GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN MECHANICAL ENGINEERING
Semester – V

Subject Code**: 2351903**
Subject Name**: Machine Tools Technology**

Sr. No.	Subject Content	Hrs.
1.	**Introduction to Machine Tools Technology:** 1.1 Need, Scope & importance of Machine tools technology in industries. 1.2 List of major industries having machine tools in GUJARAT. 1.3 Need of attitude, knowledge & skill required for shop floor supervisor in Machine tools based industries. 1.6 Recall fundamentals: definitions of machine tool, cutting speed, feed, depth of cut, metal removal rate, surface finish symbols and values, cutting tools and their geometry.	2
2.	**Grinding and Super finishing Processes:** 2.1 Cutting action of Grinding Wheel. 2.2 Grinding Wheels: Types, materials , nomenclature, selection criteria and applications. 2.3 Terms associated with Grinding wheel operations. 2.4 Grinding and super finishing operations and machines : definition, constructional features, working principles, cutting parameters for "commonly used grinding wheels and work piece materials" and applications of following machine tools. • Surface (rotary and sliding) grinding machines. • Cylindrical (centre less, internal, external)grinding machines. • Bench and portable grinder. • Tool and cutter grinding machine. • Profile grinding. • Honing, Lapping and Super finishing. 2.5 Static and dynamic balancing of grinding wheels-need and Methods. 2.6 Methods of mounting work piece on cylindrical grinding Machines (Including chuck and mandrel).	8
3.	**Gear Manufacturing and Gear Finishing Processes:** 3.1 Nomenclature of spur and helical gear, types of gears. 3.2 Generating and forming processes. 3.3 Gear forming methods –Machine tools specification, working principles, process, cutting tools used with nomenclatures and cutting angles, cutting	8

	parameters. 3.4 Gear generating methods –Machine tools specification, working principles, process, cutting tools used with nomenclatures and cutting angles, cutting parameters. 3.5 Gear finishing methods-methods and working principles.	
4.	**Thread Production Methods:** 4.1 Various methods of thread productions, constructional features of thread production machines/processes, their working principles, cutting tools and cutting parameters, applications, advantages and limitations.	4
5.	**Broaching Machines:** 5.1 Need, types, constructional features and applications. 5.2 Broaching methods. 5.3 Shapes which can be broached. 5.4 Special features and comparison.	2
6.	**Jig Boring Machine:** 6.1 Need, constructional features, working principle and applications.	2
7.	**Single Spindle and Multi Spindle Automats:** 7.1 Need, constructional features, working principle and applications.	2
8.	**Special Purpose Machine Tools:** 8.1 Need, factors affecting constructional design and applications. 8.2 Comparison of SPM with other automates.	2
9.	**Nonconventional Methods of Machining:** 9.1 Need, constructional features, working principles ,tools, working parameters and applications: (ECM, EDM, USM, ECG, AJM, Plasma beam, laser, plasma arc machining, Electro beam machining, chemical machining.)	6
10	**CNC Machines (Computerized, Numerical Control):** 10.1 Evolution of CNC, definitions of NC, CNC, CAM and DNC. 10.2 Need of CNC. 10.3 Concept of numerical control. 10.4 Selection criteria for CNC. 10.5 Methods of machine controls. 10.6 Constructional features of CNC, elements of CNC and their functions with working principles. 10.7 Classifications of CNC Machines. 10.8 Various motors and controls used . 10.9 Axes nomenclature. 10.10 Latest development in CNC machines.	6
	Total	42

References Books:

1. Machine tools technology, G. S. Kandaswami.
2. All about machine tools, Gerling.
3. Machine tools, B. Chennov.
4. Machine tool Vol.-I to IV, Achercan.
5. Metal cutting technology & Experiments, K. G. Chaniramani.
6. Engineering Productivity Vol.1 & 2, W F Walker.
7. Principles of Engineering Production, Lissamay & Martin.
8. Production Engineering Sciences, Dr. P. C. Pande & C. K. Singh.
9. Fundamental of Metal Machining and Machine Tools, Boothroyd.
10. The Art of Tool & Cutter Grinding, S. P. Narang.
11. Production Technology, HMT.