

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences		
DEPARTMENT	Department of Chemistry		
LEVEL OF STUDIES	ISCED level 6 – Bachelor's or equivalent level		
COURSE CODE	EN31	SEMESTER	7 or 8
COURSE TITLE	Petroleum and Natural Gas Engineering		
TEACHING ACTIVITIES <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>		TEACHING HOURS PER WEEK	ECTS CREDITS
-		3	3
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>		-	-
COURSE TYPE <i>Background, General Knowledge, Scientific Area, Skill Development</i>	Specific Area		
PREREQUISITES:	No		
TEACHING & EXAMINATION LANGUAGE:	Greek		
COURSE OFFERED TO ERASMUS STUDENTS:	No		
COURSE URL:	https://chem.duth.gr/en/courses/chemical-process-modelling-and-simulation		

(2) LEARNING OUTCOMES

Learning Outcomes <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>
<p>After the successful completion of the course, participants will be able to:</p> <ul style="list-style-type: none"> • Demonstrate advanced knowledge in the field of petroleum and natural gas engineering. • Possess advanced cognitive and practical skills for solving complex and unpredictable problems in the oil and gas industry. • Apply complex techniques and methodologies for decision-making in highly demanding industrial environments. <p>Knowledge</p> <ul style="list-style-type: none"> • Understand the operation of key units in the hydrocarbon extraction and production industry. • Understand the structure and sequence of engineering stages from geophysical exploration through to production. • Comprehend the fundamental principles and theories underlying petroleum and natural gas engineering methodologies.

- Understand the thermodynamics, fluid mechanics, and behavior governing geological fluids.

Skills

- Characterize, classify, and estimate oil and gas reservoirs.
- Prepare oil and gas wells for production.
- Operate specialized laboratory equipment and advanced simulation software used in petroleum and natural gas engineering.
- Interpret production data and information from hydrocarbon extraction operations.

Abilities

- Supervise and manage the real-time operation of oil and gas extraction and production units.
- Detect and efficiently resolve malfunctions, failures, and operational deficiencies in hydrocarbon production facilities by selecting appropriate methodologies.
- Make decisions in complex problems related to drilling, reservoir, and production engineering.
- Select appropriate instruments, techniques, or combinations of well-control methodologies, taking into account cost and effectiveness.
- Collaborate effectively with multidisciplinary teams of scientists and professionals in the international petroleum and natural gas engineering sector to develop solutions to scientific and engineering challenges.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,

ICT Use

Adaptation to new situations

Decision making

Autonomous work

Teamwork

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project design and management

Equity and Inclusion

Respect for the natural environment

Sustainability

Demonstration of social, professional and moral responsibility and sensitivity to gender issues

Critical thinking

Promoting free, creative and inductive reasoning

The general skills that participants will have acquired upon successful completion of the module are:

- Search, analysis and synthesis of data and information, ICT use
- Adaptation to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas
- Project design and management
- Respect for the natural environment
- Sustainability
- Critical thinking
- Promoting free, creative and inductive reasoning

(3) COURSE CONTENT

<p>THEORY</p> <ul style="list-style-type: none"> • Hydrocarbon Reservoirs: Reservoir Rocks and Reservoir Fluids. • Estimation of Hydrocarbon Reserves. • Drilling Engineering and Well Completion Engineering. • Reservoir Engineering. • Oil and Gas Displacement Mechanisms in the Reservoir. Oil Recovery Factor. • Well Preparation for Production. Pay Zone Completion. Well Equipment. Fluid flow from the reservoir to the surface. Natural flow and artificial lift. • Reservoir Stimulation. Near-wellbore stimulation. Far-field reservoir stimulation. Hydraulic fracturing. • Well Control. • Operation of an Oil and Gas Industry Control Room (use of simulator). • Management of Offshore Oil and Gas Wells and Gas Wells (use of simulator). • Alarm Management and Trend Graph Analysis in Oil and Gas Platform SCADA Systems (use of simulator). • Control and Management of “What-If” Scenarios in the Oil and Gas Industry (use of simulator).

(4) LEARNING & TEACHING METHODS - EVALUATION

<p>TEACHING METHOD <i>Face to face, Distance learning, etc.</i></p>	Face to face										
<p>USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i></p>	<p>Use ICT in teaching and in communication with students:</p> <ul style="list-style-type: none"> • Digital slides • Scientific simulators • Videos • MS Teams / eclass, webmail 										
<p>TEACHING ORGANIZATION <i>The ways and methods of teaching are described in detail.</i> <i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i></p> <p><i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i></p>	<table border="1"> <thead> <tr> <th><i>Activity</i></th> <th><i>Workload/semester</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>39</td> </tr> <tr> <td>Interactive learning</td> <td>30</td> </tr> <tr> <td>Bibliographic research and analysis</td> <td>21</td> </tr> <tr> <td>Total</td> <td>90</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Workload/semester</i>	Lectures	39	Interactive learning	30	Bibliographic research and analysis	21	Total	90
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	Lectures	39									
	Interactive learning	30									
	Bibliographic research and analysis	21									
Total	90										
<p>STUDENT EVALUATION <i>Description of the evaluation process</i></p> <p><i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others</i></p>	<p>Student assessment is conducted through a written examination. The final written examination includes multiple-choice questions, short-answer questions, critical thinking questions, matching exercises, true/false questions, and problem-solving tasks carried out both in written form and in silico.</p> <p>The language of assessment is Greek.</p>										

Please indicate all relevant information about the course assessment and how students are informed

The evaluation criteria are communicated from the beginning of the course and are accessible to students via eclass.

(5) SUGGESTED BIBLIOGRAPHY

- Recommended bibliography:

1. Standard Handbook of Petroleum and Natural Gas Engineering, W. Lyons, G. J. Plisga, M. D. Lorenz, Gulf Professional Publishing, 3rd Edition, 2015, ISBN: 978-0123838469.
2. Περί Πετρελαίου και Φυσικού Αερίου - About Oil & Gas, Σ. Κασίνης, Kassinis International Consulting Ltd, 2015, ISBN: 978-9963-251-43-8.

- Relevant scientific journals:

1. Journal of Petroleum Science and Engineering, Elsevier.
2. Journal of Natural Gas Science & Engineering, Elsevier.