Course Code	Course Title	ECTS Credits
OGEE-440	Pipeline Design, Laying & Maintenance	6
Department	**Semester**	**Prerequisites**
Engineering	Fall	MENG-280
Type of Course	**Field**	**Language of Instruction**
Elective	Oil & Gas Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	4th	Dr Constantinos Hadjistassou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the historical aspects of pipelines, the current pipeline infrastructure, and projected trends;
- Present the different onshore and offshore pipeline types which transmit gaseous and liquid cargoes;
- Outline the design standards and methodologies for pipelines, fluid hydraulics, frictional resistance, and buoyancy estimation;
- Determine the pipeline fluid flow rate, calculate the pipeline thickness, heat transfer characteristics, coatings and corrosion thickness allowance;
- Explain the pipeline laying and construction methods, hydrostatic testing, commissioning, and maintenance methods e.g., pipeline (smart) pigging and offshore Remotely Operated Vehicle (ROV) inspection;
- Familiarize students with the fundamental corrosion mechanisms and pipeline corrosion protection techniques;
- Present pipeline safety and environmental regulations and pipeline commercial and sharing agreements;
- Design and laying methods for submarine pipelines, composite and flexible pipelines, thermal insulation and passive & active pipeline thermal heating techniques.

Learning Outcomes:

After completion of the course students are expected to:

- Become aware of the history of pipelines, of the modern and prevailing pipeline network and future trends of pipeline transmission systems;
- Understand the different onshore and offshore pipelines which carry gaseous and liquid cargoes;
- Learn how to design pipelines including the pipeline length, conduit diameter

and wall thickness in the context of international and local standards;
- Determine the pipeline fluid flow rate, obtain the pipeline thickness and allowance for corrosion wear and tear;
- Know the pipe laying and construction methods, how hydrostatic testing is conducted, pipeline commissioning and maintenance methods e.g., pipeline (smart) pigging and ROV inspection;
- Familiarize with the principles of corrosion processes, corrosion detection and corrosion control;
- Understand flow regulations, corrosion protection, pipeline coatings, and pipeline selection materials;
- Design and suggest pipeline laying methods for submarine pipelines, understand composite and flexible pipelines, passive thermal insulation and active thermal heating techniques.

Course Contents:

- Historical aspects of onshore and offshore pipelines, world's pipeline network, and future pipeline projects;
- Types of pipelines for the transmission of oil, natural gas, water, and carbon dioxide;
- Pipeline design standards and methodologies according to DNV, ASME, ISO, and API codes, pipeline hydraulics, frictional resistance and buoyancy issues;
- Pipeline flow rate equations, methodology for pipeline thickness calculations and corrosion thickness allowance;
- Pipeline laying and construction practices, hydrostatic testing, pipeline commissioning, and maintenance methods e.g., pipeline smart (pigging) and ROV inspection;
- Types of corrosion, corrosion chemistry, protective coatings, cathodic protection, corrosion inhibitors, material selection, etc.
- Pipeline compression stations, the principles of operation of compressors, prime movers, multi-phase flow, multi-stage compression, efficiency equations;
- Understand the specifics of flow regulation, corrosion protection, pipeline coatings, pipeline selection materials and their properties;
- Design and laying methodologies for submarine pipelines, composite and flexible pipelines, passive thermal insulation and active pipeline thermal heating methods.

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
Escoe, A. K.	Piping and Pipeline	Elsevier/	2006	978 0 7506

	Assessment Guide.	Gulf Professional Pub.		7880 3

Recommended Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
Alkazraji, D.	A Quick Guide to Pipeline Engineering	Woodhead	2008	978 1 84569 491 3
Kyriakides S. and Corona E.	Mechanics of Offshore Pipelines: Vol. I Buckling and Collapse	Elsevier	2007	978 0 08 046732 0
Larock, Bruce E., Jeppson Roland W. Watters Gary Z.	Hydraulics of Pipeline Systems	CRC Press	2000	0 8493 1806 8