4035 - MACHINE DRAWING - II

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credit			Theory		Practical Ex.	Total
2	4	6	0	50	3 Hrs.	100	-	150

Pre-requisite	Source
4033	MEC

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	50	-	150

Rationale:- By this time the student has gained basic knowledge of working drawing . Hence in this course stress will be given on how to prepare a working drawing currently representing all relevant details by following standard practice as per ISI, IS-696,-1972 Also to read, from the given working drawing, the student should gain the competency to confidently interpret working drawings, and instruct workers carrying out production work.

Objectives:- i) Given the name/incomplete drawing, the student shall be able to draw hand sketches of the listed components/engine parts.

ii) Given details the student shall be able to draw assembly or vice-versa or given incomplete assembly drawing the student shall be able to detect missing details and redraw correctly the given drawing showing missing details

iii) Given a description, the student shall be able to draw correctly showing specified details and make a working drawing of machine parts/ piping/or welding fabrication drawing.

iv) Given a working drawing of a machine part/piping drawing/welding or fabrication drawing, the student shall be able to short answer (specified) questions in words.

COURSE CONTENTS	Hrs	Mks
1. FREE HAND SKETCHING 1. Given the name or the functional requirement student shall be able to sketch freehand orthographic views of: Cotter joints, Socket and spigot joint., sleeve and cotter joint; gib and cotter joint, Knuckle joint, 2. Couplings : Rigid coupling, muff coupling, claw coupling, flange coupling (protected), flexible (pin type) coupling, old hams coupling, universal coupling. 3. Pulleys- V. belt pulleys, step cone pulley, flat belt pulley, webbed wheels, spoked wheels. 4. Bearings: bushed bearing, plummer block; foot step bearing thrust bearing. 5. Pipe joints- Socket joint, socket and spigot, union-joint, expansion joint, hangers; rollers.	8+5	15
2. ASSEMBLY DRAWINGS Assembly to details and vice-versa only from the following and preferably those consisting of maximum of 8 parts/components. Pedestal bearing, simple eccentric (seam engine), screw jack, footstep bearing, IC-engine piston and connecting rod assembly, locomotive connecting rod end assembly, valve box assembly, steam stop valve, non-return valve, stuffing box.	6+10	20
3. WORKING DRAWING – MACHINE PARTS IS 696 – 1972 A) How to identify machining operations from the surface finish indicated on the drawing. Rough machining, fine machining, grinding, lapping, drilling, reaming, tapping, counter boring, counter sinking, key way cutting, gear cutting (spur, helical, bevel). How to indicate limits, tolerances, fits. Given the description to prepare a working drawing indicating above details. Given the drawing and details of modifications needed – to redraw- suitably indicating changes. Given the drawing, to indicate surface texture and geometrical tolerance as per SP 46 – 1988 B) Working drawings-piping IS 696 – 1972. Given isometric line drawing- to prepare	13+ 34	45

orthographic single or double line drawings indicating dimensions, levels and other requirements. Given the orthographic drawing to prepare single line isometric drawings indicating dimensions and levels. Note:- Details covered in folder work also to be taught –IS 996- 1972 and IS 813-1969 C)

C) Working drawings, –welding/ fabrication. Given the description to prepare orthographic drawing indicating weld symbol, sizes, finish and requirement like site weld, weld all round, erection weld, intermitted weld, etc. Given the drawing and the modification needed, to alter and redraw the given drawing correctly. Simple fabrication drawing involving maximum of four components. Welded pipe joint with flanges etc.

D) Blue Print Reading IS 696 – 1972 Students shall answer this question like theory paper i.e. by writing in words. Given a working drawing to answer in words details covered under 3A, 3B, 3C, and Name the tools required, measuring instruments needed, sequence of operations, machines on which the operation can be done, work out blank size; functional requirements of the component, measurements, surface finish, and any other similar details.

Total	96	100

TERM WORK

1. Sub sheet-1- Free hand sketching - 2 or 3 – components/machine part/engine parts from among the listed items; of them one should be either details to assembly or assembly to details.

