



# BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani Pilani Campus

## INSTRUCTION DIVISION FIRST SEMESTER 2016-2017 Course Handout (Part II)

Date: 02/08/2016

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.** : ME F313  
**Course Title** : Production Techniques-II  
**Instructor-in-Charge** : Tufan Chandra Bera  
**Instructors (Practical)** : Tufan Chandra Bera, Manikandan H.

### 1. Course Description:

Metal cutting theory, basic metal cutting processes, mechanics of various machining processes, analysis, economics and quality control of metal cutting, Laboratory exercises in metal cutting and fabrication project. Introduction to non-traditional machining processes, mechanics and their applications. Introduction to micromanufacturing technologies, Introduction to CNC technology and CAM.

### 2. Scope and objective of the course:

In-depth comprehension of metal cutting and machining processes is mandatory for a mechanical or manufacturing engineer as machining is a common and versatile operation in product manufacturing. Therefore, an attempt has been made to nurture fresh talents and transform them to competent manufacturing engineers by studying metal cutting theory, various conventional and non-conventional machining processes in detail. In later stage, micromanufacturing is introduced to be familiar with recent development and future scope of micromanufacturing along with CNC technology and CAM. This course is designed to enrich theoretical, analytical as well as practical knowledge about metal cutting, various conventional and non-conventional machining processes.

### 3. Text Book:

T. Amitabha Ghosh and Asok Kumar Mallik, "Manufacturing Science", Affiliated East-West Press, New Delhi, Second Edition, 2010.

### 4. Reference Books:

- R1. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology," Pearson Education, New Delhi, Fourth Edition, 2001.
- R2. Milton C. Shaw, "Metal Cutting Principles", Oxford University Press, Second Edition, 2005.
- R3. A. Bhattacharyya, "Metal Cutting Theory and Practice", New Central Book Agency, 2000.
- R4. P. C. Pandey and H. S. Shan, "Modern Machining Processes", Tata McGraw-Hill, New Delhi, First Edition 1980.



**Please Consider Your Environmental Responsibilities**  
**Do Not Print Unless Necessary**



### 5. Course Plan:

| Number of Lecture | Topics   | Objectives   | T/R-Chapter                              |
|-------------------|--|--|--|
| 1                 | Introduction to machining                          | To be familiar with metal cutting and machining process.   | (TB) Ch-4.1,<br>(R2) Ch-1<br>(R3) Ch-1   |
| 2                 | Various machining processes                        | To study the various motions in different machining process.   | (TB) Ch-4.3,<br>(R1) Ch-23<br>(R3) Ch-11 |
| 3-5               | Geometry of cutting tools and metal cutting theory | To study geometry of cutting tool and mechanism of chip formation.   | (TB) Ch-4.2,<br>(R1) Ch-21<br>(R3) Ch-3  |
| 6-9               | Mechanics of machining processes                   | To understand the mechanics of basic machining processes.  | (TB) Ch-4.3,<br>(R2) Ch-8<br>(R3) Ch-4   |
| 10-11             | Thermal aspects and cutting fluids                 | To analyze role of cutting fluids in machining.  | (TB) Ch-4.2,<br>(R2) Ch-12<br>(R3) Ch-8  |
| 12-13             | Tool wear, tool life and machinability             | To understand tool wear phenomena and machinability.   | (TB) Ch-4.2,<br>(R2) Ch-11<br>(R3) Ch-9  |
| 14-15             | Grinding and other abrasive machining processes    | To study abrasive machining process and other finishing process such as lapping and honing.                              | (TB) Ch-4.4,<br>(R1) Ch-25<br>(R3) Ch-15 |
| 16-17             | Surface finish and surface integrity               | To get to know surface integrity in machining process.   | (TB) Ch-4.5,<br>(R2) Ch-17<br>(R3) Ch-14 |
| 18-19             | Economics of machining processes                   | How to make the process economic in terms of production cost and production rate.  | (TB) Ch-4.6,<br>(R2) Ch-1<br>(R3) Ch-10  |
| 20                | Non-conventional machining processes               | Preface with non-traditional machining.  | (TB) Ch-6,<br>(R1) Ch-26<br>(R4) Ch-1    |
| 21-38             | AJM, USM, ECM, EDM, EBM, LBM, PAM                  | To study the mechanics, applications and influence of various process variables of different non-conventional processes. | (TB) Ch-6,<br>(R1) Ch-26<br>(R4) Ch-1    |
| 39-40             | Introduction to micromanufacturing                 | Preface with micro manufacturing and micro technology.   | (TB) Ch-7.2,<br>(R1) Ch-26               |





**6. Evaluation Scheme:**

| Component                         | Duration      | % Weightage | Date & Time            | Remarks                        |
|-----------------------------------|---------------|-------------|------------------------|--------------------------------|
| Mid Semester Test                 | 90 min        | 30          | 5/10<br>2:00 - 3:30 PM | Open book                      |
| Class Assignments & Surprise Quiz |               | 10          |                        | Home work & Closed book        |
| Comprehensive Examination         | 3 hours       | 35          | 7/12 FN                | Closed book                    |
| Lab Practical                     | Semester long | 25          |                        | Experimentations, Fabrications |

**7. Chamber Consultation Hours:**

To be announced in the class.

**8. Notices:**

All notices related to the course will be displayed on Notice Board of Mechanical Engineering Department only.

**9. 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**. No make-up will be allowed for the Surprise Quiz Tests.

**Instructor-in-Charge  
ME F313**

