



FIRST SEMESTER 2022-2023
COURSE HANDOUT (PART-II)

Date: 18/10/2022

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 : **Dr. Ravi Shanker Vidyarthi**

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.

2. 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.

3. 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:

- (i) 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.
- (ii) Richard R. Kibbe et al, *Machine Tool practices*, Sixth edition, Prentice Hall of India Pvt. limited, New Delhi, 2003.
- (iii) E. Paul Degarmo, J.T. Black, Ronald A. Kohser, *Materials and processes in Manufacturing*, PHI 2005.
- (iv) 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

Lec #	Learning Objectives	Topics to be covered	Chapter in the Text Book
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 & planing 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
1	Mid Sem Test	90 min	20	05/01 3.30PM - 5.00PM	CB
2	Comprehensive exam	180 min	30	22/02FN	CB
3	Laboratory Practical Regular class work		35	---	OB
4	Laboratory Practical Comprehensive exam		15	TBA	OB/CB

6. Laboratory:

The practical work contributes **fifty percent** directly and much more indirectly; therefore, it must be carried out seriously. The practical's 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**