



**SARVAJANIK UNIVERSITY**  
Sarvajani College of Engineering and Technology  
Bachelor of Technology



**Mechanical Engineering Department**  
**Semester V**

**Course Name:** Manufacturing Process **Course Code:** BTME15502  
**Type of course:** Open Elective Course  
**Prerequisite:** Workshop Practice (Mechanical)  
**Course Outline:** The goal of this course is to educate students about the significance, benefits, and drawbacks of various manufacturing processes so that they can use this knowledge to select a technique for producing a product from a raw material with the required knowledge and skill.

**Teaching and Examination Scheme:**

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

**CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests) **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

**Course Contents:**

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	<b>Introduction:</b> Manufacturing – need & concept. Manufacturing Processes and Production Management. Broad classification of Engineering Manufacturing Processes. Overview of Advance Manufacturing Processes	5	12%
2.	<b>Metal Casting Process:</b> Introduction: Brief History, Advantages, Limitations, and Application of Casting Process. Pattern and Pattern materials. Pattern Allowances. Sand Casting Process. Types of Molding sand. Cores, Core prints and Chaplets. Element of Gating systems. Casting Yield. Riser Importance. Casting defects. Cleaning and Inspection of Casting	10	22%



**SARVAJANIK UNIVERSITY**  
**Sarvajani College of Engineering and Technology**  
**Bachelor of Technology**



Sr. No.	Topics	Teaching Hrs.	Module Weightage
3.	<p><b>Metal Joining Process:</b></p> <p>Introduction to joining processes: Welding, Brazing, Soldering and Adhesive bonding. General applications of Welding, Brazing Soldering and Adhesive Processes.</p> <p>Welding Process - Principle of welding. Classification of welding processes. Gas welding processes: Principle and Classification and Flame cutting. Electric Arc welding processes: Principle and Classification. Influence of power sources on welding. Type of welding joints. Welding positions and techniques. Electrodes and Electrode Coatings. Resistance welding process: Principle and Classification. Welding Defects.</p>	<b>10</b>	<b>22%</b>
4.	<p><b>Metal Forming and Shaping Process:</b></p> <p>Introduction to Bulk Deformation. Hot and cold working processes. Introduction, Operation, Classification, Advantages, Disadvantages, Application: <b>Forging Process, Rolling Process, Extrusion Process, Wire &amp; Tube drawing and Sheet Metal work.</b></p>	<b>10</b>	<b>22%</b>
5.	<p><b>Machining Processes:</b></p> <p>Cutting tools and its type. <b>Lathe:</b> Purpose and Field of application of Lathe. Kinematic System and Working Principle of Lathes. Machining operations carried on Centre Lathes. Work and Tool holding devices of lathes. Working Principles, Purpose and Field of application of <b>Planners, Shapers and Slotters Machines, Drilling, Boring, Grinding Machines. Milling Machines:</b> Purpose and Field of Application of Milling Machines. Classification of Milling Machines. Working Principle of Milling Machines. Types of Milling Cutter. Machining Operations carried on Milling Machines</p>	<b>10</b>	<b>22%</b>



**SARVAJANIK UNIVERSITY**  
**Sarvajani College of Engineering and Technology**  
**Bachelor of Technology**



**Percentage Distribution of Marks as per Bloom’s Taxonomy (Theory/Practical):**

<b>% Distribution of Marks</b>					
<b>R Level</b>	<b>U Level</b>	<b>A Level</b>	<b>N Level</b>	<b>E Level</b>	<b>C Level</b>
<b>25</b>	<b>25</b>	<b>20</b>	<b>20</b>	<b>5</b>	<b>5</b>

**Legends:** **R:** Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create

**Note:** This specification table shall be treated as a general guideline for students and teachers.

The actual distribution of marks in the question paper may vary slightly from above table.

**Reference Books:**

<b>Sr. no.</b>	<b>Title of book /article</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Publication year</b>	<b>Publication edition</b>
1.	Manufacturing Engineering and Technology	Serope Kalpakjian & Steven R. Schmid	Pearson Education	2018	7th
2.	Production Technology	R. K. Jain	Khanna publishers	2001	17th
3.	Workshop Technology, Vol. I, II & III	W.A.J Chapman	CBS	2007	4th
4.	Manufacturing Technology Vol. I & II	P.N. Rao	Tata McGraw Hill	2018	4th
5.	Elements of Workshop Technology vol. II	S. K. Hajra Choudhury	Media Publishers & Promoters	2010	1st

**Course Outcomes (CO’s):**

<b>CO No.</b>	<b>CO Statement</b> <b>After learning this subject, students will be able to</b>	<b>Marks % weightage</b>
<b>CO-1</b>	Observe, Select and Explain the best Manufacturing Processes for Producing the Quality Products	20
<b>CO-2</b>	Explain the various machining processes carried out on different types of machine tools	30
<b>CO-3</b>	Identify various process parameters and plan the process in order to eliminate the defects.	30
<b>CO-4</b>	Identify, Analyse critical process parameters and plan the operations on Machine Tool	20



**SARVAJANIK UNIVERSITY**  
Sarvajani College of Engineering and Technology  
Bachelor of Technology



**Mapping of CO's with Program Outcomes (PO's):**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
<b>CO-1</b>	3	1	1	1	1	1	1	0	1	2	1	2
<b>CO-2</b>	3	1	1	1	2	1	2	1	1	2	3	2
<b>CO-3</b>	3	3	1	2	2	1	2	2	2	3	3	3
<b>CO-4</b>	3	3	2	3	3	2	3	2	3	3	3	3
<b>Rationale*</b>	12	8	5	7	8	5	8	5	8	10	10	10

**Rationale - Mapping of CO's with PO's:**

As per CO's and PO's mapping, this course will provide a wide understanding of engineering associated to traditional manufacturing processes. This course will help students work individually or in groups to develop problem-solving skills that will allow them to design and develop sustainable products from manufacturing processes, thus benefiting society and the environment.

**List of Practical:**

1. To design and prepare a 3D printed pattern of the selected object.
2. To prepare a Green sand mold and carryout Casting of the selected object.
3. To prepare a single V butt joint, using Arc welding method and Gas welding machine
4. To prepare a Butt joint on Tungsten Inert Gas (TIG) welding machine.
5. To prepare a Lap joint on Resistance Spot welding machine.
6. To perform: Facing, Turning, Knurling, Taper Turning, Grooving, Centering, and Thread Cutting operations on the given workpiece using Lathe Machine.
7. To machine a V-block out of the workpiece using Shaper Machine
8. To perform: Drilling, Counter boring and Tapping operations on the given workpiece using Drilling Machine.
9. To perform: End Milling and Face Milling operations on the given workpiece using Milling Machine



**SARVAJANIK UNIVERSITY**  
**Sarvajani College of Engineering and Technology**  
**Bachelor of Technology**



**Major Equipment:**

1. Small Foundry Shop
2. Welding Machines:
  - Arc welding machine.
  - Gas welding machine.
  - Tungsten Inert Gas (TIG) welding machine.
  - Spot welding machine.
3. Centre Lathe Machines.
4. Radial Drilling Machine.
5. Milling Machine.
6. Shaper Machine

**List of Open learning websites:**

1. <https://nptel.ac.in/courses/112107219>
2. <https://nptel.ac.in/courses/112104290>
3. <https://nptel.ac.in/courses/112107145>