Course unit title:	Industrial Processes		
Course unit code:	OG 403		
Type of course unit:	Compulsory – Oil and Gas Stream		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	7 (Fall)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Paris Fokaides		
Learning outcomes of the course unit:	1. Understand the principles of mass, energy and momentum conservation are used as basic process engineer's tools in the form of mass, energy and momentum balance. 2. Know how fluids flow through piping systems due to pressure difference. Use the Darcy - Weisbach equation to calculate the pressure drop through a pipe. Know how the pressure drop of a complex piping arrangement can be calculated. 3. Know how to design a heat-exchanger 4. Understand the basic principles of vapor - liquid equilibrium and explain the use of the equilibrium curve to design mixture separation equipment. Describe the different types of distillation equipment. 5. Know the effect of the design and operating parameters of distillation columns in separation quality. Specifically know the process of oil refining and its products 6. Know unit operations such as Liquid and Gas separations, mixing, extraction		
Mode of delivery:	Face-to-face		
Prerequisites:		Co-requisites:	None
Recommended optional program components:	None		
Course contents:	**Module 1: Process design of heat exchangers** ▪ Shell and tube heat exchangers ▪ Design of heat exchangers ▪ Process design of reboilers and vaporizers ▪ Heat exchanger networking for energy integration **Module 2: Design of liquid-liquid extractors** ▪ Industrial applications of liquid-liquid extractors ▪ Phase equilibrium ▪ Solvent properties and choice of solvents ▪ Supercritical extraction **Module 3: Process design of distillation columns** ▪ Selection of equipment for distillation ▪ Distillation column design ▪ Batch distillation ▪ Reactive and catalytic distillation **Module 4: Process design of absorbers** ▪ Criteria of absorber selection ▪ Design of packed tower type absorber ▪ Process design of spray tower absorber ▪ Process design of falling film absorber **Module 5: Petroleum refining** ▪ Refining processes ▪ Refinery feedstocks and products ▪ Operation of crude distillation units ▪ Crude oil desalting ▪ Crude distillation material balance **Module 6: Mass and Energy Balance Laboratory Exercises**		

	▪ Laboratory Exercise 1: Aspen Plus – Vapour-liquid equilibrium modelling ▪ Laboratory Exercise 2: Aspen Plus – Heat exchangers modelling ▪ Laboratory Exercise 3: Aspen Plus – Distillation column modelling (1) ▪ Laboratory Exercise 4: Aspen Plus – Distillation column modelling (2)
Recommended and/or required reading:	Thakore, S. B., & Bhatt, B. I. (2007). Introduction to process engineering and design. McGraw-Hill Education.
Textbooks:	▪ N. P. Lieberman, E. T. Lieberman, A Working Guide to Process Equipment, McGraw - Hill, 2008 ▪ O. Levenspiel, Chemical Reaction Engineering, Third Edition, John Willey & Sons, 1999.
References:	▪ D. Q. Kern, Process Heat Transfer, McGraw - Hill, 1965 ▪ H.S.Fogler, Essentials of Chemical Reaction Engineering, Pearson, 2011.
Planned learning activities and teaching methods:	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. Lectures are supplemented with laboratory sessions with aim to get acquainted with lab equipment and instruments for measuring temperatures, specific heat capacities, thermal conductivities and other thermal properties.
Assessment methods and criteria:	• Tests: 25% • Laboratory Work: 25% • Final Exam 50%
Language of instruction:	English
Work placement(s):	No