

**MEEN 3210 MEASUREMENTS LAB**  
**Fall 2017**  
**COURSE DESCRIPTION**

**Catalog**

**Description:**

**MEEN 3210: Measurements Laboratory 2 Credit Hours  
(1- hour lecture, 6-hour lab per week)**

Theoretical knowledge and practical uses of engineering measurement instruments and equipment are introduced. The course covers technical writing and presentation, design of experiments and error analysis, and data acquisition concepts. Laboratory sessions include measurement of fundamental properties: pressure, temperature, flow, and strain. Experimental analysis of engineering systems such as pumps, fans, and heat exchangers are also included in the lab sessions.

**Course**

**Objectives:**

To introduce theory and application of measuring instruments and equipment  
To demonstrate statistical methods used to design experiments and evaluate experimental errors  
To provide hands-on experience using laboratory instruments to measure pressure, temperature, and strain, etc  
To provide hands-on experience in the experimentation and analysis of engineering systems  
To develop skills to implement and conduct experiments and interpret the experimental results

**Course**

**Outcomes:**

After the completion of the class, the students will be able to do the followings:  
Describe and use various instruments for measuring pressure and pressure calibration.  
Describe and use various instruments for measuring temperature and temperature calibration.  
Use a strain gage to measure strain, and analyze data from the strain gage output.  
Describe and use various instruments for measuring flow and flow calibration.  
Conduct experimental error analysis using statistical methods.  
Prepare laboratory and engineering reports.  
Prepare and give technical presentations.

## SYLLABUS

**Course Description:** Theoretical knowledge and practical uses of engineering measurement instruments and equipment are introduced. The course covers technical writing and presentation, design of experiments and error analysis, and data acquisition concepts. Laboratory sessions include measurement of fundamental properties: pressure, temperature, flow, and strain. Experimental analysis of engineering systems such as pumps, fans, and heat exchangers are also included in the lab sessions.

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**Class Hours:** *Lecture, Cherry 1000, 11:30 a.m. – 12:25 p.m.,  
Lab, LUCAS ENGINEERING 00132, MTWR, days vary with Lab schedule*

**Office Hours:** 4:00 pm - 5:00 pm Tue. & Thu., Any other time by appointment

**Textbook:** Figliola, R. S., and Beasley, D. E., *Theory and Design for Mechanical Measurements*, John Wiley & Sons, 5<sup>th</sup> edition, 2011  
**OR Custom e-book of Figliola and Beasley**

*Measurements Laboratory Manual Handouts*

**References:** Wheeler, A. J., and Ganji, A. R., *Introduction to Engineering Experimentation*, 3<sup>rd</sup> Edition, Pearson Prentice Hall, 2009.  
Holman, J. P., *Introduction to Engineering Measurements*, 7<sup>th</sup> edition, John Wiley & Sons, 2007.  
Finkelstein, L., *Pocket Book of Technical Writing for Engineers and Scientists*, 3<sup>rd</sup> edition, McGraw Hill, 2007.

**Prerequisites:** MEEN 3311, MEEN 3380, grade C or above

**Grading:** Attendance – 5%  
Lab Reports (3) – 30%  
Lab Memos (5) – 25%  
Lab Quizzes (5) - 25%  
Lab Design Project – 15% (final report 10%, final presentation 5%)

## Letter Grade

**Assignment:** TBD

**Attendance:** See the instructions on slides.

**Final Exam:** NA

## Lab Policy:

The students will form a group and perform the lab with the help of **the lab manager Mr. David**. Each group must choose a time slot for the lab, sign in at the lab before the lab, and perform the lab as a group (all students must present and perform the lab). If one or more students from the lab group do not perform the lab, the whole group will get no credit for the lab and lose the scores for the lab memo/report.

Safety is the most important part of the lab. The students must follow the direction of lab technician at all time during the lab session.

**No shorts or flip-flop in the lab**

**No food or drink in the lab**

**Always wear protective glasses and if necessary, earprotection.**

**No operation of the lab equipment without supervision of the lab technician or the instructor.**

## Lab Memo and Report

### Policy:

All lab memos and reports are submitted **in both hard and soft copy formats before 12 pm on the due date.** Soft copies are to be submitted via Blackboard before 12 pm on the due date. **Hard copies are for grading purposes and will be returned to the students. If you do not submit the hard copy before 12 pm on the due date, you will not receive any grades even if you submit the electronic or soft copy via Blackboard.** Hard copies are to be handed in to the instructor and if the instructor is not available, it must be submitted and time stamped by the ME or other Department assistants.

**Copying or plagiarizing others' memos and reports will result in no grade for the lab. Each student must write his or her own lab memos and reports but each group is allowed to share the collected data, figures, graphs, etc., among the group members.**

## **Plagiarism and Cheating:**

Students are specifically warned against all forms of cheating and plagiarism. The Lamar University Student Handbook states:

Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Punishable offences include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials. (81)

One aspect of the handbook's definition of cheating is, "purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm" (82). Plagiarism is defined as, "the appropriation and the unacknowledged incorporation of another's work or ideas into one's own offered for credit" (82).

Students seeking to avoid plagiarism should consult with the course instructor, recent handbooks like The Little, Brown Handbook and the MLA Handbook for Writers of Research Papers, consultants in the Writing Center, or websites such as <http://www.utexas.edu/depts/doc/sjs/academicintegrity2.html>.

The Texas State University System has established the following Disciplinary Procedures for Academic Dishonesty:

- (1) **Academic Process.** All academic dishonesty cases may be first considered and reviewed by the faculty member. If the faculty member believes that an academic penalty is necessary, he/she may assign a penalty but must notify the student of his/her right to appeal to the department chair, the dean, and eventually, to the vice president for academic affairs (whose decision shall be final) before imposition of the penalty. At each step in the process, the student shall be entitled to written notice of the offense and/or of the administrative decision, and opportunity to respond, and an impartial disposition as to the merits of his/her case. After completion of the academic process, the academic officer making final disposition of the case shall refer the matter to the chief student affairs officer for any additional discipline that may be appropriate.
- (2) **Disciplinary Process.** In the case of flagrant or repeated violations, the chief student affairs officer may take such additional disciplinary action as he/she deems appropriate. No disciplinary action shall become effective against the student until the student has received procedural due process under *Subsection 5.6* and following exception as provided under *Subsection 5.15* of the Texas State University System Board of Regents Handbook.

## **Students with Disabilities:**

Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room

105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations.

For students:

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or [drc@lamar.edu](mailto:drc@lamar.edu) to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations.

## **Emergency Procedures**

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage ([www.lamar.edu](http://www.lamar.edu)) for instructions about continuing courses remotely.

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: <http://www.lamar.edu/about-lu/administration/risk-management/index.html>.

Following are procedures for the first two:

### **Severe Weather**

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

### **Violence/Active Shooter (CADD)**

- **CALL** - 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID**- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY**- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND**- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

## **Academic Continuity Statement**

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage ([www.lamar.edu](http://www.lamar.edu)) for instructions about continuing courses remotely.