

Department of Mechanical and Aerospace Engineering
University Of Texas at Arlington
Measurements Lab II - MAE 3183 – RM 219 WH

Instructor: Dr. P. S. Shiakolas

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Office Hours: TBA and By Appointment

GTA: TBD

Office: 219 WH

Office Hours: TBD

Prerequisites with a C or better: MAE 2381 (Measurements I), 3310 (Thermodynamics I), 3314 (Heat Transfer), 3319 (Dynamic System Modeling and Simulation), and EE 2320 (Circuit Analysis) (or concurrent enrollment).

**Note: If you do not have ALL prerequisites
you should contact Dr. Shiakolas immediately**

Course Description: Fundamental measurement techniques and experimental data analysis in mechanical engineering in the fields of thermal, fluid, structures, design, and dynamic systems. Introduction to sensor calibration, digital data acquisition, uncertainty analysis, and report writing.

Course objectives: To provide an understanding of fundamental measuring techniques, obtain measurements and analyze said measurements based on engineering principles for a number of experiments/engineering applications in order to bridge the gap between theory and practice.

Topics covered: Basic Concepts, Uncertainty Analysis, Report and Memorandum writing procedures, Digital and Analog Data Collection and Analysis

Course Learning Outcomes:

(b) Design & Conduct Experiments

This is a laboratory course and you are required to come prepared to the lab in order to conduct a series of experiments. In conducting the experiments you are required to familiarize yourselves first with safety issues and subsequently with the hardware, the type of measured equipment and software to be used for conducting the experiment. You are required to record your measurements on the provided sheets or save them in electronic format where applicable. The data sheets must be signed by the instructor or the teaching assistant once the experiment is completed and before the students leave the lab.

(g) Communicate Effectively

You are required to come prepared for each experiment to be performed by studying the lab manual and be ready to effectively communicate the theory and fundamentals of the experiment to the instructor through a weekly short question and answer period.

You are required to analyze the experimentally collected data using theory available in your lab manuals or your previous course work and engineering software for data analysis and graphing.

You are required to write professional technical formal lab reports or memoranda (you will be informed when a memorandum should be written) for each laboratory experiment performed. The reports should follow the procedures and format in the lab writing manual.

Key Assignments

In order to earn a passing grade in the class, you should perform all the laboratory exercises, and obtain a passing grade (>60%) for all technical reports and in addition a passing grade on the frequency response experiment both for the Q&A and technical report independently.

SAFETY NOTE

**You MUST wear EYE Protection and CLOSED TOE Shoes
at ALL times in the lab**

Grading Policy – Expectations – Course Logistics

**Assume no collaboration is allowed unless expressed permission is obtained from the instructor.
Anyone collaborating on reports or an exam will be given a failing grade in the course.**

Lab Assignments: You will form **groups of two** during the first two class meetings. A lab schedule will be posted on the class web page. The experiments and reports are a group effort. If a group member does not show up for the lab session, he/she will get a grade of zero for the experiment unless arrangements are made to perform it later and submit an individual report.

You must prepare before coming to the lab by reading and understanding the theory for the experiment you are assigned to perform. You must also prepare **an individual pre-lab report (both electronic and written) and submit it when you come to class.** The TA and/or the instructor reserve the right to question you on the theoretical aspects of the experiment (15% of lab grade). If you are not fully prepared, you may be asked not to perform the experiment, restudy the material and retested in the lab or asked to leave and make arrangements to perform the experiment at a different day (based on GTA schedule and availability). The penalties for late performance and report write-up will be enforced.

The TA or Dr. Shiakolas reserve the right to ask anyone for information appearing in their lab report, and if you cannot answer, then you will be penalized. Experiments will be performed according to the schedule, and the reports both written and electronic must be turned in at the beginning of the following class meeting. The first graded report will be available for you on time, usually a day or two before the next report is due to allow enough time for you to correct, if needed, the report to be turned in on the next experiment.

