GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)
Semester-III

Course Title: Ship Construction Technology
(Course Code: 4331801)

Diploma programme in which this course is offered	Semester in which offered
Marine Engineering	Third

1. RATIONALE

In the field of shipping and marine engineering, ship construction has an important place because latest technology is being employed in the field of construction and repair of ships. The knowledge of shipping terms, hull construction, hull dynamics and launching is required for the marine engineer.

1. COMPETENCY

At the end of the study of III Semester the student will be able to

- Understand the terms related to ship, movement of ships and thevarious materials used in ship building.
- Acquire knowledge about different types of ships.
- Acquire broader ideas about shell & deck plating and stresses acting on thehull. Understand about hull dynamics and paintings.
- To study bulkheads, water tight doors, deep tanks and hatches.

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

a) Complete the understanding of how each requirement impacts the ship construction.

b) Know and understand engineering principles which apply to modern ship construction technology.

c) Demonstrate an understanding of the requirements of ship systems.

d) Apply lessons learned in the integration of requirements and ship system.

e) Understand the need to hull dynamics and paintings

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
3	2	0	4	30*	70	0	0	100

(*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

***Legends: L**-Lecture; T– Tutorial/Teacher Guided Theory Practice; P-Practical; C– Credit, **CA** - Continuous Assessment; **ESE** -End Semester Examination.*

5. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit I **Introduction**	**1.a Ship types** **1.b Terms and General Use** **1.c Stresses in ship structure**	1.1 :Passenger ships - cargo liners - cargo tramps - oil tankers - bulk carriers - container ships - roll-on/roll-off vessels - liquefied gas carrier - chemical carrier. 1.2 : Forward – Aft - port side - starboard side – draught- freeboard – Length overall – length between perpendiculars – camber - tumble home – bilge radius – sheer – tonnage – displacement – light weight and dead weight. 1.3 Longitudinal bending in still water and waves – Transverse bending - stresses when docking – panting and pounding.
Unit II **Framing and Plating**	**2.a Bottom and side framing:** **2.b Shell and decks:**	2.1 Double bottom – internal structure – duct keel – double bottom in machinery space. Side framing- tank side brackets – beam knees – web frames. 2.2 Shell plating – bulwarks – deck plating – beams – deck girders and pillars – discontinuities – Hatches – steel hatch covers – water tight hatches.
Unit III **Fore and Aft Structures**	**3.a Fore part** **3.b Aft part**	3.1 Plating – arrangement to resist panting and pounding – bulbous bow – anchor and cable Stem arrangement. 3.2 Cruiser stern – transom stern – stern frame and rudder – fabrication of stern frame – cast steel stern frame – unbalanced rudder – balanced rudder – open water stern – spade rudder – rudder and stern frame for twin screw ship – bossing – shaft tunnel – kort nozzle – fixed nozzle rudder –tail flaps and rotary cylinders.
Unit IV **Ship Dynamics**	**4.a Ship dynamics**	Propellers – wake distribution blade loading – controllable pitch propeller – contra rotating propellers – vertical axis propellers – bow thrusters – controllable pitch bow thrusters – hydraulic thrustunits – rolling and stabilization – reduction of rolling – bilge keels – fin stabilizers – tank stabilizers – passive tanks – controlled passive tanks – active controlled tanks.

Unit V Bulkheads & Tanks	**5.a Bulk heads and deep tanks** **5.b Ship maintenance**	5.1 Water tight bulkheads – water tight doors – deeptanks for water ballast and oil – non water tight bulkheads – corrugated bulkheads. 5.2 Insulation of ships – corrosion prevention – surface preparation – painting – cathodic protection – impressed current system – fouling

6. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction	05	02	03	00	05
II	Framing and Plating	04	05	05	00	10
III	Fore and Aft Structures	05	06	07	07	20
IV	Ship Dynamics	08	05	05	10	20
V	Bulkheads & Tanks	06	02	08	05	15
Total		**28**	**20**	**28**	**22**	**70**

Legends: *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED LEARNING RESOURCES

List of Books:

1. Reeds ship construction – E.A. Stroke
2. Ship construction- Edrich Fernands Publishers: Pro-Navigator books
3. Notes on ship construction – Capt. Dara E. Driver By Rumar Publications

8. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

Sr.	Name and Designation	Institute	Contact No.	Email
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