</b>
<b>Quiz</b>		10		<b>Closed Book</b>
<b>Lab Experiments</b>		20		<b>Viva Voce</b>
<b>Comprehensive Examination.</b>	3 hrs.	40	11/12 FN	<b>Closed Book</b>

## **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