GUJARAT TECHNOLOGICAL UNIVERSITY

Subject Name: SHIP FIRE PREVENTION & CONTROL
(Code: 3351804)

Diploma Programme in which this course is offered	Semester in which offered
Marine Engineering	5th Semester

1. RATIONALE

As a marine engineer it is necessary to understand about the fire and its causes for fire which is one of the major reasons for the accidents caused in the maritime industry. With this a marine engineer is able to understand the type of fire and have the knowledge to take the respective measures in order to avoid dangerous hazard as a good watch keeping practice.

2. COMPETENCY

At the end of the study of V th Semester the student will be able to

- Understand the fires and its types, fire triangle.
- Know about the different types of fire extinguisher
- Study about different types of fire detection system and alarms.
- Acquire broader ideas about fire fighting equipments (miscellaneous).
- Understand about fire drill & duties.

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	150
3	0	2	5	70	30*	20	30	

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	Topics and Sub-topics
Unit – I **Theory of fire**	1.a Fire triangle. 1.b Classes of fire	1.1 Introduction, Safety & Principles, Fire triangle, Spontaneous Combustion. Limits of flammability. 1.2 Advantages of various fire extinguishing agents including vaporizing fluids and their suitability for ship's use. 1.3 Control of Class A, B and C fires.
Unit – II **Fire Prevention**	2.a SOLAS Convention on fire. 2.b Ship electrical installations .	2.1 SOLAS Convention (Class A, B bulkheads), fire detection and extinction systems, escape means. 2.2 Electrical installations, statutory requirements for firefighting systems and equipment on different vessels..
Unit – III **Fire Detection and Safety Systems**	3.a Detectors & types. 3.b Detectors operational limits. 3.c Testing of detectors .	3.1 Fire safety precautions on cargo ships and tankers during working. 3.2 Types of detectors, 3.3 Selection of fire detectors and alarm systems and their operational limits. 3.4 Commissioning and periodic testing of sensors and detection system. 3.5 Description of various systems fitted on ships.
Unit – IV **Fire Fighting Equipment (Fixed & Miscellaneous types)**	4.a Operation of fire fighting equipments. 4.b Classes of fire extinguishers used in ships. 4.c Firemans outfit with the equipment maintenance.	4.1 Fire pumps, hydrants and hoses, Couplings, nozzles and international shore connection . Construction, operation and merits of different types of portable and non-portable fire extinguishers and fixed fire extinguishing installations for ships. CO2 systems. 4.2 Fireman's outfit, its use and care. Maintenance, testing and recharging of appliances. Breathing Apparatus – types, uses and principles.

Unit – V **Fire Control, Firefighting & Shipboard Organization:**	5.a Control of fire using techniques. 5.b Fighting fire in various space according to its class. 5.c Drills & duties of personnel during fire emergency.	5.1 Action required and practical techniques adopted for extinguishing fires in accommodation, machinery spaces, boiler rooms, Cargo holds, galley etc. 5.2 Firefighting in port and dry dock. 5.3 Procedure for re-entry after putting off fire, Rescue operations from affected compartments. 5.4 First aid, Fire organization on ships. 5.5 Fire signal and muster. Fire drill and duties.

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

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	**Theory of fire**	06	04	03	03	10
II	**Fire Prevention**	06	03	03	04	10
III	**Fire detection and Safety system**	10	04	06	06	16
IV	**Fighting Equipment (Fixed & Miscellaneous types)**	10	04	07	05	16
V	**Fire Control, Firefighting & Shipboard Organization**	10	04	06	08	18
Total		**42**	**19**	**25**	**26**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Notes:

1. This specification table shall be treated as a general guideline for students and Teachers. The actual distribution of marks in the question paper may slightly vary from above Table.
2. If mid sem test is part of continuous evaluation, unit numbers I, II and unit III up to 2.0 are to be considered.
3. Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.

6. SUGGESTED LIST OF PRACTICAL/EXERCISES

LIST OF EXPERIMENTS :

1. Identifying the class of fire .

2. Donning of fire man's outfit with breathing apparatus.

3. Testing and operation of Jet and spray type nozzles and fire hoses..

4. Study and operate total CO2 flooding of Engine room (Model)

5 .Operation of different types of fire detectors.

6 .Use of Potable Fire Extinguishers and refilling.

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Perform the tasks mentioned in above Practical/Exercise.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

Sr. No.	Unit Title	Strategies
1	**Theory of fire**	Real life examples. Demonstration of real systems. Movies/Animations. Numerical.
2	**Fire Prevention**	
3	**Fire Detection and Safety Systems**	
4	**Fire Fighting Equipment (Fixed & Miscellaneous types)**	
5	**Fire Control, Firefighting & Shipboard Organization.**	

9. SUGGESTED LEARNING RESOURCES

(A) List of Books:

Text Book :

Commentary on SOLAS - Bhandarkar Publication

Reference Book :

SOLAS - IMO Publication
Marine Engineering Practices- IME Publication,
Fire Safety Code Book
Firefighting aboard ships - M.G.Stavitsky

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

FACULTY MEMBERS FROM POLYTECHNIC

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

- **Prof Devanshu Trivedi**
  (Lecturer in Marine engineering Govt Polytechnic Diu)

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