### SECOND SEMESTER 2021-2022

**COURSE HANDOUT (PART-II)**

**Date: 11/03/2022**

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

#### Course No. : ME F112

#### Course Title : Workshop Practice

**Instructor-in-charge : Sujith R**

**1. Course description (as given in the Institute Bulletin):**

Engineering materials, casting, forming, machining, joining, powder metallurgy, additive manufacturing, plastic processing, various other manufacturing processes and related laboratory exercises.

1. **Scope and Objective of the Course:**

This course is required for all first-degree students at first year level. The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials. The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes. The primary objective of this course is to learn how the physical artifacts we use are manufactured and gain technical knowledge and skills. Much of the knowledge in the course is conceptual and no great mathematics is involved. This knowledge will be useful in whatever discipline the students are going to specialize.

1. **Books:**

**(i)** Laboratory Manual: Practical Manual for Workshop Practice, EDD, BITS Pilani, 2008.

**(ii)** Textbook:

(1) B S Nagendra Parashar and R K Mittal, *Elements of Manufacturing Processes*, Prentice Hall of India, 2008.

Reference Books:

1. Mikell P.Groover, “Fundamentals of Modern Manufacturing”, Second edition, John Wiley& sons Pvt Ltd. Campbell J.S., Principles of Manufacturing Materials and Processes, Tata McGraw-Hill, New Delhi, 1995.
2. Richard R. Kibbe et all, Machine Tool practices, Sixth edition, Prentice Hall of India Pvt. limited, New Delhi, 2003.
3. E. Paul Degarmo, J.T. Black, Ronald A. kosher, Materials and processes in Manufacturing, PHI 2005.
4. Choudhary H., "Elements of Workshop Technology", (Vols I & II), Media Promoters and Publishers, Bombay.

**4. Course Plan:**

| **Lec #** | Learning Objectives | Topics to be covered | **Chapter in the Text Book** |
| --- | --- | --- | --- |
| 1-2 | Introduction, Engineering Materials, Role of measurements and Quality | Basics, ethics and safety in workshop, Material properties, Mechanical properties, Common engineering materials, Metrology, Quality, Limits & fits, Examples*.* | **T1-1**  **T1-2**  **T1-3** |
| 3 | Production of parts by casting processes | Casting processes, Pattern making. Moulding, Moulding sands. | **T1-11** |
| 4 | Casting processes | Pattern allowances, Examples. Yield, Cooling rate, defects | **T1-11** |
| 5 | Metal cutting basics | Metal cutting, Machine tools, Cutting tools, Tool material. | **T1-4** |
| 6 | Metal cutting basics | Types of tools, Tool geometry, Chips, Tool life. | **T1-4** |
| 7 | Lathe machine tool | Lathe machine tool, Turning and other operations. | **T1-5** |
| 8 | Metal cutting & Lathe operations  Hole making & allied operations | Operating conditions, MRR, Examples | **T1-5**  **T1-6** |
| 9 | Production of flat surfaces | Shaping & planning machines | **T1-7** |
| 10 | Production of complex surfaces | Milling machine, Types of milling operations, Operating conditions, Milling operations, MRR, Examples. | **T1-8** |
| 11 | Producing fine surface finish,  Grinding and fine finishing process | Abrasives, Grinding, Grinding wheel, Grinding machines, fine finishing operations. | **T1-9** |
| 12 | Production of parts by forming processes, Sheet metal working | Metal forming processes, Rolling, Extrusion, Forging, Punches and dies, Sheet metal operations | **T1-12**  **T1-13** |
| 13-14 | Powder metallurgy,  Mechanical joining processes | Metal powders: mixing, compaction, sintering, etc.  Mechanical joining, Welding (arc, gas), Soldering, Brazing, Fasteners, Examples. | **T1-14**  **T1-15** |
| 15 | Additive manufacturing and Plastics in manufacturing | Processing of plastics, Types of plastics, Processing. | **T1-16** |

**5. Evaluation Scheme:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| EC No. | Component | Duration | Weightage (%) | Date & time | Nature of Component |
| 1 | Mid Semester Test | 90 min | 25 | 04/05 3:30 – 5:00 pm | CB |
| 2 | Comprehensive exam | 120 min | 40 | 25/06 AN | CB |
| 3 | Laboratory Practical Regular class work |  | 25 | --- | -- |
| 4 | Laboratory Practical Comprehensive exam |  | 10 | To be announced later | -- |

**6. Laboratory:**

The practical work contributes **thirty-five percent** directly and much more indirectly; therefore, it must be carried out seriously. The practicals are intended to provide experience in handling of basic tools, machine tools and make simple utility jobs. Laboratory marks mentioned includes marks for models (viva) and attendance in practicals. Details of practical are available in the “Laboratory Manual”.

**7. Chamber Consultation Hour:** To be announced in the class.

**8. Notices concerning the course:** All notices concerning the course will be displayed on the CMS notice board.

**9. Make-up Policy:** Make-up will be permitted only in genuine cases with prior permission.

**10. 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.

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

Instructor-in-charge

ME F112