



Course Code OGEE-545	Course Title Oil and Gas Transport Networks	ECTS Credits 7.5
Prerequisites None	Department Engineering	Semester Fall, Spring
Type of Course Required	Field Oil, Gas and Energy Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Lecturer(s) Dr Constantinos Hadjistassou	Year of Study 1 st
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 onshore oil and gas transmission networks and right-of-way issues
- Learn the prominent pipeline codes, specifications and standards
- Present the fundamental principles governing pipeline hydraulics
- Familiarize attendees with the technical characteristics of pumping and compressor stations and coolers
- Outline the most common pipeline defect mechanisms
- Explain the major cleaning, monitoring and maintenance techniques
- Detail the operational hazards, safety, and physical security issues and cyber-attacks risks

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Learn about the economic and technical issues of pipeline networks
2. Familiarize themselves with right-of-way and access to pipeline systems
3. Be aware of the important pipeline codes, specs, standards & regulations
4. Master the fundamental flow equations and physics of gaseous and liquid flow in conduits through their application in a pipeline (simulation) network
5. Acquaint themselves with the technical matters pertaining to liquid flow pumping and compressor stations and coolers
6. Understand the most frequent pipeline defects mechanisms including crack formation, corrosion, and erosion
7. Know the most common internal oil & gas pipeline cleaning methods, flow and pressure monitoring and maintenance methods
8. Be aware of the operational hazards of pipeline, safety, physical security issues and cyber-attacks

Course Contents:

- Technical, business and economic issues of oil & gas trunklines, transmission, and distribution networks
- Pipeline codes, specifications, international standards and regulations
- Pump and compressor types including reciprocating and centrifugal systems, prime movers such as electric motors, internal combustion engines, gas turbines
- Bernoulli equation, laminar and turbulent flow, equations of flow: mass conservation and Navier-Stokes
- Frictional losses, pressure drop, flow rate and velocity measurements and valves
- Engineering aspects of liquid fuel pumps, gas compressor stations and cooling machinery
- Pipeline material defects and protection techniques such as corrosion protection and erosion mitigation
- Most popular internal oil & gas pipeline cleaning methods, flow and pressure monitoring techniques and maintenance strategies
- Computer simulation of a pipeline system; flow and pressure characteristics, terrain elevation, power requirements
- Vibration issues, flow instabilities, cavitation issues, fire hazards, physical security and protection and cyber-threads

Learning Activities and Teaching Methods:

Lectures, computer simulation exercises on software packages, in-class discussion.

Assessment Methods:

Homework, computer lab project, mid-term exam, final exam.

Required Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Pipeline Engineering	Liu Henry	Lewis Publishers	2003	0587161400

Recommended Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Valves, Piping and Pipelines Handbook	Dickenson, C. T.	Elsevier	2007	185617252
Hydraulics of Pipeline Systems	Bruce E. Larock, Roland W. Jeppson & Gary Z. Watters	CRC Press	2000	0849318068