

Subject Code: 01ME0811

Subject Name: Design of Pressure Vessel

B. Tech. Year - III (Semester - 8)

Type of course : Under Graduate

Prerequisite : Machine Design

Rationale : Understanding of Pressure Vessel

Course Outcome :

1. Students will be able to understand stresses acting in pressure vessel
2. Students will be able to design pressure vessel parts as per ASME standards
3. Students will be able to design the support of pressure vessel
4. Students will be able to understand design consideration of pressure vessel
5. Student will be able to design piping system for pressure vessel

Teaching and Examination Scheme :

Teaching Scheme			Credits	Examination Marks					Total Marks
Theory	Tutorial	Practical		Theory Marks			Practical Marks		
				ESE(E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

Content :

Sr. No.	Content	Total Hrs.
1	Stresses in Pressure Vessel Introduction to stresses in pressure vessel and its application, stresses in circular plate, Stresses in cylinder, Thermal stresses, Bending of circular plates of uniform thickness, Bending of centrally loaded circular plates	10
2	Pressure Vessel Design Code Introduction to ASME standard for pressure vessel design, Pressure vessel and related components design using ASME standard; Design of nozzle	10
3	Supports Design for Pressure Vessel Design of base plate and support lugs, Types of anchor bolt, its material and stresses, Design of saddle supports	08

4	<p>Design Consideration in Pressure Vessel Buckling of pressure vessels: Elastic Buckling of circular ring and cylinders under external pressure, Failure of thick walled cylinders or tubes under external pressure, buckling under combine external pressure and axial loading, Fatigue failure, high strength, light weight pressure vessels resistant to external high pressures found in undersea exploration</p>	12
5	<p>Piping Design Flow diagram, Piping layout and piping stress analysis, Flexibility factor and stress intensification factor, Design of piping as per B31.1 piping code, Piping components: bends, tees bellows and valve. Types of piping supports and the behavior, Introduction to piping Codes and Standards.</p>	10

Distribution of Theory Marks

R Level	U Level	A Level	N Level	E` Level	C Level
10	20	25	25	10	10

Legends: R: Remember; **U:** Understand; **A:** Apply; **N:** Analyze; **E:** Evaluate; **C:** Create

List of Experiments :

1. Introduction to ASME Pressure Vessel design codes
2. Study about various stresses in pressure vessel
3. Study about bending of circular plates
4. Design of supports for pressure vessel
5. Study about various piping components
6. Design of tall towers in pressure vessel

Open Ended Project:

1. Design of various pressure vessel components by ASME standard

Reference books :

1. Brownell L.E and Young E.D. "Process equipment design, Willey Esstern Ltd. India
2. "ASME Pressure Vessel and Boiler code, Section VIII Div. 1, 2, and 3", ASME
3. "American standard code for pressure piping, B 31.1", ASME
4. Henry H Bednar, "Pressure vessel Design Hand book", CBS publishers and distributors
5. J. Phillip Ellenberger, "Pressure Vessels: ASME Code Simplified", ASME.
6. Smith P, "Fundamentals of Piping Design", Elsevier.

List of Open Base Software/learning website :

1. nptel.ac.in
2. <https://www.asme.org/>



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Syllabus for Bachelor of Technology

Department of Mechanical Engineering