19ME201 MANUFACTURING TECHNOLOGY

SCOURCE:
https:// www.google.com/ search?q=manufacturing+ technology&source

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P
45	-	30

WA/RA	SSH/HSH	CS	SA	S	BS
10	20	-	6	-	2

PRE-REQUISITE COURSE: Workshop

COURSE DESCRIPTION AND OBJECTIVES:

This course deals with the concepts of casting technology, metal forming operations, metal joining techniques and 3D printing techniques.The objective of this course is to make the students understand and perform conventional and advanced primary shaping processes.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand concepts of basic manufacturing science.	1
2	Evaluate and prepare various elements in conventional and specialcasting techniques.	2
3	Study basic elements in mechanical working processes.	1
4	Acquire knowledge about various fabrication techniques.	3
5	Create various prototypes using rapid prototype technology.	1,3,4

SKILLS:

- ✓ *Use and evaluate various manufacturing techniques.*
- ✓ *Design and analysis of various patterns, risers and gating system.*
- ✓ *Operate various welding and casting equipment.*
- ✓ *Develop CAD models for printing the objects using rapid prototype technologies.*

UNIT- I **L-9**

CASTING: Casting terminology, Sand moulding process - types of moulding sand, moulding sand composition and its properties; Patterns - pattern materials, types of patterns, pattern allowances and simple problems on allowances; Cores; Elements of gating system - types of gates; Design of gating system and simple problems on riser and sprue design.

UNIT- II **L-9**

SPECIAL CASTING PROCESSES: Investment casting, Die casting, Centrifugal casting, Shell moulding, Continuous casting, Stir casting, Casting defects, Metal melting - Cupola, Electric resistance furnace, Crucible furnaces.

UNIT- III **L-9**

METAL FORMING PROCESS: Hot, cold and warm working, Workability - work hardening; Introduction to bulk and sheet metal forming; Rolling - theory of rolling, roll mills; Forging - Smith forging, Drop forging; Extrusion - hot and cold extrusion, direct and indirect; Defects of rolling, forging and extrusion; Sheet metal forming - Shearing, Drawing, Deep drawing and Bending.

UNIT- IV **L-9**

WELDING: Classification of welding, Gas welding - types of flames, welding techniques, Arc welding, Types - Manual metal arc welding, Submerged arc welding; TIG and MIG welding, Thermit welding, Resistance welding - Spot, Butt, Projection, Seam welding; Welding defects.

UNIT-V **L-9**

ADDITIVE MANUFACTURING: Definition, Types of prototypes, Classification of additive manufacturing systems - Stereo lithography system, Selective laser sintering, Solid ground curing, Laminated object manufacturing and Fused deposition modelling.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS **TOTAL HOURS: 30**

1. To design pattern using Auto Cad and fabricate physical model.
2. To prepare a sand mould and cast product.
3. To prepare sand mould and cast alloy product using Stir-Casting Technique.
4. To perform Butt joint using Arc welding and testing of hardness and tensile strength.
5. To perform Butt joint using Gas welding and testing of hardness and tensile strength.
6. To perform Soldering and Brazing operations.
7. To perform spot and projection welding for sheet metal joining.
8. To perform blanking and piercing using compound and progressive dies.
9. To perform deep drawing and extrusion using hydraulic press.
10. To execute RPT program and fabricate product using FDM.

TEXT BOOKS:

1. P.N. Rao, “Manufacturing Technology (Volume 1)”, 4th edition, Tata McGraw-Hill, 2013.
2. Sarma P.C, “Production Technology”, 3rd edition, S.Chand and Co, 2007.

REFERENCE BOOKS :

1. R.K. Jain, “Production Technology”, 6th edition, Khanna Publishers, New Delhi, 2005.
2. Terry Wohlers, “Wohlers Report 2001”, Wohlers Associates, 2008.
3. S.K. Hajra Chowdary, “Elements of Workshop Technology”, 11th edition, Media Promoters, 1997.
4. Pham D T and Dimov S S, “Rapid Manufacturing”, 1st edition, Verlag, 2012.