

PaperCode: ICT116	Paper: Introduction to Manufacturing Process	L	T/P	C								
PaperID: 164116		3	-	3								
<b>Marking Scheme:</b> 1. Teachers Continuous Evaluation: 25 marks 2. Term end Theory Examinations: 75 marks												
<b>Instruction for paper setter:</b> 1. There should be 9 questions in the term end examinations question paper. 2. The first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 15 marks. 3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15. 4. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook. 5. The requirement of (scientific) calculators / log-tables / data - tables may be specified if required.												
<b>Course Objectives:</b> 1: The students will have basic understanding of various manufacturing processes. The students will have knowledge about casting process. 2: The students will have understanding of joining processes. 3: The students will have understanding of forging and sheet metal works. 4: The students will have basic idea of powder metallurgy and manufacturing of plastic components.												
<b>Course Outcomes (CO):</b> CO1: Understand casting process. CO2: Understand joining process. CO3: Understand forging and sheet metal work. CO4: Basic understanding of powder metallurgy and manufacturing of plastic components.												
<b>Course Outcomes (CO) to Programme Outcomes (PO) Mapping (scale 1: low, 2: Medium, 3: High)</b>												
CO/P O	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	2	1	1	1	2	-	-	-	-	-	1	1
CO2	2	1	1	1	2	-	-	-	-	-	1	1
CO3	2	1	1	1	2	-	-	-	-	-	1	1
CO4	2	1	1	1	2	-	-	-	-	-	1	1

#### Unit I

Definition of manufacturing, Importance of manufacturing towards technological and social economic development, Classification of manufacturing processes, Properties of materials.  
 Metal Casting Processes: Sand casting, Sand moulds, Type of patterns, Pattern materials, Pattern allowances, Types of Moulding sand and their Properties, Core making, Elements of gating system. Description and operation of cupola.  
 Working principle of Special casting processes - Shell casting, Pressure die casting, Centrifugal casting. Casting defects. [10Hrs]

#### Unit II

Joining Processes: Welding principles, classification of welding processes, Fusion welding, Gas welding, Equipments used, Filler and Flux materials. Electric arc welding, Gas metal arc welding, Submerged arc welding, Electro slag welding, TIG and MIG welding process, resistance welding, welding defects. [10Hrs]

#### Unit III

Deformation Processes: Hot working and cold working of metals, Forging processes, Open and closed die forging process. Typical forging operations, Rolling of metals, Principle of rod and wire drawing, Tube drawing. Principle of Extrusion, Types of Extrusion, Hot and Cold extrusion.  
 Sheet metal characteristics -Typical shearing operations, bending and drawing operations, Stretch forming operations, Metal spinning. [10Hrs]

#### Unit IV

Powder Metallurgy: Introduction of powder metallurgy process, powder production, blending, compaction, sintering  
 Manufacturing Of Plastic Components: Types of plastics, Characteristics of the forming and shaping processes, Moulding of Thermoplastics, Injection moulding, Blow moulding, Rotational moulding, Film blowing, Extrusion, Thermoforming. Moulding of thermosets- Compression moulding, Transfer moulding, Bonding of Thermoplastics. [10Hrs]

#### Textbooks:

1. Manufacturing Technology: Foundry, Forming and Welding Volume 1, P. N Rao, , McGrawHill, 5e, 2018.
2. Elements of Workshop Technology Vol. 1 and 2 by Hajra Choudhury, Media Promoters Pvt Ltd., 2008.

**References:**

1. *Manufacturing Processes for Engineering Materials*, by Serope Kalpajian and Steven R. Schmid, Pearson Education, 5e, 2014.
2. *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems* by Mikell P. Groover, John Wiley and Sons, 4e, 2010 .
3. *Production Technology* by R.K. Jain and S.C. Gupta, Khanna Publishers. 16th Edition, 2001.

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