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**SECOND SEMESTER 2020-2021**

# Course Handout Part II

Date: 16-01-2021

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 : AMRITA PRIYADARSHINI

*Instructors (Lab/Tut)* : Amrita Priyadarshini, Ravi Shanker Vidyarthi, Sreejith S, R Naresh

**Scope and Objective of the Course:**

* Identify the necessity of “machining” in production
* State the main purposes of “machining”
* Define with examples the concept of “machining”
* State with example the principles of “machining”
* State with examples the main requirements for “machining”
* State with examples the main functions of “Machine tools”
* Define the concept of “machine tools”

**Textbooks:**

1. B. L. Juneja, G.S.Sekhon, Nitin Seth, “Fundamentals of Metal Cutting and Machine Tools, New Age International, 2005, New Delhi.
2. Amitabha Ghosh and Asok Kumar Mallik, “Manufacturing Science”, Affiliated East-West Press, New Delhi, 1985.

**Reference books**

1. Geoffrey Boothroyd, Fundamentals of metal machining and machine tools, TMH, New Delhi, 2007..

2. Serope Kalpakjian and Steven R. Schmid, “Manufacturing Engineering and Technology,” Pearson Education (Low Cost Indian Edition), 4/e, 2001, New Delhi.

1. Roy A. Lindberg, “Processes and Materials of Manufacture,” PHI, New Delhi, 2004.
2. P. N. Rao, “Manufacturing Technology: Metal Cutting & Machine Tools,” TMH, New Delhi, 2000.

**Course Plan:**

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| --- | --- | --- | --- |
| **Lecture No.** | **Learning objectives** | **Topics to be covered** | **Chapter in the Text Book** |
| 1-3 | * To identify the need of machining in manufacturing industries * To determine machining time for various machining processes | **Metal cutting theory:** A brief overview of different metal cutting processes, Machining time calculations | T1 & T2 |
| 4-10 | * To understand the basic principles of chip formation process | **Analysis:** Analysis of mechanics of metal cutting in turning, milling and drilling, cutting force calculation, power estimation, cutting temperature calculation, Lee-Shafer theory, Ernest-Merchant theory, chip separation, tool life, Machining with controlled contact tools | T1 & T2 |
| 11-14 | * To understand the economics of machining processes | **Economics:** Costs of single pass turning operation, optimum cutting speed for maximum profit rate in turning, restrictions on optimum cutting speed | T1 & T2 |
| 15-17 | * To understand the importance of machining outputs | **Laboratory exercises in metal cutting:** Tool wear, surface finish, key way production | T1& T2 |
| 17-24 | * To study and gain hands on experience on various machining processes | **Laboratory exercises in metal cutting:** Milling, drilling, Shaping, Abrasive machining processes | T1 & T2 |
| 25-30 | * To understand the concept of Non Traditional Machining processes | **Non-traditional machining processes:** Introduction, Ultrasonic Machining, Abrasive Jet Machining, EDM, ECM, LBM, EBM, ECG and Chemical Machining | T2 |
| 31-32 | * To understand the basic principles of micro manufacturing processes | **Micro-manufacturing technologies:** Introduction, Chemistry-based, Electron-beam lithography | T2 |
| 33-34 | * To understand the need of CAM | **Introduction to computer aided manufacturing (CAM):** Introduction, developments in conventional machine tools, CIM, FMS, Modern developments in machine tools | T2 |
| 35-37 | * To be able to differentiate between conventional machines and CNC machines * Need of CNCs | **CNC machines:** NC and CNC Machines, Operation of NC/CNC, Definition of terms often used in numerical control, Positional control | R3 |
| 38-42 | * To learn CNC part programming | **CNC part programming:** Introduction, Programming for NC/CNC Machining, Some commonly used G codes | R4 |
| Total number of lectures = 42 | | | |

**Evaluation Scheme:**

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| --- | --- | --- | --- | --- |
| **Component** | **Duration** | **Weightage (%)** | **Date & Time** | **Nature of Component** |
| Mid Semester | 90 min | 25 | 05/03 9.00 -10.3AM | Open Book |
| Tutorials |  | 10 |  | Open Book |
| Surprise Quiz |  | 10 |  | Open Book |
| Lab Practical + Project |  | 15 |  | Open Book |
| Comprehensive  Examination | 120 min | 40 | 12/05 FN | Open Book |

**Chamber Consultation Hour:** Will be announced in the class.

**Notices:** Will be displayed on CMS only

**Make-up Policy:** Only genuine cases will be granted make up.

*NOTE: The border cases in final grading will be decided based on mainly class room attendance and attentiveness in the classroom.*

**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**

**ME F313**