



Course unit (module) title			Code
Petroleum Geology			
Lecturer(s)		Department(s) where the course unit (module) is delivered	
Coordinator: Assoc. prof., dr. Jurga Lazauskienė		Institute of Geosciences, Faculty of Chemistry and Geosciences, Vilnius University, M.K.Čiurlionio str. 21/27, LT-03101 Vilnius	
Study cycle		Type of the course unit (module)	
Full-time studies (2 nd stage, master).		Optional	
Mode of delivery	Period when the course unit (module) is delivered		Language(s) of instruction
Face-to-face	Spring semester (2 rd semester).		Lithuanian/English
Requirements for students			
Prerequisites:): Geodynamics and Sedimentary Basin Analysis, Sedimentology, Geochemistry, Earth Physics		Additional requirements (if any) none	
Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	133	48 (32 – lectures; 16 – seminars, tutorials)	85
Purpose of the course unit (module): programme competences to be developed			
Students will be acquainted with the basic knowledge of petroleum geology, hydrocarbon (oil, gas, condensate) generation, migration, accumulation and entrapment, reservoir properties, methods of hydrocarbons exploration and production, classification and assessment of resources; understanding of unconventional hydrocarbons. Case study of the selected oil or gas field – assessment of resources, defining the exploration strategy. Students will acquire ability to understand and explain principles and methods of cognition of geological environment and geological processes, their mechanisms and evolution; ability to perform geological investigations, exploration of natural resources utilizing modern methods and techniques, evaluate and summarise results; ability to work in group and individually, to organize and plan activities, improve knowledge, to find information, to apply the knowledge and understanding in practice, continuously learn.			
Learning outcomes of the course unit (module)		Teaching and learning methods	Assessment methods
- will understand origin, migration, entrapment of petroleum; formation, distribution and classification of oil and gas fields - will know the methodology for assessment of the natural resources: will be able to assess and evaluate oil and gas resources, will have an understanding of application of geological concepts to petroleum prospecting and exploration,. - will obtain basic knowledge about composition and properties of conventional and unconventional hydrocarbons (oil, gas, condensate), reservoir rocks and seals, hydrocarbon exploration methods - hands on assessment of resources, preparation of exploration strategy - case study of the selected oil/gas field.		Lectures, problem based learning; collecting of information. Methods of the active tutoring, involving lecture (fall of ideas, group discussions, debates), individual preparation and presentation of tasks Research and self-study methods (search for the information, analysis of the scientific papers, preparation and presentation of the oral presentation), debates, fall of ideas. Research and self-study methods (search for the information, analysis of the scientific papers, preparation and presentation of the	Intermediate assessments of the performance during the lectures; (open/close type tasks and questions). Intermediate assessments of the performance during the lectures; Assessment of self-prepared tasks: combination of multiple choice, completion and test or essay questions. Defence of self-prepared case study analysis,

- will gain exposure to literature in petroleum geology; be able to develop a plan for the solution of a particular problem and to successfully execute it; ability to find and evaluate areas of the application of knowledge.			oral presentation), Research and self-study methods, debates, fall of ideas.					Comprehensive final written examination	
Content: breakdown of the topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	Contact hours	Self-study hours	Assignments
1. Introduction to Petroleum geology; origin and migration of hydrocarbons (primary, secondary); formation, distribution and classification of oil and gas fields	4						4	5	Self-study of reference material
2. Composition and properties of oil, gas, condensate and associated water	2						2	4	Self-study of reference material.
3. Source rocks, reservoir rocks; reservoir properties (porosity, permeability); methods of evaluation. Traps and seals.	4		3				5	8	Self-study of reference material. Preparation and presentation of tasks
4.Unconventional hydrocarbons	4						7	8	Self-study of reference material
5. Petroleum basins, classification, variations, development of petroleum system; hydrocarbon potential of Baltic Sedimentary Basin	4		4				7	8	Self-study of reference material Preparation and presentation of tasks
4. Introduction to hydrocarbon exploration methods. Production operation	6		4				8	9	Self-study of reference material Preparation and presentation of tasks
5. Oil and gas resources and reserves; classification and methods of assessment.	5						7	8	Self-study of reference material Preparation and presentation of tasks
8. Case study of the selected oil or gas field – assessment of resources; definition of exploration strategy	3	3	5				7	25	Self-study of reference material Preparation

									and presentation of tasks	
9. Preparation for the final exam and examination			1					1	10	Self-study of reference material. Written presentation of knowledge during exam.
Total		32	1	16				48	85	
Assessment strategy	Weight, %	Deadline	Assessment criteria							
Assessments of the performance during the lectures	10%; 1 point	During the term	Knowledge and understanding of basic principles, concepts and mechanisms reasoning abilities, ability to synthesize different kinds of presented information, analytical skills, performance in a course of the active involving lectures. 1 point: active in discussion, comprehensive analysis and answers to questions 0,5 point: minimum or poor answers to questions 0: not answers the questions, do not participate in seminars.							
Assessment of the case study	30%; 3 point	End of the term	Assessment of resources, preparation of exploration strategy for selected oil/gas field – results of evaluation and task preparation, self-prepared oral presentation; the performance in presenting results of analysis in oral and written. 3 points – excellent results. 2 points – good results, can be minor weaknesses. 1 points – average results. 0 – results are below the minimum requirements. It is obligatory to self-prepare and present the oral presentation before the final examination.							
Final written examination	60%; 6 point	End of the term	Accumulative score. The score of the final exam would include evaluation of the answers to two written questions. Answers to the questions: 6 points – outstanding knowledge. 5 points – excellent knowledge. 4 points – good knowledge, can be minor weaknesses. 3 points – average knowledge, weaknesses. 2 points – knowledge is below average, important mistakes. 1 point – minimum knowledge, important mistakes. 0 – knowledge is below the minimum requirements.							
Author		Year of publication	Title		Issue of a periodical or volume of a publication		Publishing place and house or web link			
Compulsary reading										
Richard C. Selley, Stephen A. Sonnenberg (eds.).		2014	Elements of Petroleum Geology				Elsevier, Academic press, 526 p.			
Magoon L.B., Dow W.G. (eds.).		1994	The Petroleum system – from source to trap		AAPG Memoir 60, 655					
Morton-Thompson D. Woods A.M. (eds.).		1992	Development Geology		AAPG Methods in Exploration Series, No. 10.		Tulsa, Oklahoma, USA. 550.			
Zdanavičiūtė O., Sakalauskas K. (red.).		2001	Lietuvos ir Pietryčių Baltijos naftos geologija. Oil geology of Lithuania and Southern Baltic.				Vilnius, 204 p.			
Knut Bjørlykke		2010	Petroleum Geoscience: From Sedimentary Environments to Rock Physics				Springer, 501 p.			

Optional reading				
Bjorlykke K	1984	Sedimentology and Petroleum Geology		Universitetsforlaget, Oslo (psl. 269-323)
Barnard P.C. and Bastow M.A.	1991	Hydrocarbon generation, migration alteration, entrapment and mixing in the Central and Northern North Sea		London. 30.
Zdanavičiūtė O.	1998	Lietuvos nafta		Vilnius: Mokslo aidai, 144 p.