

<b>Identification</b>	<b>Course</b>	<b>PETE 509- Petroleum Geoscience- 8 ECTS credits</b>	
	<b>Department</b>	Petroleum Engineering	
	<b>Program</b>	Graduate	
	<b>Term</b>	Fall 2017	
	<b>Instructor</b>	Assoc. Prof. Gasham Zeynalov	
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	<b>Phone:</b>	(+994 12) 421-79-16 (ext. 243 )	
	<b>Class hours</b>	Tuesday in appointed time	
	<b>Office hours</b>	Wednesday, 14.00-15.00	
<b>Prerequisites</b>	Consent of instructor		
<b>Language</b>	English		
<b>Compulsory/Elective</b>	Required		
<b>Required textbooks and course materials</b>	<p><b>Core textbook:</b> 1. Knut Bjørlykke, 2010. <b>Petroleum Geoscience: From Sedimentary Environments to Rock Physics</b> ,Springer, 518 pages</p> <p><b>Additional book:</b> Jon Gluyas and Richard Swarbrick, <i>Petroleum Geoscience</i>, Blackwell Publishing, 2009</p>		
<b>Course objectives</b>	<p>This course is a major subject of a Petroleum Engineering.</p> <p><u>General Objectives of the Course:</u> to meet curriculum requirements of the MSc Petroleum Engineering program at Khazar University</p> <p><u>Specific Objectives of the Course:</u></p> <ul style="list-style-type: none"> <li>- to study origin and distribution and properties of petroleum and petroleum-bearing rocks and petroleum play key elements</li> <li>- to obtain knowledge in different geological-geophysical methods in hydrocarbon exploration and concepts of clastic and carbonate depositional environments in petroleum exploration</li> <li>- to perform knowledge in leads and prospects, risks and uncertainty in exploration and fluid distribution and contacts, reservoir property distribution and reservoir description from seismic data</li> <li>- to obtain knowledge in sour rocks and petroleum migration,</li> <li>- to study production geology and unconventional hydrocarbon resources</li> </ul> <p><b>Assignment and two quizzes:</b> First quiz will be based on course materials which had been taught by between 1-7 weeks. Second quiz will be based on course materials which had been taught by between 9-14 weeks.</p> <p><b>Practical exercises</b> will be dedicated to evaluation of poroperm properties, sedimentary structure and textural properties of reservoir rocks, net to cross mapping, interpretation of seismic data etc.</p>		
<b>Learning outcomes</b>	<p>By the end of the course the students should be able to learn:</p> <ul style="list-style-type: none"> <li>- importance of Petroleum Geoscience in Petroleum Engineering</li> <li>- Source rock, reservoir, migration path, trap and seal elements in hydrocarbon exploration</li> <li>- Geomechanis and deformation of sedimentary rocks</li> <li>- Sedimentary basins and sedimentation processes in in different types of basin</li> <li>- Reservoir description from seismic data</li> <li>- Production geology and unconventional resources</li> <li>- to integrate geological sounds with Petroleum Engineering subjects</li> </ul>		
<b>Teaching methods</b>	Lecture		X
	Group discussion		X

	Experimental exercises	x	
	Case studies	x	
	Simulation	x	
<b>Grades</b>	Evaluation Methods	Percentage (%)	
	Midterm Exam	30	
	Participation	5	
	Assignment and two quizzes	15	
	Practical exercises	10	
	Final Exam	40	
	Total	100	
<b>Academic integrity</b>	Students are responsible for the honest completion and representation of their projects, for the appropriate citation of sources, and for respect of others academic endeavors. Plagiarism and other forms of academic misconduct are serious offenses with severe penalties.		
<b>Tentative Schedule</b>			
<b>Week</b>	<b>Dates</b>	<b>Topics</b>	<b>Textbook/Assignments</b>
1	19.09.2017	Introduction to the Petroleum Geoscience Importance Petroleum Geoscience in the Petroleum Engineering Geological exploration at different scales	Chapt. 1
2	26.09.2017	Introduction to Sedimentology Sediment Transport and Sedimentary Environments Sediment texture and grain size distribution	chapt.2
3	03.10.2017	Sedimentary geochemistry How sedimentary are produced Distribution of Clay Minerals and other Authigenic Minerals as a Function of Erosion and Weathering Geochemical Processes in the Ocean Clastic Sedimentation in the Oceans	chapt.3
4	10.10.2017	Sandstone And Sandstone Reservoirs Prediction of Reservoir Quality Meteoric Water Flow and Mineral Dissolution Sandstone Reservoirs Buried to Intermediate and Deeply Depth	Chapt.4
5	17.10.2017	Carbonate Sediments Geochemistry of carbonate minerals Skeletal Components Invertebrate Skeletal Fossils Non-skeletal grains Carbonate Environments Carbonate Reservoir Rocks	Chapt 5
6	24.10.2017	Stratigraphy: Lithostratigraphy, Biostratigraphy, Time Stratigraphy,	Chapt. 7

		Relation between Lithostratigraphy, Biostratigraphy and Chronostratigraphy Radiometric Dating Methods Magnetostratigraphy Sequence Stratigraphy	
7	31.10.2017	Sequence Stratigraphy, Seismic Stratigraphy and Basin Analysis Quiz 1	Chapter 8
8	07.11.2017	<b>Mid –term exam</b>	
9	14.11.2017	Heat Transport in Sedimentary Basins Subsurface Water and Fluid Flow in Sedimentary Basins	Chapter 9, 10
10	21.11.2017	Introduction to Geomechanics: Stress and Strain in Sedimentary Basins Subsurface Fluid Pressure and Effective Stress Condition Horizontal Stresses in Sedimentary Basins Deformation Properties of Sedimentary Rocks Compaction in Sedimentary Basins	Chapt.11
11	28.11.2017	The Structure and Hydrocarbon Traps of Sedimentary Basins	Chapt. 12
12	05.12.2017	Compaction of Sedimentary Rocks Including Shales, Sandstones and Carbonates	Chapt.13
13	12.12.2017	Source Rocks and Petroleum Geochemistry Modelling of Petroleum Generation Rock-Eval Analyses Composition of Petroleum Petroleum Migration Loss of Petroleum During Migration	Chapter 14, 15
14	19.12.2017	Seismic Exploration Seismic interpretation Explorational Rock Physics – The Link Between Geological Processes and Geophysical Observables	Chapt.16, 17
15	26.12.2017	Production Geology Unconventional Hydrocarbons: Oil Shales, Heavy Oil, Tar Sands, Shale Gas and Gas Hydrates Quiz 2	Chapt.18, 19
	TBA	<b>Final Exam</b>	

