

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma in Fabrication Technology

Semester : 4

Subject Name: Plant Equipment Maintenance & Erection.

Sr. No.	Course Content
1.	PLANT EQUIPMENT AND ITS APPLICATION 1.1 Introduction • Types of plant i.e. Chemical, Fertilizer, Oil, Gas, Petrochemical & Power Plant • Classification of Plant equipment ○ Rotary Equipment & Static equipment 1.2 Valve. • Types, Specification, Function and Elements 1.3 Pump. • Classification and Application of Centrifugal and Reciprocating Pump. • Comparison Between centrifugal and Reciprocating Pump. 1.4 Compressor • Introduction, Application, Classification of compressor. • Elements of centrifugal compressor • Installation of compressor. 1.5 Fan and Blower • Difference Between Fan and Blower • Types, Construction and Application. 1.6 Industrial Piping • Fluid Mechanics Concept ○ Properties Of Fluids ○ Fluids Kinematics ○ Flow Through pipes • Types Of Pipes • Piping Elements • Expansion Joint 1.7 Static Equipment • Boilers • Pressure vessels • Columns • Heat exchangers • Cooling towers • Storage tanks
2.	POWER PLANT MACHINERY EQUIPMENT AND ITS APPLICATION 2.1 Different types of power plants. 2.2 Schematic diagram of power plants. 2.3 Introduction of power plant machinery, equipment & its application. • Thermal

	• Nuclear • Hydro
3.	MAINTENANCE OF PLANT EQUIPMENT 3.1 Maintenance engineering • Definition • Primary & secondary function & responsibilities of maintenance department • Types, comparison of maintenance, types of fault & periodic inspection assemblies, disassembly, repair & overhaul • Maintainability ○ Definition, objectives 3.2 Maintenance cost & replacement economy • Definition, factor affecting maintenance cost • Deciding factor for replacement v/s maintenance 3.3 Service life of an equipment • Definition, factor affecting service life • Methods of promoting service life of an equipment 3.4 Recovery methods • Meaning, methods, working principle, advantages, limitation & application of recovery methods 3.5 Preventive maintenance • Definition, need, major activities, steps involved, advantages, limitation & application • Preventive maintenance schedule, Repair complexities and Repair cycle 3.6 Corrosion • Types, definition, causes and remedies 3.7 Total Productive Maintenance (T.P.M.), Condition Based Maintenance (C.B.M.), Condition Monitoring (C.M.) • Definition, principle, advantages & limitation 3.8 Basic Concept of Maintenance • Rotary equipment • Static equipment 3.9 Shut down planning for plant maintenance
4.	TRIBOLOGY 4.1 Need, Scope and Importance of TRIBOLOGY 4.2 Wear-types, causes & prevention 4.3 Friction & its effect 4.4 Wear reduction methods 4.5 Lubrication & lubrication procedure 4.6 Bearing & its types
5.	ERECTION & INSTALLATION EQUIPMENTS 5.1 Classification and Application. • Crane. • Rope. • Chain & hoists. • Slings. • C.G. calculation of simple shapes.. 5.2 Erection Installation of Process Equipment

	• Advance planning ○ Availability of all drawings ○ Good housekeeping at site for easy identification of materials & accident prevention ○ Schedule for shipping men, materials & equipments ○ Erection procedure with time schedule ○ Men, materials & equipments ○ Proper lighting ventilation & other facilities ○ Safety instructions • Site operations. ○ Physical checking of the dimensions of the process equipments ○ Physical checking of the dimensions of the foundations ○ Suitable method for material handing by lifting devices ○ Selection of proper tools and tackles ○ Hoisting and position the vessel on the foundation ○ Aligning and leveling the vessel ○ Final tightening by pneumatic torque wrench ○ Pressure testing.
6.	FOUNDATION OF EQUIPMENT 6.1 Foundation. • Introduction • Definition • Effect of proper foundation • Function of foundation • Classification of foundation • Design/consideration of foundation • Foundation material • Concrete mixture for industrial equipment • Foundation size & plant

Laboratory Experience :

Exper ience No.	Description of Laboratory Experience
1.	DEMONSTRATION & STUDY (REPORT / OBSERVATION WRITING) 1. Valve Maintenance 2. Pump Maintenance 3. Compressor Maintenance 4. Machine Tool Parts Maintenance 5. Welding Machine Maintenance 6. Piping Elements 7. Piping System 8. Process Equipment Model Erection & Installation
2.	JOB PREPARATION (WRITE SEQUENCE AND PARAMETERS OF OPERATION)
3.	SEMINAR & PRESENTATION

