MENG 210 &L Sophomore Design & Measurements Fall 2018

Lecture: Tuesday & Thursday	12:55 PM–13:45 PM	Cramer 101
Lab 01: Tuesday	14:00 PM–15:45 PM	WEIR 128
Lab 02: Thursday	14:00 PM–15:45 PM	WEIR 128

Instructor: Dr. Mostafa Hassanalian, Assistant Professor, Mechanical Engineering
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Office: TBD
Office hours: TBD

Required Textbook:I have not selected a required text at this point in time. I may assign one in the future.

Course Description:*Sophomore Design & Measurements*will presentFundamentals of mechanical engineering design and instrumentation. This course introduces basic engineering measurement techniques and approaches, including analog to digital conversion, binary numbers, logic gates, sensors, and data processing. Basic C and Matlab programming will be introduced and used to collect and analyze experimental data. Data analysis will include calculation of statistical quantities and methodologies for graphing results.

Pre-requisites:MENG 110, PHYS 121

Course Learning Outcomes: By the end of the coursestudents will demonstrate understanding of:Basic computer programing structure, program flow control, data types, fundamental concepts of metrology, analog/digital conversion, propagation of uncertainty in measured quantities.

Program Learning Outcomes (ABET): Each student will demonstrate the following attributes upon completion of the course: a) an ability to apply knowledge of mathematics, science, and engineering,(e) an ability to identify, formulate, and solve engineering problems (g) an ability to communicate effectively (j) a knowledge of contemporary issues (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Class Attendance: Regular (and prompt) lecture attendance is highly encouraged but not required. If you miss class be sure to get the lecture notes from a fellow student or me.Lab attendance is mandatory. Students are responsible for all material presented in class.

Homework: Homework will be assigned in class and posted to the course canvas portal.You are encouraged to discuss the HW assignments in a group setting, but each student is expected to work the problems independently and turn in individual assignments.Late homework will be accepted in my mailbox until 4 PM the day it is due. Assignments turned in after 4PM will be returned ungraded. I will drop your lowest HW score.

Lab Assignments: Lab assignments will be due in your lab section during the week listed on the lab assignment.

Grading:

Your final grade X will be determined based on the following distribution:

Exams	40%
Quizzes	5%
Homework	15%
Labs/project	40%

Your final letter grade will be based on the scale to the right:

A:	$93.3\% \leq X < 100\%$
A-:	$90.0\% \leq X < 93.3\%$
B+:	$86.7\% \leq X < 90.0\%$
B:	$83.3\% \leq X < 86.7\%$
B-:	$80.0\% \leq X < 83.3\%$
C+:	$76.7\% \leq X < 80.0\%$
C:	$73.3\% \leq X < 76.7\%$
C-:	$70.0\% \leq X < 73.3\%$
D+:	$66.7\% \leq X < 70.0\%$
D:	$60.0\% \leq X < 66.7\%$
F:	$0\% \leq X < 60.0\%$

Counseling and Disability Services:

Reasonable Accommodations

New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. To schedule an appointment, please call (575) 835-6619.

Counseling Services

New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call (575) 835-6619.

Academic Honesty: All students are held to the standards established by New Mexico Tech's "Academic Honesty Policy". You are responsible for knowing, understanding, and following this policy. For undergraduate students, this can be found starting on page 79 of the 2016-17 NMT Course Catalog, http://www.nmt.edu/images/stories/2016-2017_Course_Catalog_FINAL.pdf

Any form of copying (e.g. from a student, solution manual, on-line source, etc) is a violation. In addition, students will refrain from using electronic means of communication (SMS, IM, etc) during class (especially during exams).

Computer programing assignments are prone to copying/plagiarism. Please be sure to write your own code. When discussing assignments with other students try to talk in terms of pseudo-code rather than actual code. If you find a code snippet that you want to implement (from the web, textbook, or help file) be sure to document the source of the code by surrounding it with appropriate comments in your code.

Individual Needs: My goal is to foster an environment in which each student can learn in an effective and comfortable manner. Come speak to me in my office to discuss anything that I can do to accommodate your individual needs.

Respect Statement: New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: "New Mexico Tech's primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community."

Final Remarks: I will make every effort to follow this syllabus. However, in case of unforeseen circumstances, the instructor reserves the right to make changes to the syllabus. Students will be notified in a timely manner of any syllabus changes.

MENG 210Topics Covered Fall 2018

- The big picture: Measurements in Science and Engineering
- Fundamentals of computer programing
    - Programing languages
    - Code vs. pseudocode
    - Data types
    - Mathematical operations
    - Logical operations
    - Program flow control
        - Loops
        - Conditional statements
- Fundamentals of instrumentation and measurement
    - Digitization of analog signals
    - Sampling frequency/aliasing
    - Measurement uncertainty
    - Data reduction/analysis
    - Presentation of data, plotting
    - Sensors for measuring:
        - Strain
        - Displacement/position
        - Light
        - Temperature
        - Pressure
        - Flow rate