

**Subject Code:** 01ME0821

**Subject Name:** Design of Pressure Vessel

**B. Tech. (IV Year) Semester- 8:** Mechanical Engineering

**Type of course:** Engineering

**Prerequisite:** Machine Design.

**Rationale:** Understanding of Pressure Vessel

**Teaching and Examination Scheme:**

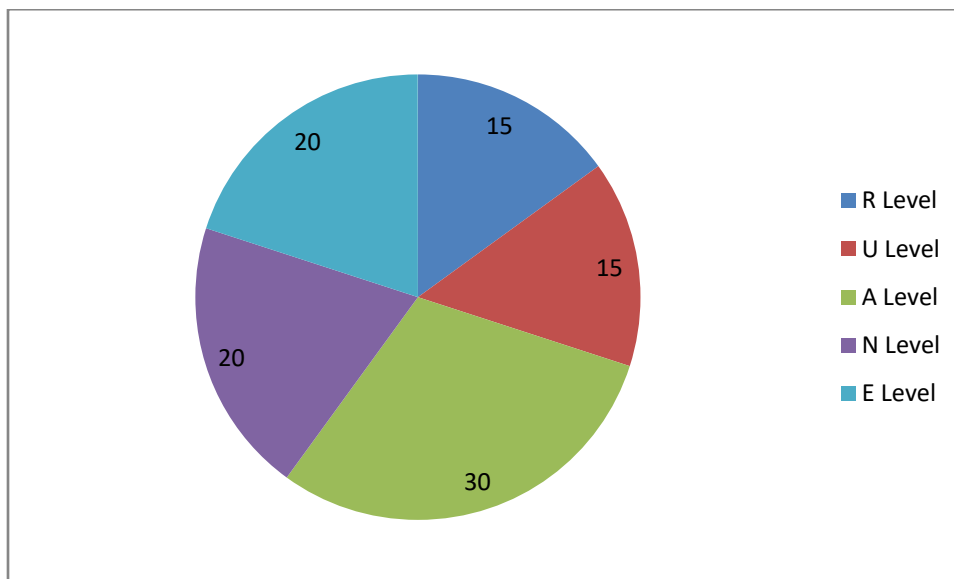
Teaching Scheme			Credits	Examination Marks					Total Marks
L	T	P		Theory Marks			Practical Marks		
			ESE	IA	CSE	VIVA	TW		
4	--	2	5	50	30	20	25	25	150

**Content**

No	Module	Sub Module	Weightage	Duration
1	Stresses in Pressure Vessel	Introduction to stresses in pressure vessel and its application, stresses in circular plate, Thermal stresses, Stresses in plate having the circular hole due to bi-axial loading, excessive elastic deformation, plastic instability, brittle, rupture and creep.	25%	12
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	25%	12
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	20%	10
4	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, Effect of supports on elastic buckling of cylinders, Design of circumferential stiffness, Buckling under combine External pressure and axial	15%	8

		loading, Fatigue failure, high pressure high temperature irradiation corrosion and other hostile environments, high strength, light weight pressure vessels resistant to external high pressures found in undersea exploration		
5	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.	15%	6

<b>Remembrance</b>	<b>Understanding</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>
<b>15</b>	<b>15</b>	<b>30</b>	<b>20</b>	<b>20</b>


**List of Experiment:**

1. To study the basic design procedure of pressure vessel design
2. Application of ASME code for pressure vessel design
3. Design the nozzle for pressure vessel
4. Design the support for the pressure vessel
5. Design the circumferential stiffness in pressure vessel
6. To study the design procedure of piping in pressure vessel

**Reference Books/ Journals:**

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.

**Course Outcome:**

1. Student are able to understand the design consideration of pressure vessel
2. Student are able to design the support of the pressure vessel
3. Student are able to design nozzle for pressure vessel
4. Student are able to design piping system for pressure vessel

**List of Open Source Software/learning website:**

<https://www.youtube.com/watch?v=erW4HZ5I928&list=PLE4970D1A7E811FA2&index=37>

<https://www.asme.org/>