Identification	**Subject**	GEOL 310 Petroleum Geology 6 ECTS
	Department	Petroleum Engineering
	Program	Undergraduate
	Term	Fall, 2023
	Instructor	Dr Elshan Abdullayev
	E-mail:	elshan.abdullayev@khazar.org
	Phone:	(+994 12) 421-79-16 ext. 243
	Classroom/hours	Monday and Thursday at the appointed time
	Office hours	Monday 16.00-17.00
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	• Richard C. Selley and Steve Sonnenberg, 2015. Elements of Petroleum Geology, 3rd edition, Academic Press of Elsevier, 507 pages • Knut Bjørlykke, 2010. Petroleum Geoscience: From Sedimentary Environments to Rock Physics, Springer, 518 pages • Jon Gulyas and Richard Swarbrick, Petroleum Geoscience, Blackwell Publishing, 2009	
Course outline	The aim of the course is to teach students about weathering process in the continents under different climatic condition. Additionally, the students will focus on studying deposition environment in the fluvial, lacustrine and marine environments. Post depositional process such as, shallow and deep water diagesnesis will be taught.	
Course objectives	This course is a major subject of Petroleum Engineering. Objectives of the Course: - to acquaint the student with the key concepts of the origin and generation of hydrocarbons, reservoir rocks and subsurface reservoirstructures (traps)which are introduced together with some of the keytechniques used within the industry (e.g. reservoir geology, petrophysics and formation evaluation) - to understand concept of the petroleum system, demonstrating how allthe elements are necessary for a conventional accumulation of hydrocarbons. - to understand details of reservoir architecture and the factors that influence the performance of reservoirs **Assignment and two quizzes:** First quiz will be based on course materials which had been taught by between 1-6 weeks. Second quiz will be based on course materials which had been taught by between 8-14 weeks. **Practical exercises** will be dedicated to evaluation of SEM images and photomicrographs, transgressions and regressions in sedimentary rocks, geological mapping, construction and interpretation seismic-geological cross sections, petrophysical properties of sedimentary rocks etc.	
Learning outcomes	On completion of the course, the student should be able to: • Derive expressions that describe a particular aspect of fluid behavior. Examples include velocity profiles of non-Newtonian fluids in pipelines, flowrate of compressible fluids, flow through porous materials. • Apply and use several conventional theoretical expressions found in fluids: examples include pressure losses across packed beds, critical pressure ratio for choked flow, two phase pressure drop. • Develop numerical schemes to solve partial differential equations in 2D steady and transient examples.	
Teaching methods	**Lecture**	x
	Group discussion	x

	Practical exercises	x
	Case analysis	x
Evaluation	**Methods**	**Percentage (%)**
	Midterm Exam	30
	Quizzes	10
	Project	20
	Final Exam	40
	Total	100

Policy

- Quizzes will be distributed throughout the classes each two weeks. Approximately, 2-4 questions will be in each quize. The each question will be marked between 0.5-1 point.

- Midterm will be carried out in the week announced by the university. Time allocated will be announced close to the midterm.

- Projects will be conducted close to the end of semester on 7 December 2023. The project presentation date, time and structure will be announced during the semester. The project will be oral or poster presentation. It will be announced after submitting reports that should be 5 pages

- Final exam date and time will be defined by the University.

- **Preparation for class**

The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes, assigned chapters and get ready for class assignments. Throughout the semester students will also have practical exercises and quizzes.

- **Withdrawal (pass/fail)**

This course strictly follows grading policy of Graduate School of Science and Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.

- **Cheating/plagiarism**

Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0) without any considerations.

- **Professional behavior guidelines**

The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.

- **Expected behavior**

Includes attending all class activities; meeting deadlines; observing common courtesies to fellow students, teachers, and staff; being honest; making a diligent

	effort to learn; and does not engage in any disruptive irresponsible manner. Legitimate collaboration is encouraged but academic collusion or dishonesty will not be tolerated. ▪ **Class attendance** Attendance is required! Please be in class on time. Attendance will be taken at the beginning of each class period. In case you are not present when attendance sheet is passed on, you will be marked absent. If students who are late for lessons for more than 10 minutes to class will be marked absent, despite this, the student can still attend the class. • **Class discussion** Feel free to voice your opinions and ask questions anytime during a class period. Practice your right and freedom to learn. Remember you are here to learn and we are here to teach and that teaching and learning are forever intertwined. You can help me teach you as much as I can help you learn. Be an active participant in the learning process!

Week	**Date/Day (tentative)**	**Topics**	**Textbook/Assignments**
1	18.09.23	The context of Petroleum Geology Relationship of Petroleum Geology to Petroleum Exploration and Production	Richard C. Selley and Steve Sonnenberg, 2015
2	25.09.23	Introduction to Sedimentology Sediment Transport and Sedimentary Environments Sediment texture and grain size distribution	Knut Bjørlykke, 2010.
3	02.10.23	Introduction to Sedimentology Sediment Transport and Sedimentary Environments Sediment texture and grain size distribution	Knut Bjørlykke, 2010.
4	09.10.23	Sandstone And Sandstone Reservoirs Prediction of Reservoir Quality. Sandstone Reservoirs Buried to Intermediate and Deeply Depth	Knut Bjørlykke, 2010.
5	16.10.23	Sedimentary geochemistry	Knut Bjørlykke, 2010.
6	23.10.23	How sedimentary are produced. Distribution of Clay Minerals and other Authigenic Minerals as a Function of Erosion and Weathering	Knut Bjørlykke, 2010.
7	30.10.23	How sedimentary are produced. Distribution of Clay Minerals and other Authigenic Minerals as a Function of Erosion and Weathering	Knut Bjørlykke, 2010.
8	06.11.23	Stratigraphy: Lithostratigraphy, Biostratigraphy, Time Stratigraphy	Knut Bjørlykke, 2010.
9	13.11.23	Diagenesis	Knut Bjørlykke, 2010.
10	20.11.23	Physical and Chemical properties of Petroleum: Natural gases Hydrocarbon gases Nonhydrocarbon gases	Richard C. Selley and Steve Sonnenberg, 2015

		Gas hydrates Composition and occurrence	
11	27.11.23	Generation and Migration of Petroleum Origin of Petroleum: Organic and Inorganic Organic Processes on the Earth surface	Richard C. Selley and Steve Sonnenberg, 2015
12	04.12.23	Reservoir Porosity, Permeability, Capillary pressure Relationship between porosity, permeability and sediment texture. Effects of diagenesis on Reservoir quality	Knut Bjørlykke, 2010.
13	11.12.23	Compaction of Sedimentary Rocks Including Shales, Sandstones and Carbonates	Knut Bjørlykke, 2010.
14	18.12.23	Traps and Seals: Nomenclature of Trap Distribution of petroleum within trap Seals and Cap Rocks Classification of traps	Richard C. Selley and Steve Sonnenberg, 2015
15	25.12.23	Petroleum System and Basin modelling Hydrocarbon generation and migration	Presentation
16	TBA	**Final Exam**	

This syllabus is a guide for the course and any modifications to it will be announced in advance.