

**Course Number: 28926**  
**Course Name: Marine Pipelines**

Course Type: Theory	Type & Max Unit: Elective, 3
Prerequisite: Strength of Materials, Fluid Mechanics	Corequisite: N/A
Level: Graduate	First Presentation: Jan 2018
Group: Ocean Engineering	Last Edition: Dec 2017

**Objectives:**

This course aims to introduce the challenges of marine pipelines from design phase to installation and operation. It provides the students with an insight into linepipe manufacturing, route selection, sizing diameter, structural strength, installation methods, on bottom stability and inspection.

**Topics:**

- **Overview**  
Applications of marine pipelines, design challenges and case studies, rigid & flexible pipes, pipe manufacturing methods, pipe grades
- **Route selection**  
Physical factors, other users of seabed, environmental & political factors, case studies
- **Pipeline Hydraulics**  
Single-phase flow of Newtonian fluids, thermal management & flow assurance, wax & hydrates, multiphase flow
- **Strength**  
Pressure containment, local buckling, progressive buckling, load combinations
- **Installation**  
Lay-barge construction, reel construction, Tow methods, shore approach
- **On bottom stability**  
Hydrodynamic forces, lateral resistance, stability design, stability enhancement measures
- **Upheaval/Lateral buckling & free span**  
Driving forces for upheaval/lateral buckling, preventive & corrective actions, span formation, vortex-induced-vibration

- **Inspection & monitoring**

Inspection techniques, pigs, corrosion monitoring (intrusive & nonintrusive techniques, fluid sampling

**References:**

1. Palmer, Andrew and King, Roger A., "Subsea Pipeline Engineering", PennWell Books, 2004
2. Bræstrup, Mikael W., Andersen, Jan Bohl, "Design and Installation of Marine Pipelines", Blackwell Publishing, 2005
3. Guo et al, Boyun, "Offshore Pipeline", Elsevier, 2005
4. DnV, "Submarine Pipeline Systems", DnV-OS-F101, 2013
5. DnV, "On-Bottom Stability Design of Submarine Pipelines", DnV-RP-F109, 2011