In addition to the printed reports, you are required to provide an electronic version of the submitted report - bring it with you on flash drive or other removable media device. You will not be allowed to perform the assigned lab if the electronic version of the previous report is not turned in. You must also upload your electronic reports to Blackboard by midnight of the date your report is due. If the report is not uploaded by each group member it will be considered late and appropriate penalties will be assessed. **Be careful to upload the correct report and information to Blackboard – if you require more than two corrections, then penalties will be assessed per correction.** The UTA Blackboard can be accessed at <http://www.uta.edu/blackboard>. If you are not familiar with Blackboard, I urge you to complete the online training and become familiar and proficient with it for the purposes of this class (consider this as your first assignment but without credit).

Excerpt from <http://www.uta.edu/blackboard/students/course-faq.php>

Per UT Arlington's Academic Dishonesty Regulation, "All students are expected to pursue their academic careers with honesty and integrity." Faculty members are given the option to make assignments "SafeAssignments" which are indicated by the green checkmark icon.

SafeAssign is an anti-plagiarism tool that monitors your work against any other works found on the Internet. Upon submission, your work will be automatically added to the SafeAssign database whose purpose is to monitor future assignments submitted by anyone at UT Arlington.

For personal protection of your work, you are also given the option to include your submission not only within UT Arlington's SafeAssign database, but to the global SafeAssign database used by any others subscribed to SafeAssign.

*Note: SafeAssign also checks against copies of assignments from previous semesters.

It is important to understand that all of your work submitted for credit through Blackboard will be added to its database and used in subsequent semesters. If it is found in the future, that your work is used by someone else for credit with your knowledge, then appropriate disciplinary actions might be taken against you and the person plagiarizing or using your work.

Q&A session and Written Report Clarification: All the Q&A sessions and the reports/memos for all the labs are to be treated as examinations for which you are getting credit for them. The purpose is to assess your understanding of the theory behind the material that the experiment addresses so at the end you will have a better understanding of the material and also to evaluate your preparation for performing the experiment in a safe manner for you and your classmates. You are **not** allowed to discuss the Q&A sessions and questions asked with other students in any of the sessions for this class, and you are not allowed to share your reports. If in doubt when to collaborate with anyone, just ask the instructor or the GTA.

Also, if reports and information from previous or current semesters are used for any reason, this will be considered as unauthorized usage and cheating. Should it be found out that unauthorized collaboration or cheating is taking place actions will be taken according to the university policies, the university Academic Dishonesty policy and the college of engineering statement of ethics.

On-time Lab Attendance: It is important that you are in the lab on time at the university scheduled time. If you do not show up on time you might not be allowed in the lab and you will be penalized (see penalties note). **Closed toe shoes and eye protection** are required at all times while in the lab and experiments are taking place.

Course Manuals: The required format for each report/memo is described in detail in the Introduction of the lab manual. The lab manuals are on the web at the above address in Adobe Acrobat PDF format. Microsoft Excel support files for some of the labs are available on the web as well.

Additional Reference Material: Your notes and textbooks from the courses on which the theoretical basis of the experiments is based on.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 8-9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for the experiments, etc.

Experimental and Demonstration Testbeds

- Impulse Turbine
- Viscous Flow
- Frequency Response of a Physical System
- Air Drag Force
- Strain Measurement
- Fuel Cell
- DAQ: Strain Gage and LabVIEW Interface
- Design of Experiments

Course Web Page: <http://mars.uta.edu>, select Courses and then select Measurements Lab II – MAE 3183. Also material will be posted on Blackboard.

Communication: Email communication will be through the MyMav system to your official UTA issued email account and/or through Blackboard and/or the class web page. It is your responsibility to check your email and web page often.

Grading Policy: Grading will be based on

Semester Comprehensive Exam (time to be announced later and possibly last week of classes)	10
Formal Lab Reports and Memos (2 memos = 1 formal, 1 DOE = 0.75 formal report)	80
Lab Partner Grade (due when turning in last group report)	10

Note that 15% of the Formal Lab Reports & Memos grade is allocated to Q&A.

