

SYLLABUS
MENG 3003-X10 Independent Study (Well Logging)
Fall 2023

Instructor: Dr. Mahmoud Elsharafi
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Office Hours: Monday: 10:00 am – 12:00 noon
Wednesday: 01:00 pm– 02:00 pm
Thursday: 10:00 am – 12:00 noon

Course Schedule: Online Class.

CATALOG DESCRIPTION

Introduction to the basic hydrocarbon reservoir formation evaluation using open-hole logs, laboratory and field measurements data, and geological information. The well logging course will essentially deal with geological strata identification and the determination of physical properties of petroleum fluids and reservoir rocks. Additional topics include the determination of the lithology of hydrocarbon reservoirs; rocks porosity, permeability, and fluids saturation distribution in hydrocarbon reservoirs.

COURSE PRE-REQUISITES

PETE 2103

OTHER PREREQUISITES

Basic computer skills, MS Excel, hand calculator.

TEXTBOOK

George Asquith and Daniel Krygowski, Basic Well Log Analysis (Second Edition), The American Association of Petroleum Geologists, 2004.

OPTIONAL TEXTBOOK

Zaki Bassiouni, Theory, Measurement, and Interpretation of Well Logs, Society of Petroleum Engineers, 1994.

TOPICS COVERED

- Basic Relationships of Well Log Interpretation.
- Properties of Rocks.
- Borehole Environments and Caliper Logging.
- Spontaneous Potential (SP) Log.
- Gamma Ray (GR) Log.
- Resistivity log.
- Porosity log, Density Log, Neutron Log and Sonic Log.
- Clean formation interpretation.
- Gas Bearing Formation Interpretation.
- Shaly formation interpretation.

COURSE LEARNING OBJECTIVES AND RELATIONSHIP TO PROGRAM EDUCATIONAL OUTCOMES

Outcome-Related Course Learning Objectives	1	2	3	4	5	6	7
Basic Relationships of Well Log Interpretation (Hw, Exam)	X	X					
Properties of Rocks. (Hw, Exam)	X	X					
Borehole Environments and Caliper Logging. (Hw, Exam)	X	X					
Spontaneous Potential (SP) Log. (Hw, Exam)	X	X					
Gamma Ray (GR) Log. (Hw, Exam)	X	X					
Resistivity log. (Hw, Exam)	X	X					
Porosity log, Density Log, Neutron Log and Sonic Log.? (Hw, Exam)	X	X					
Clean formation interpretation. (Hw, Exam)	X	X					
Gas Bearing Formation Interpretation. (Hw, Exam)	X	X					
Shaly formation interpretation. (Hw, Exam)	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.

COURSE ORGANIZATION AND ASSESSMENT

- **Lecture Format**

This course consists as an online class. Zoom meeting will be hosted if needed.

- **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 given 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. 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.

- **Other Policies**

Other policies may be announced for specified conditions.

- **Course Grade**

The final grade for the course will be based on the scores earned in the one mandatory exams, the mandatory comprehensive exam, the average score earned in the quizzes, the average score earned in the homework. The midterm exam contributes 25%, the final exam contributes 25%, quizzes average contributes 10%, homework average contributes 30%, and participation, neatness, attitude, and class attendance contribute 10%, for 100%. The overall average score (X) for the course is determined as follows:

$X = 0.25 \times \text{exam1 score} + 0.25 \times \text{exam 2 score} + 0.25 \times (\text{Comprehensive exam score}) + 0.10 \times (\text{quizzes average score}) + 0.15 \times (\text{homework average score})$. 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 EDUCATION STATEMENT

Student in this course must demonstrate their competency in oral and written communication through written homework assignments, quizzes, 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, August 27, 2023.