GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering (Part Time)
Subject Code: 2921904
Semester – II
Subject Name: Manufacturing Processes

Type of course: Engineering

Prerequisite: Zeal to learn the subject

Rationale: Manufacturing processes related to machining are included in this subject. All conventional machines are included in this course to understand the basic concepts in machining science.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Basic Machine Tools and Metal Cutting Principles: Machine tools classification, working and auxiliary motions in machine tools, Primary cutting motions in machines tools, Cutting tool geometry and tool signature, cutting forces and power requirement in machining	4
2	Metal Cutting Lathes: Engine Lathes, construction all arrangement and principal units of engine lathes, type and size range of engine lathes, Operations carried on engine lathe , attachment extending the processing capacities of engine lathes, Types of lathe machines, Capstan and Turret lathes, Taper turning on lathe, Thread cutting on lathe using gear train and chasing dial, Alignment tests of lathes	11
3	Drilling Machines: Purpose and field of application of drilling machines, Types of drilling machines, Drilling and allied operation: drilling, boring, reaming, tapping, counter sinking, counter boring, spot facing; deep hole drilling, alignment tests of drilling machine.	6
4	Boring Machine: Purpose and filed of application, Horizontal boring machines, Precision boring machines.	3
5	Milling Machines: Purpose and types of milling machines, general purpose milling machines, different types of milling operations, milling cutters, attachments extending the processing capabilities of general 11 22% purpose milling machines, Indexing, Helical milling operation and its set up, Alignment tests of milling machine.	11
6	Planers, Shapers and Slotters: Classification of planers, Shapers and Slotters, Attachments extending the processing capacities of planers, Shapers and Slotters, machine and tooling requirements	6
7	Sawing and Broaching Machines: Metal sawing classification: reciprocating sawing machines, circular sawing machines, band sawing machines, Types of broaching machines,	3

	advantage and limitations of broaching.	
8	Grinding Machines and Abrasives: Classification of grinding machines, cylindrical grinders, internal grinders, Surface grinders, tool and cutter grinders, center less grinders, Types of grinding wheels, wheel characteristics and wheel selection.	**6**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**25**	**25**	**10**	**15**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

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:

1. Workshop Technology Vol. I, II & III, WAJ Chapman.
2. Workshop Technology Vol. II, Hajra & Choudhari.
3. Manufacturing Processes, O.P. Khanna.
4. Production Technology, R. K. Jain.
5. Processes and Materials of Manufacture; Lindberg Roy A.; Prentice-Hall India.
6. Principles of Manufacturing Materials and Process, J S Campbell.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the basic concept of machining operations	20
CO-2	Analyze any conventional machining processes.	30
CO-3	Generate the sequence of machining operation to produce the end product.	30
CO-4	Judge the limitations and scope of machines to perform variety of operations.	20

Term Work:

Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

List of Experiments:

1. Study of Machine Tools (Lathe, Shaper, Slotter, Planner) – study the types of cutting tools available and relative motions between cutting tool and work piece on each machine tool. Also derive capacity and capability of respective machine tools from machine specifications and number of available attachments to perform variety of operations.
2. Study of Machine Tools (Grinding, Milling, Drilling) – study the types of cutting tools available and relative motions between cutting tool and work piece on each machine tool. Also derive capacity and capability of respective machine tools from machine specifications and number of available attachments to perform variety of operations.
3. Job making on lathe machine
4. Job making on shaper / slotter machine
5. Job making on milling machine
6. Job making on Drilling machine
7. Job making on Grinding machine
8. Alignment test on lathe machine / any other machine

Major Equipment:

All conventional machine tools such lathe, milling, shaper, slotter, drilling machine, grinder, etc.

List of Open Source Software/learning website:

https://nptel.ac.in/courses/112107145/14