Penalties: A report must be written in the required format for each experiment. Every report is due at the beginning of the class period one week after it was performed. Late reports will be subject to a late penalty of 10% (of the report grade) per day. If you miss a lab, you must make it up and the penalty for missing performing a lab will be 5% per day missed. The deadline for turning in the report remains one week from the originally assigned date.

Guaranteed Grading Scale: The guaranteed grading scale based upon the minimum percentage number of points obtained. No incompletes will be given unless prior arrangements are made with the instructor and only for extreme circumstances.

92.5% - 100% A, 85% - 92.5% B, 75% - 84% C, 60% - 74% D, 0 - 60% F

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current undergraduate catalog.

http://wweb.uta.edu/catalog/content/general/academic_regulations.aspx#10

Drop Policy: According to university regulations and schedule. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Software: You may use any computer software that you like, but make sure that you are proficient in it for solving the assignments for this class. Limited support will be provided for: MS Excel, MATLAB, SCILAB (<http://www.scilab.org>) and LabVIEW. **If you do not know how to use a spreadsheet, I would strongly encourage you to start learning.**

GTA Duties: The GTA will be available to assist and provide guidance with your data analysis. They have expressed instructions do not perform the analysis for you. In order to get any help, you must be prepared with questions and show your work and where you need help.

Miscellaneous: If you have a disability, any religious holidays that you need to observe or anything else that might interfere with this class and you would like for me to know about it, you must inform me in writing no later than the second class meeting.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Emergency Procedures for Disabled Personnel

- If the disabled person cannot safely evacuate the building, one person should stay with the disabled individual while another person reports his/her location to the University Police.
- Hearing impaired and visually impaired persons need only one person each to notify them of a fire alarm or guide them to safe escape routes during an evacuation.
- After evacuating employees and students have cleared all stairways, disabled persons should be assisted to the stairwell landings to await emergency personnel. All doors to the stairwells must be kept closed during this time.
- NOTE: Environmental Health & Safety would like to offer the following reminders to those who are disabled or have special needs:
- Take control without depending on others to take the first step.

- Don't be afraid to let others know you need assistance.
- Don't hesitate to communicate what your special needs are in order to make the evacuation easier and safer for you and for your assistants.
- Communicate with those who can help as soon as you are able by dialing 3003 to campus Police.
- Plan ahead. Be prepared. Know what you are going to do before an emergency arises. Make a plan and then test it. Determine what your alternatives are.
- When you enter an unfamiliar building, look it over and locate the most available telephones, note horizontal exits and ramps, note exit signs and enclosed stairwells determine if landings are large enough), note rooms that would make good areas of refuge, and note the location of fire alarm pull stations.
- Never take an elevator in a building on fire.
- Don't delay your evacuation or communication to evacuate. Speaking with someone over the telephone will help to keep you calm.

Americans with Disabilities Act

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112-The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act – (ADA), pursuant to section 504 of The Rehabilitation Act, here is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide “reasonable accommodation” to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing *authorized* documentation through designated administrative channels. If you require an accommodation based on disability, I would like to meet with you in the privacy of my office no later than the second class meeting to make sure that you are properly accommodated.

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KEEP FOR YOUR RECORDS

Academic Dishonesty

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspensions or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

University of Texas at Arlington Honor Code

The University of Texas at Arlington Honor Code can be found at <http://www.uta.edu/conduct/>.

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or that I contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

College of Engineering Ethics

The college of engineering ethics tutorial is at <http://library.uta.edu/plagiarism/index.html>.

You are required to go through the tutorial and sign and return the attached sheet indicating you carefully went over the material, you understand the implications of the presented material and that you will abide and follow the instructions. You must return this at the second class meeting. You will not be allowed in the class if you do not return this form.

By signing below, I affirmed that I have gone through the college of engineering ethics tutorial and that I will follow the instructions, guidance and rules given in the tutorial.

Name (Block letters)

Student ID

Date

Signature

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SIGN AND RETURN TO INSTRUCTOR BY SECOND CLASS MEETING

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