

Course Type	Course Code	Name of Course	L	T	P	Credit
IC	MEI102	Manufacturing Process	2	0	3	9

#### Course Objective

- The students will be exposed to the common manufacturing processes such as casting, metal forming, metal cutting and welding and advanced level of manufacturing processes such as CNC, 3D printing and applications Robots.
- Further, the practical assignments of this course consist of hands on experience and demonstration of these processes which will make the students confident to plan and handle any fabrication projects/assignments.
- 

#### Learning Outcomes

Upon successful completion of this course, students will:

- Students will develop idea about “how to fabricate an engineering component”.
- They can select/and plan different machining operations for producing any component.
- Independently, they can select the cutting parameters and can estimate their impacts on the machined surface.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction and general safety rules for workshop. Principle of metrology and introduction to commonly used mechanical devices: gauges/indicator and levels, CMM, surface roughness meter and other shop floor devices. Production drawings, design concepts, material selection.	03	Understanding of basic concepts of measurement and different instruments used for it. Reading and understanding of production drawings.
2	Patterns and allowances, Sand mould Casting, expendable and nonexpendable casting Processes, casting defects and remedies, special types of casting process. Cast materials and defects.	05	Upon successful completion of this chapter the student will be able to fabricate a component through melting and mold pouring technique. Identification of defects on the produced components.
3	Principle of metal forming, bulk deformation and sheet deformation processes, hot working and cold working processes. Tube manufacturing process. Sheet metal working: principle and applications.	05	This chapter will help the student to understand the different metal forming techniques.
4	Principles of metal removal operations, Machine tools - lathe, shaping, milling, drilling, boring, and grinding machine, cutting tools, selection of cutting speed, feed and depth of cut for different operations. Machine drives and Work holding devices.	07	This chapter will help the student to understand the different conventional methods for material removal to generate different surfaces and identification and selection of different machining parameters.
5	Working principle of sheet metal /plate cutting through gas, plasma, lasers. Principle of gas and arc welding, brazing and soldering, type of weld joints, welding defects. Solid state welding.	03	Upon successful completion of this chapter one can understand the principle of welding process and their types, metal transfer techniques etc.
6	Principle of ECM, EDM, WAJM, laser machining, Powder Metallurgy, CNC machine operation, 3D printing and scanning, application of robots in manufacturing process.	03	Understanding of different unconventional machining processes and their applications, CNC machine tools and its components, 3D printing process and basics of robots.

#### Text books:

Manufacturing Science, Ghosh and Mallick, East-West publisher

Principles of Modern manufacturing, M.P Groover, Willy India, 2015

#### Reference Books:

1. Workshop Technology Part I, II, III by W A J Chapman, Viva Books Pvt Ltd.
2. Manufacturing Engineering and Technology by S Kalpakjian and Schmid, Pearson Publisher
3. Elements of Workshop Technology (I & II) by Hazra & Chaudhary , Asia Publishing House