

GUJARAT TECHNOLOGICAL UNIVERSITY

PRODUCTION ENGINEERING ALLIED MANUFACTURING TECHNIQUE SUBJECT CODE: 2162507 B.E. 6th SEMESTER

Type of course: Core

Prerequisite: Enthusiasm to learn the subject

Rationale: Knowledge regarding different Allied manufacturing techniques used to produce variety of metal products used in automobile and other machines and equipment. It also develops understanding that can be used to suggest and manipulate vital process parameters related to different manufacturing processes so that the high quality component may be produced at low cost and in minimum time, this is important if we want to compete in today's global market.

The present course intends to give the exposure of various methods of producing thread, gear manufacturing processes as well as semi automats, automats and Unconventional manufacturing processes for a product whose scale ranges from miniature to extra-large. Since allied manufacturing technique is an important manufacturing route to fabricate bulk storage and processing equipment's. The subject focuses on knowledge and understanding of various manufacturing techniques and equipment's, the underlying principles and their relative merits and demerits. It also helps them to understand the advancement of technology in manufacturing.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
PA	ALA	ESE		OEP						
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Subject Contain	Total Hrs.	Wodule Weightage
1	Capstan and Turret Lathes: Introduction, Types of turret lathes, Main parts, work holding equipment, standard equipment and tools, machine operations, advantages of turret lathe, tool layout, bar stock feeding mechanism, programme controlled turret lathes, problems on tool layout.	06	10
2	Automatic Lathe Introduction, Classification of automatic lathe, Setting up of automatic and semi-automatics, Tool layout and operation sheet, Tool layout for automatic screw machine, programmed automatic lathe, bar stock feeding, problems.	06	10
3	Thread Manufacturing:	12	20

	Introduction, thread standards, thread terms, thread making methods like casting, rolling, chasing, die and tap cut, grinding, milling, screw broaching, their constructional details, Working principles, Tooling and effect of different process parameters, Screw thread inspection.		
4	Gear Manufacturing: Introduction, methods of manufacturing gears like casting, hot-rolling, stamping, powder-metallurgy, extruding, coining, gear machining methods like form tooth process, template-process, cutter generating process etc. gear finishing processes like gear shaving or burnishing, gear grinding, gear lapping, shot blasting, Gear testing.	12	20
5	Unconventional Manufacturing Processes- I: Introduction, necessity of unconventional manufacturing processes, working process parameters, mechanisms, principles, working, specification, merits & demerits and field of application of unconventional manufacturing processes such as AJM, WJM, USM, USW, ECM, ECG,	12	20
6	Unconventional Manufacturing Processes- II: Introduction, Working process parameters, mechanisms, principles, working, specification, merits & demerits and field of application of unconventional manufacturing processes such as EDM, Wire cut EDM, EBM, PAM, PAW, LBM & LBW.	12	20

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
14	14	21	7	14	0

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. Textbook of Production Engineering by P. C. Sharma, S Chand
2. Production Technology Vol-II by O. P. Khanna & Lal, Dhanpat Rai
3. Fundamentals of Manufacturing Processes by Lal G K , Narosa
4. Advanced Machining Processes by V.K.Jain, Allied

Course Outcome:

After learning the course the students should be able to:

- Indicate various semi automats and draw a tool layout
- Indicate various automats and draw a tool layout
- Identify and determine various methods to manufacturing of Thread
- Identify and determine various methods to manufacturing of Gears
- Identify and determine various Unconventional Machining processes

List of Experiments:

1. To Study about semi automats and automats (02 hours)
2. To Study about semi automats and automats (02 hours)
3. To Study about various thread manufacturing processes (02 hours)
4. To Study about various gear manufacturing processes (02 hours)
5. To Study about various unconventional manufacturing processes (02 hours)
6. Industrial Visit with student's individual report (8 Hrs)

Design based Problems (DP)/Open Ended Problem:

1. Prepare Tool Layout of Capstan/ Turret lathe for the given component.
2. Prepare Tool Layout of Automats for the given component.
3. Compare process parameters of different **Unconventional Manufacturing Processes.**

List of Open Source Software/learning website:

<http://nptel.ac.in/>

ACTIVE LEARNING ASSIGNMENTS: 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.