	1. Prepare a Seminar using Power Point Presentation / Transparencies on the topic covered in syllabus / beyond the syllabus 2. Give 10 minutes presentation 3. Group discussion
4.	PREPARATION OF MODELS , CHARTS QUIZ COMPETITION & SLOGANS (GROUP / INDIVIDUAL)
5.	INDUSTRIAL VISIT Term work content of industrial visit report should also include following a) Brief detail of industry visited b) Type, location, product, rough layout, human resource, etc of industry. c) Details, description and broads specification of machinery / process observed. d) Safety norms and precautions observed e) Student on observation on industrial environment, culture and attitude f) Any other detail / observation asked by accompanying faculty. Industrial visit of Power plant / Process industry
6.	SHEET & SKETCH WORK 1. Erection Drawing of Process Equipment 2. Foundation Drawing 3. Piping Elements (Pipe Fittings & Other Elements) 4. Prepare a Maintenance History Sheet
7.	REPORT WRITING 1. Pump, Valve & Compressor (Types, Specification, Function and Elements 2. Fan & Blower 3. Industrial Piping 4. Power Plants 5. Different types of Maintenance 6. Total Productive Maintenance 7. C.B.M. 8. C.M. 9. Tribology 10. Corrosion 11. C.G. Calculations of Simple Geometrical Shapes 12. Erection Installation of Typical Process Equipments 13. Foundation of Equipments
8.	BEYOND SYLLEBUS ACTIVITIES (DEVELOP CREATIVE & INNOVATIVE IDEAS AMONG STUDENTS) Display Article, Information, Sketch, under Knowledge Zone(K-Zone), Inspiration Zone(I-Zone) & Creative zone(C-Zone)
9.	LITERATURE SURVEY 1. Library Assignment 2. Internet Surfing 3. Refer Product Pamphlets 4. Technical Magazines
10.	SHOP TALK 10 minutes presentation on shop floor / laboratory during the preparation of job / laboratory experience by the students
11.	AUDIO VISUAL AIDS 1. Prepare Audio Cassette 2. Photograph Lab Manual 3. Technical Video Download

12.	PAPER SOLUTION 1. Write Paper Solution of Last Five Examination Papers
13.	SCHOOL WITHIN SCHOOL 1. Guiding / Sharing /Mentoring the know-how by meritorious students to lower performing students.
14.	SELF LEARNING 1. Contact with field expert, seniors, alumni and get further know-how individually or in a group. 2. Read related book/magazine/article/literature and share the content.
15.	LIVE LEARNING 1. Prepare student for live learning. 2. Study activities through powerful observation. 3. Make them aware and to form a habit to Learn at any place, any time & from any person.

NOTES:

1. Term work report content of each experience should also include following.
 - a) Experience description/ data and objective.
 - b) A skill which is/are expected to be developed in student after competition of experience.
 - c) Drawing of experience / set up with labels / nomenclature to carry out the experience.
 - d) The specification of machine / equipment / devices / tools / instruments/items / elements which is / are used to carry out and to check experience.
 - e) Process parameters / set up settings values applied to carry out experience
 - f) Steps / process description to execute the experience.
 - g) Observation
 - h) Information on resent machine / equipment / devices / tools/ instrument/ item available. In market to carry out the experience.
 - i) Special / additional notes or remarks.
2. Term work report of student of regular more should exclude distance learning manual, photocopy, printed content, etc. focus should be on developing the term work as original efforts of student.
3. Term work also include experience logbook duly certified by subject teacher.

F - 403 PLANT EQUIPMENT MAINTENANCE ERECTIONS

Sr.No.	BOOK NAME	AUTHOR
1.	Certificate Course In Piping Eng.	I T T Manual Bombay
2.	Industrial Eng. & Production Management	M.Mahajan
3.	Pump Process Piping Code	ASME B 31.3
4.	Fundamental & Maintenance Eng. 2 nd Edition	P.N. Mishra S.K. Tripathi
5.	Piping Handbook 6 th Edition	Mohinder L. Nayyer Mc. Gruwallhill
6.	D.L.M. (Material of mechanical)	
7.	Aspect Of Material Handling	Dr. K.C.Arora Laxmi Publication
8.	Engineering Fluid Mechanics	PAN Narayan Narosa Publication