

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**Course Curriculum****MACHINE DRAWING****(Code: 3346307)**

Diploma Programme in which this course is offered	Semester in which offered
Agricultural Engineering	Fourth

1. RATIONALE.

The students of Agriculture Engineering programme are mainly involved in drafting, manufacturing, inspection and planning activities (such as preparing process plans, preparing bill of materials, etc.) at industries. For all such activities, reference document is the drawing of components assemblies to be manufactured. In this context, it is of utmost priority to prepare, read and interpret these drawings correctly for production of Components and assemblies accurately and precisely. The industrial practices of drafting are also important for the students to make them aware of drafting practices, symbols, codes, norms and standards generally used in industries. Development of sketching ability also strengthens effective engineering communication & presentation.

2. LIST OF COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies.

- i. Prepare machine drawings using codes, norms and standards.
- ii. Interpret machine drawing for various planning, inspection and manufacturing activities.

3. TEACHING AND EXAMINATION SCHEME.

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	ESE	PA	ESE	PA	100
00	00	04	04	0	0	60	40	

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, ESE -End Semester Examination; PA - Progressive Assessment.

4. COURSE DETAILS.

Unit	Major Learning Outcomes	Topics and Subtopics
UNIT – 1 LIMITS, FITS AND MACHINING SYMBOLS	1.1 Limits and Fits 1.2 Surface Roughness	1.1 Introduction 1.2 Limits and Fits 1.3 Needs of Limits and Fits 1.4 Tolerance 1.5 Allowance 1.6 Application of Tolerances 1.7 Selected Assembly 1.8 General Tolerance 1.9 Tolerance of Form and Position 1.10 Unilateral and Bilateral Tolerance 1.11 Grade of Tolerance 1.12 Size of Tolerance 1.13 Tolerance of Angles 1.14 Clearance 1.15 Interference 1.16 Types of Fits 1.17 Symbol for Tolerances Deviations and for fits 1.18 Standard Tolerances 1.19 Limit Gauges 1.20 Hole basis and shaft basis system 1.21 Machining Symbol and Surface Finishes 1.22 Indication of Surface Roughness 1.23 Methods of placing Machining symbols on Orthographic Views
UNIT – 2 SHAFT COUPLINGS	2.1 Rigid Flange coupling 2.2 Flange Coupling and Flexible Bushed Pin Coupling.	2.1 Types of Shafts Couplings 2.2 Rigid Couplings and their types <ul style="list-style-type: none"> i. Sleeve or Muff Coupling ii. Clamp or Split-muff or Compression Coupling iii. Flange Coupling 2.3 Muff Coupling 2.4 Clamp Coupling 2.5 Flange Coupling 2.6 Flexible Couplings <ul style="list-style-type: none"> i. Oldham coupling ii. Universal coupling (Hooke's Joint)

Unit	Major Learning Outcomes	Topics and Subtopics
UNIT – 3 BEARINGS	3.1 Introduction of Bearing 3.2 Types of Bearing	3.1 Introduction Of Bearing 3.2 Types Of Bearing 3.3 Simple Journal Bearing 3.4 Bushed Bearing 3.5 Open Bearing 3.6 Methods Of Preventing Rotation Of Brasses In A Bearing 3.7 Plummer Block 3.8 Foot Step Bearing 3.9 Ball And Roller Bearing 3.10 Self Aligning Bearing 3.11 Introduction of Brackets
UNIT – 4 PIPE JOINTS	4.1 Symbols for piping and layout plan of piping 4.2 Flanged joint 4.3 Socket and spigot joint 4.4 Union joint 4.5 Expansion pipe joint	4.1 Introduction. 4.2 Types of Pipes 4.3 Pipe Material 4.4 Size of pipe 4.5 Different pipes and their uses 4.6 Forms of Pipe Joint 4.7 Cast iron Flanged Joint 4.8 Spigot and Socket Joint 4.9 Hydraulic Pipe joint 4.10 Expansion Joint 4.11 Union Joint 4.12 Symbols For pipe fittings
UNIT – 5 I.C.ENGINE PARTS	5.1 Introduction 5.2 Stationary Parts Of I.C Engine 5.3 Reciprocating Parts Of I.C Engine 5.4 Revolving Parts of I.C Engine	5.1 Introduction 5.2 I.C Engine 5.3 I.C Engine Parts 5.4 Stationary Parts 5.5 Reciprocating Parts 5.6 Revolving Parts 5.7 Connecting Rod, Crank Shaft, Cam Shaft 5.8 Atomizer or fuel injector 5.9 Fuel Pump

6. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Approx Hours. required
1	II	Prepare Sheet of Oldham Coupling using given data.	04
2	II	Prepare Sheet of Universal Coupling using given data.	04
3	III	Prepare Sheet of Bushed Bearing using given data.	04
4	III	Prepare Sheet of Foot step Bearing using given data.	04
5	III	Prepare Sheet of Plummer block using given data.	04
6	III	Prepare Sheet of self aligning bearing using given data.	02
7	III	Prepare Sheet of Brackets using given data.	04
8	IV	Prepare Sheet of Symbols for piping and layout plan of piping.	02
9	IV	Prepare Sheet of Flanged joint using given data.	04
10	IV	Prepare Sheet of Socket and spigot joint using given data.	04
11	IV	Prepare Sheet of Union joint using given data.	04
12	IV	Prepare Sheet of Expansion pipe joint using given data.	02
13	V	Prepare Sheet of I.C. engine connecting rods using given data.	04
14	V	Prepare Sheet of I.C Engine Piston using given data.	04
15	VI	Prepare Sheet of Screw Jack using given data	04
Total Hours			52

7. SUGGESTED LIST OF STUDENT ACTIVITIES.

SR.NO.	ACTIVITY
1	Prepare student reports as asked in experiments.
2	Visit the Bearing merchant. Collect the information on types and appearance of Bearing and its material, size and specification chart sold by them.
3	Visit the nearer Hardware merchant. Collect the information on type of pipe fittings being sold by them.
4	Visit nearer Garage. Collect the information on I.C engine piston and connecting rod and accessories being serviced by them.

8. SUGGESTED LEARNING RESOURCES.

A. List of Books:

S. No.	Title of Book	Author	Publication
1.	Machine Drawing	P.S. Gill	S.K. Kataria and Sons, Delhi.
2.	Machine Drawing	R.K. Dhawan	S. Chand and Company, Delhi.
3.	Machine Drawing	R.B. Gupta	Satya Parkashan, New Delhi.
4.	Machine Drawing	N.D. Bhatt	Charotar Publishing House.

B. List of Major Equipment/ Instrument with Broad Specifications:

1. Various machined parts assemblies.
2. Set of various industrial updated drawings being used by industries.
3. Large size drawing equipments and instruments for class room teaching-.
4. Half imperial size drawing board.
5. T-square or drafter (Drafting Machine).
6. Set squares (450 and 300-600).
7. Protector.
8. Drawing instrument box (containing compasses and divider).
9. Drawing sheets.
10. Drawing pencils.
11. Eraser.
12. Drawing pins / clips.

C. List of Software/Learning Websites.

1. <http://www.youtube.com/watch?v=P5g5omLoDr8>
2. <http://www.techdrawingtools.com/12/11201.htm>
3. <http://www.wermac.org/documents/isometric.html>
4. <http://www.me.metu.edu.tr/courses/me114/Lectures/assembly.htm>
5. http://metal.brightcookie.com/2_draw/draw_t1/hm/draw1_2_1.htm
6. <http://www.ductedreversecycleairconditioning.com.au/category/37165122>
7. http://www.affordablecomfort.org/images/Events/15/Courses/422/Proctor_TAM07.pdf
8. http://www.sevenhillsh.schools.nsw.edu.au/Graphics_TG201/Orthographic/Drawort ho.htm
9. www.design-technology.info
10. www.studyvilla.com
11. www.authorstream.com
12. Computer based learning material published by KOROS.

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Member from Polytechnics.