



## VAP and Add-On Course

(Doc. No.: BITACAD/VAP Template/Sem Even-Odd/ 22-23)

<b>Shiksha Mandal's BIT, Wardha</b>	<b>Add-On Course</b>			<b>Page</b>	<b>1 of 4</b>
				<b>Prepared on</b>	01/08/22
<b>Academic Year</b>	<b>2022-2023</b>	<b>Class</b>	Final	<b>Semester</b>	VII
<b>Subject</b>	<b>Piping Engineering</b>				
<b>Examination Scheme</b>	Quiz			<b>No of Hours</b>	32
<b>Teaching Scheme</b>	<b>Lecture: 32</b>	<b>Practical: Nil</b>		<b>w. e. f.</b>	06/09/22
<b>Faculty In-charge</b>	Dr. Deepak Bhope				

### 1. Process of GAP analysis and Title Finalization:

In the process of GAP analysis, it is observed that in the curriculum of Mechanical Engineering none of the subjects address the contents related to piping engineering. Knowledge of piping engineering is very important in process industries like Power Plant, Petrochemical Plants, Pulp & Paper Plant, Fertilizer Plant, Piping for Hospitals & Office Building, Pharmaceutical Plants, Food & Beverages Plant, Synthetic fuel Plants, Offshore platforms, Refineries, Chemical plants etc. This curriculum gap was observed during the interviews scheduled by Ballarpur Industries Limited, and hence it is decided to address this gap through this add on course.

### 2. Pre-requisite of the Programme/Course:

- Basics of Mechanical Engineering
- Machine Drawing & CAD, Basic Heat Transfer, Fluid Mechanics & Fluid Machineries
- Strength of Materials & Machine Design

### 3. Course Objectives:

This course is designed to provide entry-level knowledge of Piping Engineering. This course will provide the exposure to piping engineering field. It is intended that; students should be able to identify the components & equipment used in the piping, piping layout and to perform preliminary design calculations.

### 4. Course Outcomes:

After attending this Add-on Course, participants will be able to:

- CO1: Understand the importance of piping engineering in process industries.
- CO2: Know the importance of various components in piping systems.
- CO3: Preliminary design the piping system.

### 5. Syllabus of the Program/Course:

**Introduction:** Introduction to the course and syllabus, piping system, plant types, types of plant designing, phases of plant designing, types of designing companies, knowledge requirement, piping & other departments, codes & standards, piping components, **Pipe:** Introduction, pipe designation, pipe manufacturing, pipe fittings, pipe flanges, flange gaskets, valves, types of valves.



**Equipment:** Static equipment – tanks, heat exchangers, heaters, boilers, columns reactors, separators, Stainer, air vents, PIG launcher. Rotary equipment: Pump, compressor, agitator, turbines, turbo expanders, engines, fans & blowers.

**Terms, Layout & Drawing:** Project documentation, chemical process selection, anatomy of chemical process, material balance, energy balance, plot planning, equipment layout, symbols, PFD, UFD, P&ID exercises on tank, separators, heat exchangers, column, complex.

**Design calculations & considerations:** Fluid & its properties, types of fluids, fluid at rest, fluid in motion, continuity equation, Bernouli's theorem, pipe size calculations, pipe thickness calculations, pump selection, insulation thickness calculation, Miter bend calculations, dyke wall calculations.

**Piping Fabrication & Support:** Fabrication activities, types of welding, piping lining, piping insulation, Supports: types, hanger, clamp, strap, saddle, slide supports.

**Stress analysis & Testing:** Types of stresses, static load, dynamic load, visual inspection, liquid penetration test, magnetic particle test, radiographic testing, Ultra-sonic testing, hydrostatic pressure testing, pneumatic pressure testing.

#### 6. Schedule of the Course:

Day	Topic	L/P*
1	Introduction to the course and syllabus, piping system, plant types	L
2	Types of plant designing, phases of plant designing, types of designing companies	L
3	Knowledge requirement, piping & other departments	L
4	Codes & standards, piping components	L
5	<b>Pipe:</b> Introduction, pipe designation, pipe manufacturing	L
6	<b>Pipe:</b> pipe fittings, pipe flanges, flange gaskets, valves, types of valves	L
7	Static equipment – tanks, heat exchangers	L
8	Static equipment - heaters, boilers, columns reactors	L
9	Static equipment - separators, Stainer, air vents, PIG launcher	L
10	Rotary Equipment: Pump, compressor, agitator	L
11	Rotary equipment: turbines, turbo expanders, engines, fans & blowers	L
12	Project documentation, chemical process selection	L
13	Anatomy of chemical process	L
14	Material balance, energy balance	L
15	Plot planning, equipment layout	L
16	Symbols, PFD, UFD	L
17	P&ID exercises on tank, separators	L
18	P& ID exercises on heat exchangers, column, complex	L
19	Fluid & its properties, types of fluids, fluid at rest, fluid in motion	L

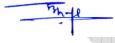


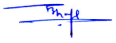
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20	20	Continuity equation, Bernoulis theorem	L
21	21	Pipe size calculations, pipe thickness calculations	L
22	22	Pump selection, insulation thickness calculation	L
23	23	Miter bend calculations, dyke wall calculations	L
24	24	Fabrication activities, types of welding	L
25	25	Piping lining	L
26	26	Piping insulation	L
27	27	Supports: types, hanger, clamp, strap	L
28	28	Supports: saddle, slide supports	L
29	29	Types of stresses, static load, dynamic load	L
30	30	Visual inspection, liquid penetration test	L
31	31	Magnetic particle test, radiographic testing,	L
32	32	Ultra-sonic testing, hydrostatic pressure testing, pneumatic pressure testing	L

7. Mapping of COs with POs of the Program/Course:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1								2
CO2	3	1	1	1								2
CO3	3	2	3	2								2

  
**Prepared By**  
(Faculty In-Charge)

  
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**HEAD**  
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Document No	Prepared on	Revised on	Prepared By	Approved By
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**Value Added Programme/ Add-On Structure**

<b>Programme Name</b>	<b>Add on Course in Piping Engineering</b>			
<b>Proposed Programme Duration</b>	Three Months			
<b>Over View of the Programme</b>	Industry Sector – Process Industries  Skills acquired includes – Piping Fundamentals & Preliminary Design Calculations			
<b>Target Group of Learners</b>	<b>Module</b>	<b>Elements</b>	<b>Th (Hrs)</b>	<b>Pr (Hrs)</b>
Final Year students of Mechanical engineering	<b>M-01</b>	Piping Engineering	32	Nil
		<b>Total no of Hours</b>	<b>32</b>	

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