SYLLABUS
PETE 3203 - 370: Drilling Engineering
Spring 2025

Instructor: Dr. Mahmoud Elsharafi

Office No.: MY 219 F

Tel, : (940) 397-4551

E-mail: mahmoud.elsharafi@msutexas.edu

Office Hours: Tuesday: 10:00 am – 12:00 noon
Wednesday: 01:00 pm– 02:00 pm
Thursday: 10:00 am – 12:00 noon, all other times by appointment.

Course Schedule: Online Class (Tuesday-Thursday 12:00-1:00pm. Zoom-meeting).

Note: it is recommended but not required to attend the online lecture since it will be recorded and posted into D2L.

CATALOG DESCRIPTION
Introduction to the drilling technology, drilling fluids, rheological properties, drilling hydraulics, drill bit selection, pressure loss calculations, casing design, well cementing, pore pressure and geo mechanical considerations in drilling, introduction to directional drilling and deviated wells.

COURSE PRE-REQUISITES
PETE 2103

OTHER PREREQUISITES
Basic computer skills, MS Excel, hand calculator.

TEXTBOOK
Applied Drilling Engineering, Textbook Vol. 2 Author: A.T. Bourgoyne Jr., K.K. Millheim, M.E. Chenevert,

OPTIONAL TEXTBOOK
Drilling Technology, second edition, Steve Devereux

REFERENCES
Additional Material will be distributed in the form of handouts.

TOPICS COVERED
- An introduction to the drilling process
- Fundamentals of drilling
- Drilling string and drilling rigs
- Rotary drilling rig components
- Drilling bits and drilling fluids
- Drilling hydraulics
- Casing design.
- Cementing
- Drilling problems
- Directional drilling
- Well control

Outcome-Related Course Learning Objectives	1	2	3	4	5	6	7
An introduction to the drilling process. (Hw,	X	X					
Fundamentals of drilling. (Hw, Quiz, Exam)	X	X					
Drilling string and drilling rigs. (Hw, Quiz, Exam)	X	X		X		X	
Rotary drilling rig components. (Hw, Quiz, Exam)	X	X		X		X	
Drilling bits and drilling fluids. (Hw, Quiz, Exam)	X	X		X		X	
Drilling hydraulics. (Hw, Quiz, Exam)	X	X		X		X	
Casing design. (Hw, Quiz, Exam)	X	X		X		X	
Cementing. (Hw, Quiz, Exam)	X	X		X		X	
Drilling problems. (Hw, Quiz, Exam)	X	X		X		X	
Directional drilling. (Hw, Quiz, Exam)	X	X		X		X	
Well control. (Hw, Quiz, Exam)	X	X		X		X	
Final Report and Presentation	X	X	X	X	X	X	X

1. The ability to identify, formulate, and solve complex engineering problems by applying the principles of engineering, science, and mathematics.
2. The ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental, and economic factors.
3. The ability to communicate effectively with a range of audiences.
4. The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. The ability function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. The ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. The ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

CONTRIBUTION OF COURSE TO PROFESSIONAL COMPONENT

This course contributes to the engineering science component of the petroleum engineering certificate.

COURSE ORGANIZATION AND ASSESSMENT

- Lecture Format

This course consists of online lectures. We are going to meet through zoom meeting two times a week TR, 12:00-1:00pm. The online class will be spent mostly explaining and discussing concepts, and solving related case problems. Students highly recommended studying the different chapters in their textbook course or content course subject specified by the instructor. Student attendance and participation in online class discussions is highly recommended.

- Exams

There will be two regular exams plus one comprehensive exam at the end of the semester. Each exam is based on two testing parts. A Theoretical part designed to test the students' ability to master the taught materials. A practical part designed to test the students' ability to analyze and solve a set of problems on their own. You are expected to take the exam on the scheduled date and time. There will be no makeup examinations except under very exceptional circumstances pre-excused by the instructor, such as **documented** medical reasons, emergencies, or University sponsored activities. A copy of the official excused absence letter must be send to instructor for absences due to University sponsored activities as soon as the letter is issued to students. The examination materials for the make-up exam may be different from the ones given in regular exams.

- Quizzes

The goal of these quizzes is to encourage the students to study the course materials by themselves. Quizzes will consist of true/false, multiple choice, and short problems related to the course. You are expected to take these quizzes on any dates and times. However, if for a major reason you are unable to do so, then you must provide the instructor with a

valid written excuse. For those who missed quizzes with a valid reason, the instructor will then give them a make-up quiz. The examination materials for the make-up quiz may be different from the ones given in regular quizzes.

