RKUNIVERSITY

SYLLABUS

Course Title	MANUFACTURING PROCESS – I
Course Code	ME121
Course Credit	Theory :03
	Practical :01
	Tutorial :00
	Credits :04

Course Learning Outcomes

After successful completion of the course, students will be able to:

1. **Explain** all the processes, tools and their applications.
2. **Operate** various types of Conventional machines.
3. **Understand** the influence of the different parameters on manufacturing processes.
4. **Develop** troubleshooting capacity for basic machine related problems.

Detailed Syllabus

Sr. No.	Name of Chapter & Details	Hours Allotted
	SECTION -I	
1.	**Introduction:** Importance of manufacturing processes, Classification of manufacturing processes, Different types of shops in mechanical Engineering workshop and their processes, Types of Accidents, Causes and Common Sources of Accidents in workshop, Methods of Safety, First Aid.	03
2.	**Metal Casting Processes:** Casting terms, Sand mould making procedure, Patterns, Moulding sands, Testing and properties of Sands, Sand preparation, Types of sand Moulds, Cores, Elements of Gating system, Gating ratio, Melting furnaces, Casting cleaning and Casting defects, Special casting processes: Shell moulding, Precision investment casting, Permanent mould casting, Die casting, Centrifugal casting, Continuous casting.	12

3.	**Metal Forming Processes:** Nature of Plastic deformation, Concept of strain hardening, Hot and cold working; Rolling: Principle, Rolling load, Roll passes, Breakdown passes, Roll pass sequence; Forging: Forging operations, Forging defects; Extrusion: Principle, Hot extrusion, Cold extrusion; Wire drawing; Swaging; Sheet metal operations: Press tool operations, Shearing action, Shearing operations, Drawing, Spinning, Bending, Stretch forming, Embossing and Coining.	**06**
	Total	**21**
	SECTION -II	
4.	**Metal Fabrication Processes:** Introduction, Classification, Weld terms. Gas Welding and Cutting: Principle, Types of Gases, Types of Flames, Edge preparation, Welding filler rod, Oxy – Acetylene Weld equipment and Welding Technique, Oxy Hydrogen Welding, Gas Cutting. Electric Arc Welding: Principle of Arc, Arc Welding Equipment, Electrodes, Manual Metal Arc Welding, Carbon Arc Welding, Inert Gas Shielded Arc Welding, Tungsten Inert Gas Welding, Gas Metal Arc Welding, Submerged Arc Welding, Atomic Hydrogen Welding, Plasma Arc Welding, Stud Arc Welding, Fire Cracker Welding, Arc Cutting. Resistance Welding: Principle, Resistance Spot Welding, Resistance Seam Welding, Projection Welding, Upset Welding, Flash Welding. Other Welding Processes: Thermit Welding, Electroslag Welding, Laser beam Welding, Forge Welding, Friction Welding, Diffusion Welding, Explosion Welding. Defects in Welding, Brazing, Braze Welding and Soldering.	**17**
5.	**Plastics and their Processing:** Introduction, Types of Plastics, Elastomers, Materials for processing plastics, Moulding Processes, Calendering, Thermoforming, Laminating.	**04**
	Total	**21**

Instructional Method and Pedagogy

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and laboratory. Minimum two internal exams will be conducted and average of two will be considered as a part of overall evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. Minimum eight experiments shall be there in the laboratory related to course contents.
- Minimum six tutorials which includes solution of minimum five numerical under each head.

Reference Books:

1. P. N. Rao, Manufacturing Technology: Foundry, Forming, Welding, New Delhi: Tata McGraw Hill,
2. S.K. Hajra Choudhury,A.K. Hajra Choudhury, Workshop Technology Vol. I, Mumbai: Media Promoters and Publishers Pvt. Ltd.
3. Heine Richard, W. Loper Carl, Rosenthal Philip, Principles of Metal Casting, New Delhi: Tata McGraw Hill Publishing Pvt. Ltd.
4. R. K. Jain, Production Technology, Delhi: Book Publishing Company (P) Ltd.
5. O. P. Khanna, Production Technology: Volume 1, Delhi: Dhanpatrai& Company Pvt. Ltd.,
6. A. K. Chakrabarti, Casting Technology & Cast Alloys, Prentice – Hall of India Pvt. Ltd.
7. Campbell John, Castings, New Delhi: Elsevier
8. Little Richard, Welding & Welding Technology, New Delhi: Tata McGraw Hill Publishing Company Ltd.
9. O. P. Khanna, Textbook of Welding Technology, Delhi: Dhanpatrai& Company Pvt. Ltd.
10. O. P. Khanna, Textbook of Foundry Technology, Delhi: Dhanpatrai& Company Pvt. Ltd.
11. R.K.Rajput, Manufacturing Technology, New Delhi: Laxmi Publications.

Additional Resources

- http://www.sme.org/fmp/
- http://iitvids.blogspot.in/2012/12/manufacturing-processes-ii.html
- http://www.cosmolearning.com/courses/manufacturing-processes-i-538/video-lectures/
- http://www.ias.ac.in/sadhana/

List of Experiments

1. To **understand** how to make fitting and tin smithy job.
2. To **understand** how to make carpentry, black smithy and plumbing job.
3. To **learn** the use of various foundry tools.
4. To **learn** various types of pattern materials, patterns and pattern allowances.
5. To **perform** moisture content test of moulding sand.
6. To **perform** sand casting process.
7. To **perform** different weld joints by using shielded metal arc welding.
8. To **perform** different weld joints by using tungsten inert gas welding.
9. To **perform** different weld joints by using metal inert gas welding.
10. To **perform** different weld joints by using gas welding.
11. To **perform** cutting of plate by using gas cutting.
12. To **perform** spot welding on sheet metal.
13. To **demonstrate** Dye penetrant test on weld joint.
14. To **perform** various operations by using mechanical press machine.
15. To **perform** a job on plastic injection moulding machine.