INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**4**
COURSE TITLE	**MANUFACTURING PROCESS-II**
COURSE CODE	**09ME2405**
COURSE CREDITS	**3**

Objective:

1 This subject provides knowledge regarding different types of machining operations for conversion into finished product. This course will make student familiar with fundamentals of cutting mechanics, kinematics, constructional features and selection criterion for various basic machine tools and automates with some basic exposure to conventional work holding devices and cutting tools and tool holders used on the same machines. As a technician the knowledge and practical skills of different type of machine are essential and hence emphasis is also given in this course towards skills development. Further the technician should be able to handle machine, equipment, tools and accessories in the recommended manner and also follow safety precautions.

Course Outcomes: After completion of this course, student will be able to:

1 Explain mechanics of cutting and the effect of varying cutting parameters.

2 Explain working principles, classification, construction and operation of various type of machine tools

3 Observe and conclude the effect of varying tool materials, cutting parameters and work piece materials.

4 Select tool and tool holder designation system.

5 Identify the machine tools and select cutting parameter for given job.

6 Manufacture the variety of component as per given drawing.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	6	0	30	20	25	25

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Contents : Unit	Topics	Contact Hours
1	**Introduction to mechanics of cutting** Need, Scope & importance of manufacturing processes in industries, Need knowledge & Skill required for shop floor supervisor in machine tools based industries, Difference of forming and generating processes, Orthogonal cutting, oblique cutting, (Without derivation),Forces acting on tool and chip, chip formation and type of chip, Concept and definition of cutting speed, feed and depth of cut, Basic need, types, properties and applicationsof cutting fluids, Safety precautions in machine tools.	0
2	**Basic Machine tools-I** Classify basic machine tools, Movements of job, slides, tool, Work holding devices during cutting operation on various machine tools, Lathe machine, types and working principle, Kinematics-(drive, head stock, feedbox, carriage, cross slide, top slide, swivel, apron, tailstock, operations on lathe machine, Work holding devices-(3 jaw chuck, 4 jaw chuck, face plate, centers), Thread cutting setting-concept methods and simple numerical, Metal removal rate (MRR) – concept and method to calculate on lathe, Drilling machine type and working principle, Kinematics (drive, spindle speeds, feed mechanism, radial movement), Tool holding and setting methods, operations on drill machine, Work holding devices, Metal removal rate (MRR) (MRR) –method to calculate on drilling machine.	0
3	**Basic Machine tools-II** Milling Machine type and working principle, Constructional features, Kinematics (drive, spindle speeds, feed mechanism, table movement), operations on milling machine, Type of milling cutters, concept of up-milling and down milling, advantage, disadvantage and application, Indexing-dividing head, Indexing-dividing head-constructional sketch, working, and use, Simple, differential and compound indexing methods with simple numerical, Work holding devices, Metal removal rate (MRR)	0
4	**Basic Machine tools-III** Shaping machine type and working principle, Constructional features, operations on shaping machine, Quick return mechanisms, work holding device, Slotting machine type and working principle, operations on shaping machine, Work holding device, operations on slotting machine, Planning machine type and working principle, operations on planning machine, work holding device, operations on planning machine	0
5	**Cutting tools & tools holders** Various type of cutting tool material and their properties, compositions, Carbide inserts-Need, Benefits, Designation method for turning, milling and drilling (As per ISO), Tool holders for carbide inserts, Mounting and replacement methods of carbide insert, Cutting tool angles and their functions, 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	0

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Contents : Unit	Topics	Contact Hours
6	**Automates** Capstan and turret lathe- working principle and constructional features, difference between Capstan and turret lathe, Turret lathe in comparison with basic Centre lathe, Work holding devices, Single spindle Automats, working principle, application, Collets-constructional features and applications.	0
Total Hours		**0**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Preparation of single point cutting tool of mild steel material** Preparation of single point cutting tool of mild steel material	6
2	**Demonstration of lathe machine** Demonstration of lathe machine	8
3	**Prepare a job of given drawing on lathe machine** Prepare a job of given drawing on lathe machine	10
4	**Prepare a job of given drawing by thread cutting operations** Prepare a job of given drawing by thread cutting operations	6
5	**Demonstration of drilling machine** Demonstration of drilling machine	6
6	**Prepare a job of given drawing on drilling machine** Prepare a job of given drawing on drilling machine	6
7	**Demonstration of shaper machine** Demonstration of shaper machine	6
8	**Prepare a job of given drawing on shaper machine** Prepare a job of given drawing on shaper machine	10
9	**Demonstration of slotting** Demonstration of slotting	4
10	**Demonstration of milling machine** Demonstration of milling machine	8
11	**Prepare a job of given drawing on milling machine** Prepare a job of given drawing on milling machine	8
12	**Demonstration of surface grinding machine** Demonstration of surface grinding machine	6
Total Hours		**84**

Textbook :

1 Manufacturing Engineering-II, R.R.Mahitcha , Atul prakashan , 2017

2 Manufacturing Engineering-II(Gujarati), R.R.Mahitcha, Atul prakashan, 2017

References:

1 Workshop Technology (vol-II), Workshop Technology (vol-II), S. K. Hajra Choudhury, MPP, 2010

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
22.00	40.00	38.00			

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, Quiz, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1 https://nptel.ac.in/courses/112104195

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