GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
Course Curriculum
MARINE SYSTEM LINE DIAGRAM
(Code: 3341805)

Diploma Programme in which this course is offered	Semester in which offered
Marine Engineering	4th Semester

1. RATIONALE

For every Marine engineer officer, preliminary theoretical knowledge of day to day operations and piping & line systems is important for taking cognizance of complicated machinery operations. The hierarchy on board further defines and demands the engineers in their first stint onboard to trace the piping diagrams in order to have thorough understanding of different symbols and lines from the facsimiles provided onboard.

Usually, a typical line diagram would look like a printed labyrinth and could be difficult to understand. It is hence suggested to keep them for reference and trace them physically.

2. COMPETENCY (Program Outcome according to NBA Terminology)

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency.

- Junior engineer can successfully take in charge of daily transfers related to sludge and bilge waters under the directions of second engineer**.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	**100**
0	0	4	04	0	0	40	60	

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical; **C -** Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

4. COURSE DETAILS

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – I Introduction	1.a Understanding the different lines and types. 1.b Tracing of lines	1.1 Basic knowledge of lines and various types of lines used onboard. 1.2 Identify each type of lines with the line diagram. 1.3 Tracing and Drawing each line according to its setup. 1.4 Understanding the color code.(bilge ,ballast , seawater, fresh water, steam ,fuel , lubricating oil, etc).
Unit – II Safeties for pipe laying and survey	2.a Safety during laying of the various pipes 2.b Testing method of different types 2.c Surveys Its types and its period.	2.1 Safety against static electric charges(use of bonding strips etc). 2.2 Pipe corrosion and failure due to various reasons).Types of corrosion internal and external corrosion. 2.3 Test carried out for the strengtheness of pipe. 2.4 Pipe failure and its prevention. 2.5 Annual survey,intermediate survey,Renewal survey.
Unit – III Pipes & Pipe Fittings	3.a Flanges 3.b Elbows 3.c Reducers 3.d Tees 3.e Union. 3.f Expansion 3.g Other Fittings	3.1 Uses of flanges its fitting and purpose of using flanges .Types of flanges. 3.2 Types & uses of elbows ,reducers tees ,union ,expansion etc.
Unit – IV Ship s piping system	4.b Draw different types of ships piping system which includes bilge,ballast,fire fighting system ,sprinkler system etc.	4.1 Prepare three charts in total from the list of all the piping system in detailed with mentioning parts and the direction of flow .

Unit V Reasons for pipe failure & Pipe Repair	5a. Reasons for failure ,uniform corrosion ,pitting corrosion etc 5b. Methods to withstand pipe failure 5c. Pipe repair & Maintenance	5.1 Various reasons of failure and the reason for corrosion ,types of corrosion ,water hammering effect ,erosion etc. 5.2 Actions to be carried out during pipe failure ,methods to take for fuel pipe leakage ,steam pipe leakage etc. 5.3 Temporary repairs Binding & Clamping , maintenance of pipes ,inspections carried, 5.4 Permanent Repairs,pressure test ,supports for vibrations.

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Not Applicable

6. SUGGESTED LIST OF PRACTICAL/EXERCISES

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Ex. No.	Unit No.	Practical/Exercises (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx. Hrs. Required
1	I	a. Trace all lines physical or in computer based simulator and make separate charts for each lines traced by students , lines include all the working lines onboard (fuel ,water ,steam ,air ,lub oil, sludge etc)	10
2	II	a. Understanding pipes sizes and its material ,corroded pipes and their classified types wear down of galvanic corrosion ,wear down of water hammering ,wear down of erosion	08
3	III	a. Practically showing the usage of flanges to connect pipes and different types of elbows varying according to the angles and other fittings mentioned above.(charts to be made according to the practical done with detailed diagrams)	12

Ex. No.	Unit No.	Practical/Exercises (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx. Hrs. Required
4	IV	A. All the ships piping system to be traced in computer simulator which contains all the details of ballast system ,bilge water system ,fire fighting system,sprinkler system,Co2 system etc.(charts to be made by students at the end of practical of each lines traced)	12
5	V	a. Pipe repair to be done practically both temporary and permanent with binding ,clamping ,doublers ,cement boxes ,clamps ,plastic resin. b. Pressure testing & NDT tests & use of supports. c. Pipe maintenance & inspection	14
Total Hours			56

Notes:

*THE ABOVE MENTIONED PRACTICAL EXERCISES MUST BE CARRIED IN THE WORKSHOP AND IN CASE IF THERE ARE NO AVAILABILTY OF CERTAIN EQUIPMENTS OR TESTING INSTRUMENTS IT MUST BE SHOWN TO THE STUDENTS BY MEANS OF EDUCATIONAL VIDEOS & SIMULATOR BY PRESENTATIONS AND CHARTS.

7. SUGGESTED LIST OF STUDENT ACTIVITIES

- SAME MENTIONED ABOVE TO PREPARE CHARTS WITH DIAGRAM AND THE METHODS AT THE END OF EACH PRACTICAL UNIT AND GET IT ASSESSED BY THE CONCERNED FACULTY.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

NOT APPLICABLE

9. SUGGESTED LEARNING RESOURCES

A. List of Books:

Sr. No.	Title of Books	Author	Publication
1	A Master Guide to Ship s Piping	Eric Murdoch (Chief Surveyor)	Charles Taylor &Co Ltd The Standard House
2	Marine Piping System	K L Narayan	Ngee Ann Polytechnic

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. Nair Gopikrishnan**
  Lecturer in Govt Polytechnic Diu
  (Marine engineering**)**

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