GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

MECHATRONICS ENGINEERING

Subject Name**: Manufacturing Technology – I**
Subject Code: **152002**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Sr. No.	Course Content
1.	**Turning and Allied Operations:** Type of lathe, Constructional details of an engine lathe, Speed and feed drives for lathe, Work holding devices and auxiliaries, Operations performed on engine lathe, Taper turning on lathe, Thread cutting on lathe, Chasing dial, Choice of operations and their sequencing, Special purpose and production lathe, Cutting time calculations, Alignment tests on lathe, Capstan and turret lathe and their tooling holding devices.
2.	**Metal Cutting Principles:** Classification of the manufacturing processes, Cutting parameters, Cutting tool geometry, Tool signature, Tool materials and cutting fluids, Power required for machining, Smoothness and accuracy of machined surfaces.
3.	**Drilling and Allied Operations:** Drilling, Boring, Reaming, Tapping, Countersinking, Counter boring and spot facing, Drilling machines, Drill geometry, Machine and tooling requirements, Metal removal rate and power required for drilling, Drilling time calculation, Estimation of drilling force and torque, Deep hole drilling, Production, Boring and jig boring operations, Alignment tests on pillar type drilling machine.
4.	**Production of Flat Surfaces:** Shaping and planning, Machines and tooling requirements, Metal removal rate and power required for cutting, Operation planning, Alignment tests on shaper.
5.	**Milling Operations:** Plane and form milling, Milling cutters and their geometry, Production milling operations, Special milling operations and setups, Milling machine attachments and associated operations, Direct, simple, differential and compound indexing, Helical milling, General purpose, Production and special purpose milling machines, Cutting parameter, Metal removal rate and cutting time calculations.

6.	**Sawing and Broaching Operations:** Operation parameters, Saw tooth and broach geometry, Applications.
7.	**Abrasive Machining Processes:** Abrasives, Grinding wheels, Wheel characteristics and wheel selection, Surface, Cylindrical and centreless grinding setups, Grinding machines, Lapping, Honing, Super finishing, Polishing and Buffing operations, Machines and operation parameters.
8.	**Measurement and Gauging:** Standards, limits, fits and tolerances, Indirect measurements, Straightness and flatness testing, Surface finish measurement, Limit gauging, Taylors gauging principle, Gauging of taper angle, Gauge design, Measurement of screw threads and gears.

List of Experiments:

1. Study of Machine tools. (Lathe, shaper, slotter)
2. Study of Machine tools (Grinding, Milling and Drilling)
3. Group job on lathe (No. of turns = 02)
4. Group job on grinding machine.
5. Group job on milling machine.
6. Study of tooling requirements.
7. Group job on Boring (No. of turns = 02).
8. Group job on Capstan lathe.
9. Machine tool Alignment.
10. Helical Gear Cutting on Milling.

Reference Books:

1. W.A.J.CHAPMAN, Workshop Technology Volume I, II, II, CBS Publishers.
2. S.K.Hajra Choudhary, Workshop Technology Volume II, Media Promoters and Publishers.
3. Dr.R.P.Arora & Prof.B.K.Ragunath, Manufacturing Processes – I (First Edition), Atul Prakashan.
4. O.P. Khanna, Manufacturing Processes.
5. J S Campbell, Principles of a Manufacturing Materials & Process, Tmh Edition.
6. Haslehurst, Manufacturing Technology, ELBS.