

# CV4103 Offshore Engineering

[Lectures: 26 hrs; Tutorials: 13 hrs; Lab: 0 hr; Pre-requisite: CV3012; Academic Units: 3.0]

## **Learning Objective**

Provides knowledge needed to solve engineering problems related to both fixed and floating offshore structures.

## **Course Content**

Overview of offshore engineering. Fixed structures: design criteria and loadings, preliminary design, computer modeling, in-place analysis and code compliance checks, fatigue analysis, seismic and dynamic analysis, marine studies, and certification and inspection. Floating structures: moorings/riser systems, wave loads on floating structures, dynamic response of floating structures, stability of vessels, regulations/construction/maintenance of floating structures. Computer analysis using software packages GTSTRUDL and Orcaflex.

## **Course Outline**

<b>S/N</b>	<b>Topic</b>
1	Overview of offshore engineering
2	Introduction to fixed structures
3	Preliminary design and computer modeling
4	Design criteria and loadings
5	In-place analysis and code compliance checks
6	Fatigue analysis
7	Seismic and dynamic analysis
8	Marine studies
9	Certification and inspection
10	Hands-on computer modelling using GTSTRUDL
11	Introduction to floating structures
12	Overview of design and analysis of floating structures
13	Moorings and riser systems
14	Ocean waves and wave loads
15	Dynamic responses
16	Stability of vessels
17	Regulations, construction and maintenance
18	Hands-on computer modelling using Orcaflex

### ***Learning Outcome***

At the end of the course, students will be able to understand the basic theoretical concepts in offshore engineering and apply them to actual problems. They will be able to calculate wave forces on fixed and floating structures and calculate the dynamic response. They will be able to use design codes to check the capacity of structural members. They will be proficient in the use of finite element software to perform computer simulations, thus being prepared for the practical needs of the industry.

### ***Textbooks/References***

1. American Petroleum Institute, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Load and Resistance Factor Design, 1st Edition, 1993. (TP690.A642 RP2A-LRFD)
2. American Petroleum Institute, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Working Stress Design, 21st ed., 2000. (TP690.A642 RP2A-WSD).
3. American Welding Society, AWS D1.1 Structural Welding Code – steel, 17th edition, 2000. (TS227.A967 AWS D1.1 2000)
4. Bartrop, N.D.P., Floating structures: A guide for design and analysis, vol 1 & 2. Oilfield Publications Ltd,1998.
5. Chakrabarti, S., Handbook of Offshore Engineering, Vol 1 and 2, Elsevier, 2005.