5342 – PIPING FABRICATION & INSTALLATION

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credit						
3	2	5	25	25	3Hrs.	100	25/or	175

Pre-requisite	Source
Nil	MCL

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

Rationale- Modern industries without pipelines would be handicapped in their performance. Therefore this course in piping Fabrication and installation is aimed to equip the students with knowledge and skill to Fabricate pipelines. This course therefore includes piping design, piping materials and components, piping drawings and piping fabrication, essentially required to erect a pipeline. Other considerations like pipeline inspection and testing, piping insulation and special design considerations are also given due importance.

COURSE CONTENT	Hrs	Mks
1. PIPING SYSTEM BASICS Piping system Definition, Major phases in piping installations, piping cycle, PFD's, P & ID's piping class, pipeline and lists, symbols in drafting PFD's & P&ID's, codes and standards commonly used in industry.	3	8
2. PIPING DESIGN Process Design criteria for pipeline sizing, Mechanical Design Fundamentals. stress values, stress values, its effect with rise in temperature, thickness calculations v/s temperature rating, commercial sizes available and its standard date.	5	10
3. PIPING MATERIAL SPECIFICATION Factors deciding material of construction, overview on corrosion, general types of materials (Metallic/Non metallic), order of selection including general guidelines for selection for common services, material standards, Introduction to ASTM/ASME/BS/IS standards, requirements in standards (chemical composition, physical properties, Metallurgical structures, methods of testing) concept of test certificate, stamping, major certifying bodies in India, non metallic piping selection and specifications	6	14

4. PIPING COMPONENTS 5 14

Requirements of piping components, different piping components, Elbow, Tee, Flanges, Reducers, Couplings, Nipples, Blinds, special fittings, Fasteners, Gaskets, Rating class, Basic thumb rules of Dimensions, classifications in between fittings, General connection practices etc. Pipeline supports, spring hangers.

5. PIPING DIMENSIONAL STANDARDS AND DRAWING 8 16

Basic pipe dimensions, Nominal Diameter, Dimensional standards, piping end classifications, Manufacturing tolerances, piping schedule number, weight calculation table.

Different construction drawings, Equipment layout, Nozzle schedule, plot plan, sectional drawings. Clearances, Tolerances, supporting details and symbols, Bills of materials and material take off including numerical calculations.

6. PIPING FABRICATION 10 20

Pipe bending, selection of bending methods, weld-joint preparation, selection of welding process, selection of welding electrodes, welding & fabrication fixtures. Pre-heating and post weld Heat treatment, Procedure planning of prefabrication activities. Fabrication Joining of various non-metallic piping.

7. PIPELINE INSPECTION & TESTING 3 8

Material Inspection, Pipeline testing by various non destructive testing, pipeline Hydro testing, Acceptance standards, Testing of Non-metallic piping.

8. PIPE INSULATION 3 5

Types of Insulation Hot and cold, Methods of installation, weather protection, cladding, standards for measurement of pipe insulation.

9. SPECIAL DESIGN CONSIDERATION 5 5

Special consideration for steam piping, water piping, compressed Air piping, Gas piping.

Total

TERM WORK:

1. Drafting of P & ID Symbols -- 5 Sessions
2. Drawing Piping components -- 5 Sessions
3. Drawing of Equipment Nozzle Schedule -- 5 Sessions
4. Drawing of Piping Plot Plan -- 5 Sessions
5. Drawing of piping Isometric drawing -- 4 Sessions
6. Preparation of Material Take Off (BOM) -- 4 Sessions
7. Preparation of Technical Tender Document -- 4 Sessions

ORAL EXAMINATION:

The oral examination shall be conducted based on the contents mentioned in the term work.

REFERANCE BOOKS:

1. Piping handbook by Nayyar. Mac Grawhill.
2. Process piping Designs Vol. I &Vol. II, by Weaver.
3. Process piping drafting by Weaver.
4. Piping Guide Sherwood.
5. Pipefitters Handbook by Lindsey.
6. Pipe welding procedures by Rampaul.