

GUJARAT TECHNOLOGICAL UNIVERSITY

MANUFACTURING ENGINEERING

BASIC MANUFACTURING PROCESSES

SUBJECT CODE: 2133404

B.E. 3RD SEMESTER

Type of course: Theoretical + Practical (Regular)

Prerequisite: Basic knowledge of machine tools and its operations

Rationale: Correlate the machining processes

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			
3	0	2	5	70	20	10	20	10	20	150

Contents:

Sr. No.	Subject Content	Hours	Module Weightage
1.	<p>Lathe</p> <p>Introduction to production processes – Types of production – Production processes – Casting – Forming – Machining and Welding – Machine – Machine tool – Lathe – Engine lathe – Block diagram – Sketch – Functions of each part – Work holding devices in lathe – Functions – Chuck, Centre – Dogs – Steady Rest and Follower Rest – mechanism of lathe – Apron – Feed – Tumbler Gear – various operations performed in Lathe – Facing – Turning – Chamfering and knurling – Relative positions of tool and job – Taper turning operations – Thread cutting – Thread – RH and LH – Single start and multi start with application – Method of thread cutting – Selection and arrangement of tool and work – Problems in metric and inch thread conversion – Specifications of Lathe – Burnishing</p>	16	20
2.	<p>Shaper, Planer & Slotter</p> <p>Purpose of shaping – Block diagram – Functions of each part – Purpose of planer – Block diagram – Functions of each part – Purpose of slotting machine – Block diagram – Functions and working principle – Operations carried out – Horizontal plane – Vertical plane – V type with relative position – Comparison of planer with shaper – Work holding devices in shaper and planer – Quick return mechanism in shaper – Mechanical and hydraulic – Cross feed mechanism –Types of planer with application – Mechanism in planer – Comparison of shaping with slotting – Tool holding devices in shaper – Planer – Slotter – Simple problems to calculate the velocity – Speed – Feed – Depth of cut.</p>	12	20

3.	<p>Drilling</p> <p>Purpose of drilling – Block diagram and function – Types of drilling machines – Portable drilling – Bench type – Sensitive drilling – Radial arm drilling – Functions of parts – Purpose and operation – Gang milling – Multiple drill head – Upright drilling – Relative operations – Reaming – Boring, tapping – Counter boring – Courses sinking – Trepanning and spot facing – Work holding devices – specification torque Calculation – Speed – Feed – Depth of cut</p>	8	20
4.	<p>Milling</p> <p>Milling machine purpose – Up and Down milling – Classification of milling machines – Slot – Keyway machining – Methods of milling – Single piece – String – Rotary – Index – Gang, progressive – Copy – Horizontal milling machine – Block diagram – Functions of each part – Applications – Vertical milling machine – Block diagram – Functions of each part applications – Gear cutting using milling machine – Procedure with neat sketch – Milling cutters – Peripheral – Face – End T slot – Attachments and special accessories for milling – Rotary – Slotting attachment – Indexing mechanism – Methods of indexing – Direct – Plain – Compound – Differential indexing – Problems – Specifications – Cutting conditions and parameters</p>	12	20
5	<p>Grinding</p> <p>Purpose – Classification – Surface finish – Applications – Grinding wheel – Types – Specifications – Selection – Surface grinding machine – Block diagram – Functions of each part – Cylindrical grinding – Centre-less grinding – Comparison – in feed –end feed and through feed – Balancing – Dressing – Loading and Truing of wheel – Special grinding machines – Specification of machine – Cutting condition</p>	12	20

Reference Books:

1. HMT Bangalore, “Production Technology”, Tata Mc-Graw Hill Publishing Company Limited, 2001.
2. Sharma, P.C., “A Text Book of Production Technology”, S.Chand and Company, 2001.
3. Jain, R.K., “Production Technology”, Khanna Publishers, 2001.
4. Hajra Choudhary etal, “Elements of Production Technology –Vol. II”, Asia Publishing House, 2000.
5. Kumar, B., “Manufacturing Technology”, Khanna Publishers, 2000.

Course Outcome:

The course will help the students to understand the operations and construction of various machine tools. Students will get an opportunity to work on the shop floor which can help them to get familiar with the practical problems.

List of Experiments:

1. To Study About Lathe Machine
2. To Study About Drilling Machine
3. To Study About Shaper Machine
4. To Study About Grinding Machine
5. To Study About Milling Machine

Design based Problems (DP)/Open Ended Problem:

1. Preparing the work piece on different machine tools by students.
2. Seminar on the different machine tool structures and operations.

Major Equipments:

- Lathe Machine
- Drilling Machine
- Shaper Machine
- Grinding Machine
- Milling Machine

List of Open Source Software/learning website:

1. <http://freevidelectures.com/Course/2345/Industrial-Automation-and-Control/23>
2. <http://creo.ptc.com/2011/03/08/creo-training-straight-from-the-developers-%E2%80%93free/>
3. <http://www.mcad.com/solidworks-free-trial/>

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.