

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
Course content	<ul style="list-style-type: none"> ▪ Elemental analysis of pipeline design for natural gas transportation ▪ Equations used for calculation of pressure drop due to friction ▪ Piping in series and in parallel analysis ▪ Compressor stations versus pipe loops ▪ Computational Applications
Course modules:	<p><u>Module 1: Pressure drop due to friction</u></p> <ul style="list-style-type: none"> ▪ Ideal and real gases ▪ General flow equation ▪ Colebrook-white plain and modified equation ▪ Panhandle A and B equation ▪ Comparison of flow equations <p><u>Module 2: Pressure required to transport</u></p> <ul style="list-style-type: none"> ▪ Frictional effect ▪ Effect of pipeline elevation ▪ Piping in series and in parallel ▪ Locating pipe loops <p><u>Module 3: Compressor Stations</u></p> <ul style="list-style-type: none"> ▪ Compressor stations locations ▪ Hydraulic balance ▪ Isothermal, adiabatic and polytropic compression ▪ Compressor performance curves <p><u>Module 4: Pipe analysis</u></p> <ul style="list-style-type: none"> ▪ Pipe wall thickness ▪ Barlow's equation ▪ Pipe material and grade ▪ Class location <p><u>Module 5: Valves and flow measurements</u></p> <ul style="list-style-type: none"> ▪ Purpose and types of valves ▪ Codes for design and construction ▪ Flow measurement ▪ Flow meters <p><u>Module 6: Mass and Energy Balance Laboratory Exercises</u></p> <ul style="list-style-type: none"> ▪ 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