Sub-sheet- 2- on Assembly drawing - either assembly to details or vice – versa. Any one from among listed in this chapter.

Sub sheet 3 and 4- (two sheets) on working drawings.

2. Two working drawings of any of the machine parts/engine parts from among those listed or any other similar ones. - Sheet No. 3
3. One each on piping and welding – sheet No, 4
4) An appropriate working drawing given 80% of the details in the chapter

To draw as a working drawing to scale and minimum 15 questions i.e. short answer questions based on this where the students will read and draw inferences to answer the questions. Preferably one drawing should be given to a maximum group of 10 students so that entire class does not indulge in blind copying. Sheet No. 5

5) Answers written shall be part of the term work.
6) a) Free hand sketch of components of any one of the machine parts listed above. b) Assignment on Auto Cad on details, Assembly & working drawing of above machine parts at 6 (a)

SUGGESTIVE PATTERN OF QUESTION PAPER

Q.1) 20 marks- 4 bits of 5 marks or 5 bits of 4 marks- Min. 8 options out of which 4/5 to be attempted.

Q.2) 15 marks – 3 bits of 8 marks –of which two to be attempted, Based on chap. 1 free hand sketching.

Q. 3) 16 marks –Details to assembly or vice-versa, if details to assembly any two views, of which one sectional view (marks 10),and other views(marks 6) If assembly to details, Any two components-two views of each, 8 marks each

Q.4) 16 marks - given decription and basic drawing, Redraw incorporating specified details and indicate limit, tolerances, surface finish etc, one detailed view-alternately if simple drawing is given two views can be asked.

Q.5) 16 marks- Two bits of 8 marks each, having an option of which any one to be attempted. One based on piping drawing another based on welding drawing.

Q.6). 16 marks- Based on blue print reading Min.15 Nos.of short answer/questions based on a given working training– 8 to be attempted. Answers to be written in words.

DETAILS OF FOLDER WORK

It shall consist of minimum 15 Nos. of A-2 size sheets preferably in a plastic file or cover etc.

1) Freehand Sketching: Minimum 2 items from each of –cotter joints, couplings, pulleys, bearings, pipe item joints.
For each item min. two view-preferably one should be sectional.
2) Assembly drawings: At least one from assembly to details and from details to assembly.
3) Working Drawings:- A- Machine Parts- min. 2 components.
i) Given the details-draw the specified views and indicate all machinery details, limit, parts tolerances etc. – One exercise based on this.
ii) Given a working drawing modify and redrew as specified –one exercised based on this.
B- Working Drawings- Piping;-
i) Given a description/and/or bldg. Plan or plan of any industry- to prepare an orthographic/ isometric line sketch of the one exercise based on this.
ii) To work length of pipe, fitting etc. –required to carry out the piping –one exercise based on this.
C - Working Drawing-Welding/fabrication IS 696-1972 and IS 813-1961
Welding together in different positions-of various steel sections like angles, channels, H-section, etc. to MS plates-or one section to other section.
Welding together hollow cylindrical parts to base plates and supporting with ribs, fabricated pulleys with spokes and welds etc. In all such cases, orthographic drawings to given to prepare a welding drawing, minimum-four exercises based on above.
D- Blue Print Reading, Minimum three exercises based on this, one each on – machine components, piping drawing, welding drawing.
Working drawing to be provided to the students. The teacher shall draw at least 10-15 questions asking for machining details, finish required, fit/limit/tolerances indicated, how to measure/determine these details etc. Preferably the question should be given group wise i.e. students can be divided in groups 4 or 5 and each group will have separate set of questions. This will reduce the risk of mass copying without understanding blue print reading.

REFERENCE BOOKS

1. Machine Drawing by N.D. Bhatt.
2. Machine Drawing by Gopalkrishnan
3. Machine Drawing by Kannaiyyah
4. Machine Drawing by P.S. Gill
5. Machine Drawing by Sidheshwar Shatry