



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-5(Diploma)

Subject: Fabrication Technology- DETME15219

Type of course: Professional Elective Courses

Prerequisite: Engineering Drawing, Engineering Materials and Metallurgy, Workshop Practice

Rationale: This course focuses on fabrication of different types process plant equipment used in various refineries, chemical, Petro-chemical, solid-liquid-gas handling industries. This course would help students how to interpret design drawings, code & standards used in fabrication industry. Student also acquainted with use of code & standards to various to prepare engineering documents. This course also provides opportunity for hands on practice for student to develop skill for process equipment fabrication with use of necessary desired safety norms.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.



Course Content:

Unit No	Course content	Hrs.	% Weightage
1	Introduction: Need of Fabrication Technology, Scope of Fabrication Technology, Importance of Fabrication Technology, Weldability, Concept of Weldability, Meaning of Weldability, Factors affecting, Importance of Weldability, Power source, Selection criteria of power sources, List of national and international fabrication industries, Third-party Inspection Agencies. Drawing Interpretation: Interpret Welding Drawing, Welding Symbols and their Different Standards, Process Equipment drawing - Prepare bill of materials, parts list and quantity, Welding Documents, Welding Procedure Specification, Welder Performance Qualification, Codes used in fabrication work, their importance and use.	8	20
2	Fabrication Process and Safety: Selection of joint, Equipment and Machines used for Edge Preparation, Preheating, Methods of Preheating, Applications of Preheating, Post heating, need of post-heating, Methods of post heating, Applications of post-heating, Post weld heat treatment, Methods of Relieving Thermal Stresses, Peening, Vibratory stress Relief, Thermal treatment, Thermo-Mechanical Stress Relief Treatment, over stressing Technique, Welding parameters, Advance welding methods, Ultrasonic welding, Laser beam welding, Electron beam welding, Friction welding, Welding Automation, Process Equipment Fabrication Procedure, Fabrication Steps/stages, Pressure vessel fabrication, Heat exchanger Fabrication, Need for Safety, Indian standards for safety	13	30
3	Inspections and Testing: Common Weld Defects, Thermal Distortion, Types of Thermal Distortion, Methods to control Thermal Distortion, Weld quality, Importance of weld quality, Factors affecting weld quality, Modes of inspection of weld work, Methods of testing the weld quality, Non-Destructive testing, Destructive tests.	10	20



4	Surface Preparations, Finishing and Coating Methods: Introduction, need for Surface Finishing, Importance of Surface Finishing, Advantages of surface finishing and surface coating, Methods and procedure, Surface Coating, Need, Advantages, Gas Welding, Shielded Metal Arc Welding (SMAW), Submerged Metal Arc Welding, Gas Metal Arc Welding (GMAW), Metal spraying or metalizing, Plasma Arc Spraying, Electric Arc Spraying, Detonation Gun Spraying Installations, Erection and Commissioning: Introduction, Metallic Structures, Erection steps of Common Fabrication Structures, Erection steps for fabrication equipment, Erection Steps for piping, commissioning procedure for plant machinery, Foundation Size and plan, Types of Foundation, Foundation of Centrifugal Pump, Foundation Bolts	14	30
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Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Study on Fabrication Technology Research and explain the need, scope, and importance of fabrication technology in modern industries. Prepare report and Upload on GMIU web portal.	10
2	Advanced Welding Methods Research and explain advanced welding methods such as ultrasonic welding, laser beam welding, and electron beam welding. Discuss their applications and advantages. Prepare report and Upload on GMIU web portal.	10
3	Pressure Vessel Fabrication in the Oil & Gas Industry Research the fabrication process of pressure vessels used in the oil & gas industry. Discuss the materials, welding procedures, and post-weld heat treatment used to ensure their strength and safety. Prepare report and Upload on GMIU web portal.	10
Total		30



Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	40%	40%	20%	-	-	-

Course Outcome:

After learning the course, the students should be able to:	
CO1	Explain the need, scope, and importance of fabrication technology in various industries.
CO2	Describe the fabrication process, welding techniques, heat treatment methods, stress-relief techniques, and safety standards in industrial applications.
CO3	Analyze weld defects, thermal distortion, inspection methods, testing techniques, and factors affecting weld quality in fabrication.
CO4	Understand surface preparation, finishing, coating methods, welding techniques, erection procedures, and commissioning of fabrication structures.

List of Practical:

Sr. No	Descriptions	Unit No	Hrs.
1	Interpretation of Welding Drawings and Symbols Understand and interpret different welding symbols as per international standards.	1	2
2	Preparation of Bill of Materials (BOM) and Parts List Identify materials, prepare a BOM, and list quantities for fabrication components.	1	2
3	Selection and Preparation of Welding Joints Understand different types of welding joints used in fabrication technology.	1	2
4	Preheating and Post-Weld Heat Treatment Methods Demonstrate the preheating and post-heating processes for different welding applications.	2	2



5	Fabrication of a Small-Scale Pressure Vessel Model Design and fabricate a simple pressure vessel considering fabrication steps.	2	4
6	Fabrication of a Heat Exchanger Model Design and fabricate a simple heat exchanger, considering material selection and welding techniques.	2	4
7	Study of Welding Automation Techniques Demonstrate automated welding methods such as robotic welding and CNC-based welding.	2	2
8	Inspection of Weld Quality using NDT Methods Perform visual and non-destructive testing (NDT) methods such as Magnetic Particle Test	3	4
9	Analysis of Weld Defects and Methods to Control Thermal Distortion Identify common weld defects and apply corrective measures to minimize thermal distortion.	3	4
10	Surface Preparation and Coating Techniques Apply and analyze different surface finishing and coating methods, including metal spraying.	4	4
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Welding technology by Khanna O.P
- [2] Welding engineering and technology by Parmar, R.S.
- [3] Manufacturing processes (Foundry, Forming and Welding) by Rao P.N.
- [4] Metal Fabrication Technology by Shyamal Mukharjee

