

Identification	Subject	PETE 505 – Advanced Drilling Engineering – 8 ECTS	
	Department	Petroleum Engineering	
	Program	Graduate	
	Term	Fall, 2023	
	Instructor	Ulviyya Asgarova	
	E-mail:	ulviyya.asgarova@khazar.org	
	Classroom/hours	11 Mehseti str. (Neftchilar campus), Thursday 18:40- 21:00	
Prerequisites	Algebra, Basic Calculus, Solid Mechanics, Fluid Mechanics, General Chemistry, Geology, Drilling Engineering basics		
Language	English		
Compulsory/Elective	Compulsory		
Required textbooks and course materials	<ul style="list-style-type: none"> • <i>Drilling Engineering: Author Dr. John Ford, Heriot-Watt University, Department of Petroleum Engineering, Edinburgh, UK, 2004, 539 pages (available at the library)</i> • <i>Advanced Oilwell Drilling Engineering: Dr. Bill Mitchel, 1995, 626 pages</i> 		
Course outline	<p>Course is aimed for master students. It addresses in depth review of the Drilling Operations, Rig Components, The Drill string, Drilling Bits, Formation Pressures, Well Control, Casing, Cementing, Drilling Fluids, Hydraulics, Directional Drilling, Deflection tools and Directional Surveying, Logging Operations, Measurement While Drilling, Introduction to Completion.</p> <p>Students will be evaluated through:</p> <ul style="list-style-type: none"> • Problems – to evaluate the ability of the student to cope with the given material. • Presentation and group discussions – to evaluate the students' individual presentation skills and ability to work in groups. 		
Course objectives	<ul style="list-style-type: none"> • Provide overview of modern drilling engineering industry. • Provide skilful understanding of drilling engineering theory. • Perform advanced well planning and operations related calculations. • Evaluate the ability of the students to cope with the given materials, find GAPS in their development. 		
Learning outcomes	<p>By the end of the semester, students should be able to gain or improve the following skills:</p> <ul style="list-style-type: none"> • Ability to discuss in depth the Drilling Operations • Describe all rig components and its systems • Select an appropriate well design according to the Formation Pressures • Identifying Well Control cases and well control barriers • Be informed about Casing design, Cementing program • Should know all the functions of Drilling Fluids and its chemical/physical properties • Hydraulics, Directional Drilling, types of well trajectories • Deflection tools and Directional Surveying, Logging, Measurement While Drilling and know difference between conventional logging tools • Introduction to Completion, basic information about completion, perforation and etc. • Teamwork 		
Teaching methods	Lecture		x
	Group discussion		x
	Practical exercise		x
	Case analysis		x
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam	TBA	30
	Class Participation		10

	Presentation/Group Discussion	TBA	20
	Final Exam	TBA	40
	Total		100
Policy	<p>Midterm exam will be carried out in the week announced by the university. Time allocated will be announced close to the midterm. A midterm examination is a test administered approximately midway through an academic grading term, be it a quarter or semester. Its primary objective is to provide students with a clearer assessment of their progress within the course, enabling them to gauge their performance and understanding up to that point.</p> <p>The student receives 10 bonus points for the class participation and activity at the end of the semester if they attend all classes and follow all course policies and procedures.</p> <p>Presentation/Group Discussion will be conducted close to the end of semester in December. Date and time will be announced during the semester. A presentation/group discussion is a collaborative activity of students relating to research about drilling technology. The reasons for including a presentation/group discussion in the subject course is to evaluate the students' individual presentation skills and ability to work in groups.</p> <p>A final examination is an examination administered at the end of an academic term, with a set of questions or exercises evaluating the skill or knowledge of students. Final exam date and time will be defined by the University. A final examination is an evaluative assessment presented to students at the conclusion of an academic term or course of study.</p> <p>Preparation for class</p> <p>The structure of this course makes individual study and preparation of students outside the class very 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 student's understanding of the lecture. After the lecture student should study his notes, work relevant problems and cases from the end of the chapter.</p> <p>Withdrawal (pass/fail)</p> <p>This course strictly follows grading policy of the School of Science and Engineering. Student is normally expected to achieve a mark of at least 65% to pass. In case of failure, he/she will be required to retake the course the following term or year.</p> <p>Cheating/plagiarism</p> <p>Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation and invalidation of student's results.</p> <p>Professional behaviour guidelines</p> <p>Students shall behave in professional way to create favourable academic</p>		

environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behaviour 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 the 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. You shall receive 5 bonus points at the end of the semester if you attend all classes and follow all course policies and procedures.

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!

Tentative Schedule			
Week	Date/Day (tentative)	Topics	Textbook/Assignments
1		Overview of Drilling Operations, Cost and Hazards (drilling personnel, rotary drilling equipment, the drilling process, offshore drilling, drilling cost, hazards in drilling operations).	Floating Drilling Manual, Ch. 1&2, HW Drilling Ch. 1
2		Field Development Process. The role of drilling engineering in FDP.	Advanced Drilling Engineering Ch. 1
3		Drilling optimizations methods. Drill string	Advanced Drilling Engineering Ch. 2
4		Drill bit design and use.	Advanced Drilling Engineering Ch. 2
5		Drill Hole Mechanics.	Advanced Drilling Engineering Ch. 3
6		Well Control and Kick Removal (well control system, primary control, warning signs of kicks, secondary control, well killing procedures).	Well Control Manual, HW Drilling Ch.6
7		Casing design (Component parts of a casing string, casing terminology, properties of casing, API specifications, standards and bulletins, wellheads and casing hangers, rig-siteoperations).	HW Drilling Ch. 7
8		Mid-term Exam	
9		Cementing Design Rig Hydraulics, Drilling fluids.	HW Drilling Ch. 8 HW Drilling Ch. 9 & 10
10		Deflection tools and Directional Surveying (building assemblies, holding assemblies, deflecting tools, surveying calculations, survey calculations and plotting results, photographic surveying tools, downhole telemetry tools,inertial navigation systems).	Directional drilling Ch. 2 & 7, HW Drilling Ch. 12,HW Drilling Ch.
11		Logging operations and Tools (Aim of logging operations, Neutron density, Porosity, Resistivity tools, LWD, MWD, readings the logs)	Drilling Manual Ch.6
12		Measurement While Drilling (MWD systems, MWD directional tools, MWD-gamma ray tools, transmission and control systems, surface system, example systems) <i>Introduction to Completion</i>	Directional drilling Ch.8, HW Drilling Ch. 13
13		Presentation/Group Discussion	
14		Presentation/Group Discussion	
15		Revision	
16	TBA	Final Exam	

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