

**214306**  
**Manufacturing Processes-I**

Credit Points	Teaching Hrs/Week	Practical Hrs/Week
05	3	2

Objective	1. To make familiarized students with basic manufacturing processes such as welding, casting, forging etc. 2. To make familiarized students with basic machining processes such as turning, drilling, milling, shaping, and various finishing processes eg. grinding
Prerequisites	1. Students should know about three manufacturing processes addition processes, subtraction process and no addition & no subtraction processes.

Unit	Topic Name	Details	Hrs
I	Pattern Making, Moulding and Casting	<b>Pattern Making:</b> Pattern materials, pattern making tools, allowances, types of patterns <b>Moulding</b> – Sand types, properties, ingredients and their effects, sand conditioning, moulding process and equipments, cores and its type, core boxes, core making, sand testing. <b>Casting:</b> Furnace-type-cupolas- construction, operation, zones, chemistry, etc. Gating systems. Cleaning and finishing. Special moulding and casting processes- lost foam process, shell moulding, investment casting, die casting, casting defects.	7
II	Hot working and cold working Processes	Principle-rolling, forging-drop, press, upset, roll-forging-Extrusion, drawing, spinning, effects of hot working. Cold rolling, swaging, extrusion-forward, backward, impact, roll forming, tube drawing, wire drawing, Spinning shop peening. Sheet metal working- types of presses, drives and different operations	4
III	Welding Processes	i) <b>Gas welding:</b> Oxy-acetylene, Air-acetylene, Oxy-hydrogen ii) <b>Arc welding:</b> Carbon arc, metal arc, MIG, TIG, atomic hydrogen arc, plasma arc, submerge arc, flux cored arc, electroslag, electrogas welding. iii) <b>Resistance welding:</b> Butt, spot, seam, projection, percussion welding. iv) <b>Thermit welding.</b> v) <b>Solid state welding:</b> Friction, ultrasonic, diffusion, explosive welding. vi) <b>Newer welding processes :</b> Electron beam, laser beam welding. vii) <b>Related processes:</b> Oxyacetylene cutting, arc cutting, hard facing, brazing, soldering etc. viii) <b>Welding defects</b> and inspection.	7
IV	Lathe machine	Principle of lathe, classification, functions of lathe parts, different accessories, operations performed on lathe, single point cutting tool geometry, lathe specifications.	7

V	<b>Milling machines</b>	Principle of milling,types,standard milling cutters and geometry. Fundamental of milling processes and operations performed on milling machines, dividing head, indexing methods, gear train calculations for spur and helical milling oper	7
		<b>Drilling machines</b> Introduction, types of drilling machines, parts of radial drilling machine,twist drill geometry, work and tool holding devices., Operations performed on drilling machines, reaming and tappingprocess	3
VI	<b>Grinding machines</b>	Principle and types of grinding machines.grinding wheel shapes and sizes ,standard marking system,selection of grinding wheel, mounting,dressing and balancing of grinding with <b>Shaper,Slotter and Planner Machines</b> Working principal,types, Parts,feed and quick return mechanism.	7

### **Lab/ Term Work**

**A Journal containing record (any 10 out of which Sr. No.5,9,12 are compulsory) of the following experiments based on the demonstration on machine tools ( sketches and relevant description)**

- 1.Study of all geared and back geared head stock of a centre lathe machine.
- 2.Study of half nut mechanism of a lathe.
3. Study of lathe accessories( chucks,centres,face plate,catchplates and carriers,rests,mandrels,etc.)
- 4.Study of taper turning methods.
- 5.Study of universal dividing head.
- 6.Twist drill geometry and grinding technique
- 7.Study of different tool holding and work holding devices in drilling  
( Drill chuck,Quick change chuck sleeves,vices etc)
- 8.Different operations performed on drilling
- 9.Mounting,dressing and balancing of grinding wheels.
- 10.Rachet and pawl feed mechanism of a shaper.
- 11.Quick return mechanism of a shaper.
- 12.Industrial visit to any manufacturing industry,and students should submit the brief report on visit.

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Text Books	<p>1) Elements of Workshop Technology, Vol-I&amp;II by S.K.Hajara Choudhary. Published by Media Promoters &amp; publishers Pvt.Ltd, Mumbai</p> <p>2) Manufacturing Technology Vol –I, II by P.N.Rao Tata McGraw Hill</p> <p>2) Manufacturing Technology Vol –I, II by P.N.Rao Tata McGraw Hill</p>
Reference Books	<p>1) Manufacturing Processes-I ,by A.Ghosh, A.K.malik</p> <p>2) Introduction to Manufacturing Processes by J.A.Schey, Tata McGraw Hill</p> <p>3) Production Technology by R. K. Jain. Khanna publications</p> <p>4) Production Technology by HMT Tata McGraw Hill</p> <p>5) Production Engineering by P.C. Sharma, Khanna publishers.</p> <p>6) Material and Processes in manufacturing by Degarmo, Black and Koshreth 8<sup>th</sup> Edition Prentice Hall of India</p>
Related Websites	

Examination Scheme	Internal Assessment	40 Marks
	Term Work	25 Marks
	Final Theory Paper	60 Marks