SARVAJANIK UNIVERSITY

Sarvajanik College of Engineering and Technology

Bachelor of Technology

Mechanical Engineering Department

B. Tech. Semester VI

Course Name: **Production Technology** **Course Code: BTME14615**

Type of course: **Professional Elective Course**

Prerequisite: **Basic knowledge of Manufacturing Processes**

Rationale of Course: Students would be able to apply the fundamentals of machining processes with ease. They will comprehend the utility of jigs and fixtures. Moreover, the students will get familiar with super finishing technology, sheet metal working and other material processing techniques; as well as their relevance, applications, benefits and cost-effectiveness in production technology.

Teaching and Examination Scheme:

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

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.

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction:** Production machine tools, types of productions. Types of layout, economic justification of transfer machines, inline transfer, drum type transfer machines. Automatic loading and transferring methods, machining heads, automatic inspections, tool servicing and transfer press linked lines.	3	8%
2	**Jigs and Fixtures:** Definition, differences between jigs and fixtures, usefulness of jigs and fixtures in mass production, design principles, materials used for jigs and fixtures, 3-2-1 location principle and its application to short and long cylinders, types of locators,	8	18%

	concept of work piece control, geometric control, dimensional control and mechanical control, clamps, jig bushes, jigs and fixtures for various machining operations.		
3	**Press Tools:** Classification of presses, classification of dies, cutting actions in dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing center of pressure, blanking, piercing, drawing, bending and progressive die design, scrap reduction, strip layout.	**8**	**18%**
4	**Sheet Metal Working and Super finishing Technology:** Introduction, punches and dies, sheet metal working operations: piercing and punching, shearing, blanking and mechanism of blanking, slotting, bending notching, beading, flanging, perforating, slitting, stamping, deep drawing, coining, embossing, metal spinning, roll forming. Super finishing Technology: Lapping, honing, buffing, barrel tumbling, burnishing, powder coating and polishing.	**10**	**22%**
5	**Plastic, Ceramic and Glass Processing:** Classification of plastics, materials of moulding compounds, general properties of plastics, types of plastic. Forms of raw plastic material: powder form, laminated sheets and rods, fibers, resins. Plastic part manufacturing processes such as compression moulding, transfer moulding, injection moulding, extrusion moulding, blow moulding. Ceramic structures: Properties and applications, shaping Ceramics. Glass Structures: Properties and applications, forming and shaping of glass, composite materials.	**6**	**12%**
6	**Unconventional Manufacturing Processes:** Introduction, necessity of unconventional manufacturing processes, working process parameters, mechanisms, principles, working, specification, merits and demerits and the fields of applications of unconventional manufacturing processes such as AJM, WJM, USM, USW, ECM, ECG, EDM, PAM, PAW, LBM and LBW.	**10**	**22%**

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

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	**35**	**30**	**10**	**05**	**5**

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:

Sr. No.	Title of book /article	Author(s)	Publisher	Publication year	Publication edition
1.	Production Technology	R.K. Jain	Dnyaandeep Publication	2022	1st
2.	Tool Design	Cyril Donaldson, H. LeCain George, V. C. Goold, Joyjeet Ghose	McGraw Hill Education	2017	5th
3.	Jigs and Fixtures	P. H Joshi	McGraw Hill Education	2017	3rd
4.	Design of Jigs, Fixtures and Press tools	V. Balchandran	Springer Nature	2015	1st
5.	Unconventional Machining Processes	M. Adithan	A R S Publication	2013	1st

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Course Outcomes (COs):

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Describe production machine tools, types of productions and types of layouts.	8
CO-2	Identify manufacturing techniques as well as jigs and fixtures used in various machining operations.	18
CO-3	Explain how press tools work and how they are designed.	18
CO-4	Illustrate sheet metal working operations and super-finishing operations and its applications in manufacturing/production industries.	22
CO-5	Apply the knowledge of processing techniques of glass and ceramics in production industries.	12
CO-6	Determine various unconventional manufacturing processes.	22

Mapping of (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs):

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO-1	1	1	2	1	0	2	1	0	1	1	1	1	2	1	3
CO-2	1	1	1	0	0	0	1	0	0	1	1	1	2	0	3
CO-3	1	2	2	1	1	1	1	0	0	1	2	1	2	0	2
CO-4	2	2	2	2	1	2	2	1	1	2	1	1	2	0	1
CO-5	2	1	2	1	1	1	2	0	0	2	1	1	2	0	1
CO-5	1	2	1	0	3	2	2	1	2	1	1	1	2	1	2
Rationale*	**8**	**9**	**10**	**5**	**6**	**8**	**9**	**2**	**4**	**8**	**7**	**6**	**12**	**2**	**12**

Rationale - Mapping of COs with POs and COs with PSOs:

The course will develop knowledge of engineering science in production, societal and environmental contexts; it focuses on individual and team work and better communication. Course also focuses on fundamentals of machining processes, super finishing technology, processing of plastics, glass, ceramics and sheet metal, as well as their relevance, application, benefits, and cost-effectiveness in production technology. Moreover, this course will help the students to plan, analyze and maintain production systems with quality and safety measures which will be helpful to work as a responsible technocrat using their technical and managerial skills.

This course highly maps with Program outcomes 1, 2, 3,6,7,10,11 and Program Specific Outcomes 1 and 3. It states that the course will develop engineering knowledge, problem analysis, design / development of solutions for the society, environment and sustainability, communication, project management and finance. Finally it will lead to convert conceptual knowledge of mechanical engineering to real life applications and apply their technical, managerial and other soft skills in their professional life.

List of Practical:

1) Design a Jig and Fixture for a given component.
2) Apply the principles of jigs and fixtures for a given component.
3) Demonstration on injection moulding machine.
4) Demonstration on extrusion machine.

Students Activities:

1. Make a report on industrial visit for sheet metal working and super finishing technology.
2. Make a report on industrial or research laboratory visit for unconventional machining processes.

Major Equipment:

1. General machine tools
2. Injection moulding machine

List of open learning website:

1. https://nptel.ac.in/courses/112104304