BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE- PILANI, HYDERABAD CAMPUS

SECOND SEMESTER 2024-2025

Course Handout (Part II)

01.01.2025

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	**: ME F219**
Course Title	**: Manufacturing Processes**
Instructor-in-charge	**: N Suresh Kumar Reddy**

1. Course Description: Fundamentals of manufacturing properties of metals; metal casting processes; metal forming processes; introduction to metal cutting, mechanics of metal cutting; machine tools; other machining processes, machining centers; grinding and finishing operations; non-conventional machining processes; chipless machining processes; powder metallurgy; soldering, brazing and welding technology.

Advances in synthesis, processing, and technology of different polymers (thermoplastic and thermosetting) including both synthetic and biopolymers generated from non-renewable and renewable resources. Steady state and non-steady state basic processes of fibre formation and fibre processing. Fundamentals of composites and major manufacturing processes for polymer matrix composites with an emphasis on continuous fibre-reinforced composites. Introduction to biocomposites and nanocomposites, design, materials selection and recent developments in manufacturing these advanced materials.

2. Scope and Objectives: This course is an introductory course on manufacturing processes. It aims at providing a basic understanding of manufacturing processes used in industry, which are important in various engineering applications. Various manufacturing processes will be discussed in detail from the viewpoint of their diverse applications in industry and day to day life. All processes will be given equal emphasis because of their importance to the industry by considering their minute details for a particular application.

3. Text Book:

T1 Serope Kalpakjian, Steven R. Schmid, "Manufacturing Processes for Engineering Materials", Pearson Education (Low Price Edition), 2003.

4. References:

1. Manufacturing Science by Amitabha Ghosh and Asok Kumar Mallik, East-West Press Pvt Ltd
2. Materials and Process in Manufacturing by DE Garmo, J.T Black and Ronald A Kosher, Wiley.
3. Manufacturing Engineering and Technology by Seope Kalpkjian and Steven R.Shmid, Pearson, 4e
4. Gerling, *All about Machine Tools*, Skip Series No 2, New Age International (P)Limited, New Delhi, 2002
5. Hermann Jutz, Eduard Scharkus, Westerman Metal Tables, New Age International (P) Limited, New Delhi, 2003

5. Course Plan:

Lecture No.	Lecture plan	Topics to be covered	Chapter in the Text Book
1	Introduction to Manufacturing, Manufacturing Processes	What is Manufacturing, Selection of Materials, Selection of Manufacturing Processes	T1-Ch1 & R1
2	Fundamentals of Manufacturing Properties of Metals	The Structure of Metals, Mechanical Behavior, Testing, and Manufacturing Properties of Materials	T1-Ch 3 & R1
3-8	Metal Casting Processes	Introduction, Solidification of Metals, Cast Structures, Fluid Flow and Heat Transfer, Casting Alloys, Riser Design, different types of casting processes, casting analysis	T1-Ch 5 & R1
9-14	Metal Forming and Forging Processes	Introduction,, Forging, Rolling, Extrusion, Rod, Wire, and Tube Drawing, Sheet-Metal Characteristics	T1-Ch 6 & 7& R1
15-22	Introduction to metal cutting, Mechanics of metal cutting	Introduction, Mechanics of Chip Formation, Cutting-Tool Materials, Tool Wear and Failure, Surface Finish and Surface Integrity, Machinability	T1-Ch 8 & R1
23-29	Machine Tools, Other Machining Processes & Machining centers	Lathe, Milling, Drilling**,** shaping,	T1-Ch 8
30-31	Grinding & Finishing Operations	Introduction, Abrasives, Bonded Abrasives, Mechanics of Grinding, Grinding Wheel Wear, Grinding Operations and Machines, Finishing Operations	T1-Ch 9 & R1
32-34	Soldering, Brazing and Welding Technology	ARC welding, gas welding, Soldering, Brazing,	T1-Ch 12
35	Properties and processing of polymers and reinforced plastics	Introduction, The Structure of Polymers, Thermoplastics: Behavior and Properties, Thermosets: Behavior and Properties, Thermoplastics: General Characteristics and applications, Thermosets: General Characteristics andapplications	Lecture Notes
36-37	Engineering Metrology and Instrumentation	Dimensional Tolerances, Testing and Inspection	T1-Ch 10
38-42	Limit and Fits	Limits and fits, Gauges	R3

6. Evaluation Scheme:

EC No.	Component	Duration	Weightage (%)	Date & time	Nature
1	Mid Sem Test	90 min	25		CB
2	Tutorial		10	To be announced later	OB
3	Class Room Assignments		10	To be announced later	OB
4	Practical		15	To be announced later	OB
5	Comprehensive exam	120 min	40		CB

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

8.Notice: Notices, if any, concerning this course shall be displayed on CMS 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.

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 F219.