Course Unit Title	**ASOG 402 Fundamentals of pipeline design**
Programme of study	BSc in Mechanical Engineering
Lecturer	Dr.-Ing. Paris A. Fokaides
Type of course unit	Compulsory (for Oil and Gas Engineering Stream)
ECTS	5
Year of study:	3
Semester(s) offered	Spring Semester 2016, 2018, 2021, 2022, 2025
Course content	▪ Elemental analysis of pipeline design for natural gas transportation ▪ Equations used for calculation of pressure drop due to friction ▪ Pipping in series and in parallel analysis ▪ Compressor stations versus pipe loops ▪ Computational Applications
Course modules:	Module 1: Pressure drop due to friction ▪ Ideal and real gases ▪ General flow equation ▪ Colebrook-white plain and modified equation ▪ Panhandle A and B equation ▪ Comparison of flow equations Module 2: Pressure required to transport ▪ Frictional effect ▪ Effect of pipeline elevation ▪ Pipping in series and in parallel ▪ Locating pipe loops Module 3: Compressor Stations ▪ Compressor stations locations ▪ Hydraulic balance ▪ Isothermal, adiabatic and polytropic compression ▪ Compressor performance curves Module 4: Pipe analysis ▪ Pipe wall thickness ▪ Barlow's equation ▪ Pipe material and grade ▪ Class location Module 5: Valves and flow measurements ▪ Purpose and types of valves ▪ Codes for design and construction ▪ Flow measurement ▪ Flow meters Module 6: Mass and Energy Balance Laboratory Exercises ▪ Laboratory Exercise 1: Aspen Plus – Performance of a pump ▪ Laboratory Exercise 2: Aspen Plus – Performance of a compressor ▪ Laboratory Exercise 3: Aspen Plus – Pipes performance ▪ Laboratory Exercise 4: Aspen Plus – Compressor station sizing
Textbooks:	Menon, E. S. (2005). Gas pipeline hydraulics. CRC Press.
Instruction language	English
External reference	link