BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Hyderabad Campus

First Semester 2019-2020
Course Handout (Part II)

01.08.2019

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 : **N. Suresh Kumar Reddy**

1. Course Description:

Fundamental concepts of metal forming and plasticity of metal, metal forming processes, parameters and its influence, materials behavior during forming, formability and forming limit diagrams, metal forming presses and selection. Fundamental concepts of metal machining, cutting tool materials, machine tools and types, machining processes and types. Influence of process parameters, workpiece materials and its influence.

2. Scope and Objective of the Course:

The course aims at developing the knowledge base for the students in the area of Metal Forming and Machining. It helps to analyze these two broad production processes and their importance in manufacturing.

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) **William Hosford and Caddel**, **"Metal Forming Mechanics and Metallurgy"**, Cambridge University press.

iv) **Milton C. Shaw**, **"Metal Cutting Principles",** Oxford University Press, II Edition.

v) **A. Bhattacharyya**, **" Metal Cutting Theory and Practice",** New Central Book Agency.

vi) **A. B. Chattopadhyay**, **"Machining and Machine Tools",** Wiley India, 2011.

5. Course Plan:

5a. Course plan for Metal Forming

Lect. No.	Topic	Objective(s)	Chapter in the Text Book
01	Introduction to metal forming	To be familiar with metal forming process	Class notes
02	Forging processes and analysis	To select forgoing equipment	(TB1) 6.1-6.4
03	Types of forging processes	To select the forging process for manufacturing and load determination	(TB1) 6.5-6.9
4 & 8	Analysis of rolling process	To determine the rolling force and rolling torque	(TB1)7.5.1-7.8
9	Rolling defects and analysis	To identify the limitations of rolling process	(RB1)17.8
10	Wire drawing process	To analyze the process of wire drawing	(TB1) 9.1-9.5
11	Tube and strip drawing process	To analyze the parameters of tube and strip drawing	(TB1) 9.6-9.9
12	Extrusion process	To study extrusion process	(TB1)10.1-10.5
13	Analysis of extrusion process	To determine the load required for extrusion	(TB1) 10.6.1,10.6.3-10.8
14	Types of sheet metal forming	To identify the different types of sheet metal forming	(TB1) 111.1-11.4
15-17	Analysis of sheet metal forming	Determination of load during sheet metal forming	(TB1) 11.5-11.8

5b. Course Plan for Machining

Lect. No.	Topic	Objective(s)	Chapter in the Text Book
1	Introduction to machining	To be familiar with machining process.	(TB2) 1.1- 1.12
2-6	Various machining processes	To study the various motions in different machining process	(TB2) 1.1- 1.12
7	Materials and geometry of cutting tools	To study influence of cutting tool geometry on metal machining.	(TB2) 2.1 – 2.10
8-11	Mechanics of machining processes	To understand the mechanics of machining: Turning	(TB2) 3.1 -3.3

12	Thermal aspects and cutting fluids	To analyze role of cutting fluids	(TB2) 4.1 -4.8
13	Tool wear, tool life and machinability	To understand the effects of different parameters on machinability	(TB2) 5.1-5.10
14-16	Grinding and other abrasive machining processes	To study abrasive machining process	(TB2) 7.1-7.13
17-18	Surface finish and surface integrity	To get to know surface integrity in machining process	(TB2) 9.1 -9.13
19-22	Non-conventional machining processes	Preface with non-traditional machining	(TB2) 8.1-8.10
23-24	Economics of machining processes	How to make the process economic	(TB2) 10.1 - 10.11
25	Modeling of chip formation	Importance of modeling and simulation in machining	Class Notes

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 & Time	Nature of Component
Mid-Sem Test	90 min.	20	30/9, 3.30 -- 5.00 PM	**Closed Book**
Class Room Assignments		10	Announced later	**Open Book**
Tutorials		15		**Open Book**
Practical		15	Announced later	**Open Book**
Comprehensive Examination.	3 hrs.	40	**5/12 AN**	**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 **CMS** only.

10. Make-up Policy:

Make-up will be granted **ONLY** in genuine cases with prior permission. The request application for make-up test **MUST** be reached to the Instructor-in-charge before commencement of the scheduled test along with **DOCUMENTARY PROOF**.

11. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor- in- charge
MF F313