



Course Code OGEE-370	Course Title Offshore Engineering	ECTS Credits 6
Department Engineering	Semester Fall	Prerequisites MENG-280
Type of Course Required	Field Oil & Gas Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 3 rd	Lecturer(s) Dr Constantinos Hadjistassou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the mechanics of the marine environment including water waves, wind and surface and subsea currents;
- Present the engineering and scientific principles of fixed and floating offshore oil and gas and wind energy installations;
- Explain sea loads, structural and hydrodynamic characteristics of jacket platforms, jack-up rigs, compliant platforms, gravity based structures, tension leg platforms, Floating, Production, Storage and Offloading (FPSO) vessels, and subsea production systems;
- Detail anchoring systems, common structure failure mechanisms, material selection, corrosion mechanisms and control;
- Identify the operational and environmental hazards and risks to personnel related to near-shore and offshore structures;
- Cover safety issues, pollution avoidance and mitigation measures of offshore engineering and platform decommissioning.

Learning Outcomes:

After completion of the course students are expected to:

- Appreciate the dynamics of the water-air interface, the characteristics of water waves, wind and currents;
- Understand the technical aspects of fixed foundation and floating oil & gas and energy systems;
- Comprehend the specifics of sea loads and hydrodynamics on fixed and floating platforms as well as subsea systems;
- Familiarize with floating systems' anchoring systems, structural failure mechanisms (eg, buckling), select appropriate materials, identify corrosion mechanisms and propose corrosion control strategies;
- Recognize risks to equipment, personnel and the environment associated with

coastal and offshore operations;

- Assess the safety, pollution prevention and mitigation strategies as well as offshore structure abandonment.

Course Contents:

- Characteristics of ideal water waves, basic fluid mechanics concepts, water currents and elements of offshore wind;
- Modeling of fixed structures and floating platforms, material behavior under direct and shear stresses;
- Jacket platforms, jack-up rigs, compliant towers, gravity based structures, tension leg platforms, spars, Floating, Production, Storage and Offloading (FPSO) vessels and subsea systems
- Fluid-structure interaction, sea states, calculation of wave loads, vibration, resonance modes;
- Forces on anchor lines, chains, wires, synthetic lines, structural failure modes, corrosion chemistry, corrosion control, coatings;
- Operational and environmental hazards of offshore oil & gas and energy projects, hazards to personnel, contingency planning, protection and avoidance measures, escape routes, rescue boats, etc
- Safety considerations, pollution conventions and local legislation, protection gear, mitigation strategies, firefighting and pollution fighting options, platform decommissioning.

Learning Activities and Teaching Methods:

Lectures, Projects, Discussion

Assessment Methods:

Homework, Project assignments, mid-term exam, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Gerwick Jr, B. C.	Construction of Marine and Offshore Structures	CRC Press	2007	0 8493 3052 1

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Faltinsen, O. M.	Sea loads on Ships and Offshore Structures	CUP	1993	0521458706
Susan Gourvenec & David White	Frontiers in Offshore Geotechnics II	CRC Press	2011	9780203830079
Douglas J.F., Gasiorek J. M., Swaffield J.A., Jack L.B.	Fluid Mechanics, fifth ed.	Pearson/Prentice Hall	2005	0 13 129293 5