- Homework Assignments

Homework assignments must be turned in on the due date, at the beginning of class. Late homework will not be accepted. Arrangements must be made in advance and in person if homework cannot be turned in by the due date and it is subjected to the instructor judgment. Copying of others' work is strictly prohibited. Each student is responsible for submitting his own individual personal homework copy, written in his own words. No dual or group homework copy is accepted unless specified by the instructor.

- Final Report and Presentation

Write a report on a topic related to the course by typing. The topic should be related to the course. The report should be typed and emailed to me through D2L. The report should be at least 5 pages. Please prepare the report in APA style, which can be found at www.apastyle.org.The final report will be graded based on the following criteria:

- ✓ Five pages or more.
- ✓ The topic must be related to the course.
- ✓ The final Report most show the ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental, and economic factors.
- ✓ The report should be well written and easy to understand.
- ✓ Part distributions should include: introduction, main-body, conclusions, and references.
- ✓ The PowerPoint presentation must be submitted into Dropbox in D2L.
- ✓ The work should be presented to the online class by zoom meeting or/and recorded and submit into Dropbox in D2L.

- Other Policies

Other polices may be announced for specified conditions.

- Course Grade

The final grade for the course will be based on the scores earned in the midterm mandatory exam, the mandatory final exam, the average score earned in the quizzes, the average score earned in the homework. Two midterm exam contribute 20% each, and final exam contributes 20%, quizzes average contributes 10%, homework average contributes 15%, and Final Report and Presentation 15%, for 100%. The overall average score (X) for the course is determined as follows:

X =0.20 x midterm exam1 score+ 0.20 x midterm exam2 score+ 0.20 x (final exam score) + 0.10 x (quizzes average score) + 0.15 x (homework average score) + 0.15 x (Final Report and Presentation). The final letter grade for the course is based on the value of X and is determined from the following grade levels:

Letter Grade	Value of X (%)
A	90-100
B	80-89
C	70-79
D	60-69
F	below 59

GENERAL GUIDELINES

- Plan on spending at least 6 hours to study the material and to work on homework assignments, Do not wait until the last day to start working on your report, or prepare for the exam.
- Read the course material before class.
- Utilize the office hours throughout the semester to seek explanations from the instructor.
- Use engineering paper for all homework assignments and exams. Use a systematic approach to solve problems. If a problem involves drawing a graph, use Excel, Matlab, or any other graphic software tool to draw the graph. In engineering, neatness is a must, not a luxury. Be advised that you will be penalized for a lack of neatness.
- You are strongly encouraged to study in group if possible.

GENERAL EDUCATION STATEMENT
Students in this course must demonstrate their competency in oral and written communication through written homework assignments, quizzes, final reports, and exams. They must also demonstrate their ability to use the English language.

ACADEMIC INTEGRITY POLICY
Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior. Any form of plagiarism will not be accepted, and will be heavily reprimanded.

DISABILITY SUPPORT SERVICES
Students registered with Disability Support Services should have a letter verifying their disability and the appropriate accommodations.

DISCLAIMER STATEMENT
Information contained in this syllabus, other than grading, late assignments, makeup work, and attendance policies, may be subject to change with advance notice, as deemed appropriate by the instructor.

CAMPUS CARRY
Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit Campus Carry.

ACTIVE SHOOTER
The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit Safety / Emergency Procedures. Students are encouraged to watch the video entitled "*Run. Hide. Fight.*" which may be electronically accessed via the University police department's webpage: *"Run. Hide. Fight."*

MIDTERM REPORT
In order to help students I will keep track of their progress toward course objectives, then I will provide a Midterm Progress Report through each student's WebWorld account. Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students earning below a C at the midway point should schedule a meeting with the professor.

Conflict Resolution

a. The student should contact the instructor face to face or via e-mail if there is an issue with the course or the instructor. The faculty and the student will discuss this face to face or via email. Hopefully a resolution is reached on the issue.
b. The student should notify the faculty via email again if the issue still did not get resolved after the first encounter or communication.
c. The student can then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss this issue. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully a resolution is reached on the issue after this.
d. The student should notify the Chair via email if the issue still did not get resolved.
e. The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, she will forward the case to the Grade Appeals Committee if necessary.

Student Resources https://msutexas.edu/academics/scienceandmath/student_resources.php.
Texas Tech University: Since writing, analytical, and critical thinking skills are part of the learning outcomes of this course, all writing assignments should be prepared by the student. Developing strong competencies in this area will prepare you for a competitive workplace. Therefore, AI-generated submissions are not permitted and will be treated as plagiarism.

Prepared by Mahmoud Elsharafi, January 17, 2025.