GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
Course Curriculum
MARINE WORKSHOP TECHNOLOGY-2
(Code: 3341806)

Diploma Programme in which this course is offered	Semester in which offered
Marine Engineering	4th Semester

1. RATIONALE

To provide the concepts and working principles of special machineries and recent trends in Manufacturing.

2. COMPETENCY

- To understand the concept and working of standard machine tools such as shaping, planner and allied machines, milling, drilling and allied machines.
- To understand the basic concepts of (CNC) Computer Numerical Control of Machine tools

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	4	7	70	30*	40	60	200

Legends: L -Lecture; **T -**Tutorial/Teacher Guided Student Activity; **P -**Practical; **C -** Credit; **ESE**-End Semester Examination; **PA** -Progressive Assessment.

* 30 marks of Theory PA include two assignments each of 5 marks. First assignment must have total 12 numerical from Unit number I,II and III. Second assignment must be of 10 numerical from Unit number IV and V and report on student activities performed. Each numerical of each assignment must have different parameters for each student, that is each student will get total 22 numerical with same problem but with varied parameters. (Values of temperature, pressure, volume, etc may be different for each student.).

4. COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I **CENTRE LATHE**	1.a Introduction 1.b Principal parts 1.c Working and operations.	1.1 Theory of lathes – specifications – principal parts – head stock . 1.2 Back geared type – all geared type – tumbler gear mechanism – quick change gear box – apron mechanism – carriage cross slide . 1.3 Automatic, longitudinal and cross feed mechanism – tail stock and its functions . 1.4 Work holding device –face plate – three jaw chuck – four jaw chuck – catch plate and carrier – types of centers – machining operations done on lathe. 1.5 Straight turning – step turning – taper turning – knurling – Thread cutting – Facing. 1.6 Boring – chamfering – cutting speed – feed – depth of cut.
Unit – II **DRILLING MACHINES**	2.a Drills & Types 2.b Methods of holding	2.1 Drills- twist drills – nomenclature – types of drilling machines – bench type – floor type – radial type – gang drill – multi spindle type – principle of operation in drilling — speeds and feeds of various materials – drilling holes – method of holding drill bit – drill chucks – socket and sleeve – drilling operation – reaming – counter boring – counter sinking – spot facing – tapping – deep hole drilling

Unit – III **MILLING MACHINES.**	3.a Types & Nomenclature 3.b Milling Process	3.1 Types- column and knee type – plain milling machine – universal milling machine – vertical milling machine – specifications of milling machines- 3.2 Principles of operation-work and tool holding devices – arbor – stub arbor – spring collet – adapter – milling cutters – cylindrical milling cutter – slitting cutter-side milling cutter – angle milling cutter – T-slot milling cutter – woodruff milling cutter – fly cutter – nomenclature of cylindrical milling cutter. 3.3 Milling process – conventional milling – climb milling – milling operations – straddle milling – gang milling.
Unit – IV **ABRASIVE PROCESS**	4.a Types & Classification 4.b Grinding wheel operations	4.1 Types and classification – specifications – rough grinding – pedestal grinders- portable grinders – belt grinders – precision grinding-cylindrical grinder- center less grinders – surface grinder – tool and cutter grinder – planetary grinders. 4.2 Principles of operations – grinding wheels – abrasives-natural and artificial diamond wheels – types of bonds – grit, grade and structure of wheels – wheel shapes and sizes – standard marking systems of grinding wheels – selection of grinding wheel – mounting of grinding wheels – Dressing and Truing of wheels – Balancing of grinding wheels.
Unit – V **RECIPROCATING MACHINES**	1.a Planer 1.b Shaper 1.c Slotter	5.1 Introduction, Types of planers – description of double housing planer-specifications-principles of operation- drives. 5.2 Quick return mechanism-feed mechanism- work holding devices. Thermodynamics properties & their units. 5.3 Types of shapers- specifications-standard-plain- universal -principles of operation –drives- quick return mechanism-crank and slotted link-feed mechanism- work holding devices . Zeroth law of

		thermodynamics and its application. 5.4 Types of slotter - specifications- method of operations- Whitworth quick return mechanism- feed mechanism – work holding devices.
UNIT VI **COMPUTER NUMERICAL CONTROL (CNC) MACHINE OPERATIONS**	6a. Definitions & Principles 6b. Difference Between NC & CNC 6c. Types of turning center 6d. Types of machining centre	6.1 Numerical control – definition components of NC systems – working principle of a CNC system distinguishing features of CNC Mach ines - advantage of CNC machines. 6.2 Difference between NC and CNC. 6.3 Types of turning Centre: horizontal, vertical.

5. SUGGESTED SPECIFICATIONTABLE WITH HOURS & MARKS(THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Centre Lathe	10	04	05	06	15
II	Drilling Machines	06	03	03	04	10
III	Milling Machines	06	02	03	02	07
IV	Abrasive Process	05	03	02	02	07
V	Reciprocating Machines	08	04	07	05	16
VI	Computer Numerical Control Machine Operations	07	04	06	05	15
Total		**42**	**20**	**26**	**24**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Notes:

1. This specification table shall be treated as a general guideline for students and Teachers. The actual distribution of marks in the question paper may slightly vary from above Table.
2. If mid sem test is part of continuous evaluation, unit numbers I, II and unit III up to 3.4 are to be considered.
3. Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.

6. SUGGESTED LIST OF PRACTICAL/EXERCISES

Excercises :

Drilling:

a) Through hole drilling

b) Through hole drilling with counter sunk

c) Part drilling

d) Through hole drilling (on pitch circle)

Milling:

a) Milling a cube

b) Milling a slot

c) Milling a gear

Grinding:

a)Surface grinding

Lathe:

a) Plain turning

b) Step turning

c) Taper turning

d)Thread cutting

e) Drilling

f) Knurling

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Carry out the activites according to above mentioned exercises.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

Not Applicable

9. SUGGESTED LEARNING RESOURCES

(A) List of Books:

1) Elements of workshop Technology By S.K Hajra Choudhury , A.K Hajra Choudhury & Nirjhar Roy Volume I & II, Media promoters & Publishers (P) Ltd-2004

2) A Text book of workshop Technology, R. S. Khurmi & J. K. Gupta, S.Chand & Co., Ram Nagar, New Delhi – 2006

3) A Text book of Foundry Technology, O.P.Khanna, Dhanpat Rai Publications(P) Ltd-2000

4) A Text book of Production Technology, O.P.Khanna, M.Lal, Dhanpat Rai Publications(P) Ltd-2002

Reference Books

1) Shop Theory ,James Anderson, Earl E.Tatro Sixth Edition , Tata Macraw- Hill Publishing Co Ltd- 2001.

2) Technology of Machine Tools, Fourth Edition, Steeve F.KRAR, J. William Oswald, Tata Macraw- Hill Publishing Co Ltd-Singapore-1991.

3) Automation production systems and computer –Integrated manufacturing, Mikell.P.Groover, Prentice- Hall of india private Ltd, 2003.

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

FACULTY MEMBERS FROM POLYTECHNIC

- **Prof Nair Gopikrishnan**
  (Lecturer in Marine engineering Govt Polytechnic Diu)

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