



C.U.SHAH UNIVERSITY – Wadhwan City

FACULTY OF: - Technology and Engineering (Diploma Engineering)

DEPARTMENT OF: - Mechanical Engineering

SEMESTER: - IV **CODE:** - 2TE04MFE1

NAME OF SUBJECT: -Manufacturing Engineering –II _____.

Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/ Viva	TW	Pr	
<u>2TE04MFE1</u>	Manufacturing Engineering -II	03	00	04	07	05	30	1.5	70	03	30	20	----	150

Objective: - After completion of the course, student will familiar with :

- Fundamentals of cutting mechanics, kinematics, constructional features and selection criterion for various basic machine tools.
- Different types of cutting tools, cutting tool materials and tool holders used on the same machines.
- Machine tool, its types, functions, specifications, cutting parameters, operations carried out and safety precautions to be taken on it.
- Work holding devices and tool holding devices used on the same machines.

Prerequisites: - Workshop

Course outline:-

Sr. No.	Course Contents	Teaching Hours
1	Introduction and Mechanics of Cutting. Need, scope & importance of manufacturing processes in industries, Need of attitude, knowledge & skill required for shop floor supervisor in machine tools based industries. Mechanics of cutting action, forming and generating processes and orthogonal and oblique cutting. (Without derivation), Chip formation, types of chips, chip breakers and types of chip breakers, Concept and definition of cutting variables i.e. cutting speed, feed and depth of cut and Influence of it on surface finish, tool life, economy, and mass production, Cutting fluid- basic need, types, properties and its applications Safety precautions in machine tools	6
2	Basic Machine Tools - I. Define machine tool, types of machine tools-Basic machine tools, Production machine tools and Special purpose machine tools, types of basic machine tool, Movements of tool, job, slides and work holding devices during cutting operation on various machine tools Lathe machine - Working principle (using block diagram), types. of lathe machine and applications of each types, Construction of Centre lathe machine (using block diagram), principal units and their function. All geared head stock and its constructional features, Detailed specifications of S. S. & S. C. lathe machine, Operations performed in centre lathe machine, Kinematics of lathe machine - (drive, head stock, feedbox, carriage, cross slide, compound slide, saddle, apron, tailstock) constructional sketch and working, Lathe accessories, Lathe mechanisms, Feed mechanism and screw cutting mechanism, and back gear mechanism, constructional sketch and working, Thread cutting in lathe machine, concept, gear ratio and setting of change gears, constructional sketch and working, Metal	12

	removal rate 2.10 Drilling machine Working principle (using block diagram), constructional features (using block diagram), classification of drilling machine, detailed specifications and operations performed, Radial drilling machine - constructional features, detailed specifications and kinematics (drive, spindle speeds, feed mechanism, radial movement, etc.) constructional sketch, working, and use, Work holding and tool holding devices- constructional sketch, working and applications, Metal removal rate (MRR)	
3	Basic Machine Tools- Ii. Milling machine - working principle (using block diagram), classifications, constructional features, detailed specifications and operations performed (peripheral and face milling – up milling and down milling), Kinematics (drive, spindle speeds, feed mechanism, table movement, etc.) constructional sketch, working, and use, Milling cutters-types and applications, Indexing-dividing head- constructional sketch, working, and use, methods of indexing (simple, differential, compound and angular indexing) with simple numerical, Work holding and cutter holding devices- constructional sketch, working and applications, Metal removal rate (MRR).	8
4	Basic Machine Tools-Iii. Shaping machine - working principle (using block diagram), constructional features, classification, detailed specifications and operations performed, Quick return mechanisms-kinematic sketch, working and advantages, Work holding devices- constructional sketch, working and applications. Slotting machine -working principle (using block diagram), constructional features, classification, detailed specifications and operations performed, Work holding devices- constructional sketch, working and applications. Planing machine - working principle (using block diagram), constructional features, classification, detailed specifications of double column planner and operations performed, Work holding devices- constructional sketch, working and applications.	6
5	Cutting Tools. Define cutting tool, types of cutting tool, cutting tool materials (composition and properties), cutting tool angles and their functions, Various cutting tools (with tool geometry, nomenclature, tool materials, sketch/drawing of each) used for various operations on lathe, milling and drilling machines(Single point cutting tool, Plain milling cutter, Side and face milling cutter, Centre drill, Twist drill), Tool life, tool wear and machinability, factors affecting them, Re-sharpening of cutting tools specified at above	6
6	Installation, Erection And Commissioning Of Machine Tools. Introduction, Design and planning of foundation, Erection and commissioning of equipments, Alignment and testing of equipments.	4

List of Experiments:-

- Introduction of shop floor activity and preparation of job drawings.
- Preparatory activity.
For given work piece and tool material; select, set and observe cutting speed, feed and depth of cut on lathe machine. Also define these terms, Calculate metal removal rate (MRR) for above case, Identify various cutting tools, its geometry and material available at workshop. Sketch them, Identify various carbide inserts and ISO codification, Calculate revolution per minute (RPM) for lathe, milling cutter and drill spindle based on given data.
- Effect of varying work piece materials.
Demonstrate type of chips, surface finishes and tool life for varying work piece material with same cutting parameters. Tabulate the observations.
- Job preparation on lathe machine - turning exercise.
Job preparation on milling machine - milling exercise
- Job preparation on shaper machine – shaping exercise
- To grind a single point cutting tool.
- To study erection, installation, foundation and testing of a newly installed machine in shop.
- Industrial visit
- Mini project and presentation.

Learning Outcomes:-

- Explain mechanics of cutting.
- Classify and explain working of basic machine tools with kinematics.
- Observe and conclude the effect of varying tool materials, cutting parameters and work piece materials.
- Interpret and select tool and tool holder designation system.
- Identify the machine tool and select cutting parameters for given job.
- Produce the job as per given drawing.

Books Recommended:

- Workshop Technology I & II, Raghuwanshi, Dhanpat Rai and Company(P) Limited
- Workshop Technology I, II & III, W. A. J. Chapman, Viva books
- Production Technology, R. K. Jain and S. C. Gupta, Khanna Publishers
- Workshop Technology Volume . II , Hajra Choudhary, Bose S., Media promotors and publishers pvt. Limited
- Manufacturing Processes, S. E. Rusinoff, Times of India Press
- Production Technology, HMT, Tata McGraw-Hill Publishing Co
- Manufacturing processes – I, Bava, McGraw-Hill