



Indian Institute of Technology

Course Details Report

Course No: OE6008

Course Name: Design, Construction and Operation of LNG Carriers and Terminals

Course Type:

Theory

Description:

In a structured manner, this course introduces the critically important concepts, design and operational practices, and production technologies related to the LNG shipping, LNG carrier ships, LNG terminals and ports. These are needed to design, analyse and manufacture LNG ships and related technologies.

Course Content:

Introduction to the LNG carrier ships and terminals; Design of Different Types of Gas Carriers - Integral Tanks, Independent Tanks, Type 'A' Tanks, Type 'B' Tanks, Type 'C' Tanks, Membrane Tanks, Moss tanks (Spherical IMO type B tanks) IHI (Prismatic IMO type B tanks), TGZ Mark III, GT 96, and CS1, etc.

LNG Containment Systems; Fully Pressurized Tanks; Semi Pressurized or Semi Refrigerated Tanks; and Fully Refrigerated Tanks.

Ship handling at port: Factors affecting berthing/unberthing; Pilot; Support crafts; Mooring System; Ship/Shore Mooring Equipments; Mooring Hooks & Capstan; Fender arrangement; and Access gangway, etc.

Concept design; Preliminary design and contract design; Basic hull form development; Estimation of the Basic Forces (i.e. weights of structure, cargo and other systems, and buoyancy etc.), Scantling; Estimation of Mass; Loading conditions analysis; and Local and global structural analyses.

LNG terminals - Engineering parameter estimates; LNG terminal concept; Preliminary sizing of the 'Modified Gravity Based Concrete Structure (MGBCS)'; Offshore environmental loads on the structure (i.e. wave and wind loads); and Analysis of the terminal. Tutorials: Design and analysis problems with software solution systems.

Text Books:

1. L. N. Patnaik (2011), "Design of LPG and LNG jetties with navigation and risk analysis", CBS, India.
2. Apostolos Papanikolaou (2014), "Ship Design", Springer Nature, Singapore.
3. Owen F. Hughes and Jeom Kee Paik (2010), "Ship Structural Analysis and Design", The Society of Naval Architects and Marine Engineers (SNAME), USA.
4. Suresh Chandra Misra (2015), "Design Principles of Ships and Marine Structures", CRC Press, USA.

Reference Books:

1. DNV (2018), "Rules for classification of ships: Newbuildings special service and type additional class", PART 5 - CHAPTERS 5, 6, 7, 15; and PART 6 - CHAPTERS 36, 37; DNV GL, Germany.
2. DNV (2013), "Strength Analysis of Liquefied Gas Carriers with Independent Type B Prismatic Tanks", Classification notes 31.12, DNV GL, Germany.
3. DNV - GL (2018), "GAS CARRIERS Leading the way – from concept to operation", DNV GL, Germany.