

**Mechanic of Materials Laboratory  
EML 3301C All Sections**

*Lecture Class Periods: Tuesday/Thursday, 2th period, 8:30-9:20am*

*Lecture Location: PUGH 170*

*Laboratory Class Periods: Tu/W/Th according to your assigned section*

*Lab Location: NSC 316*

*Academic Term: Spring 2020*

It may become necessary to modify this syllabus during the semester.

In this event, students will be notified and the revised syllabus will be posted on the course web site.

Instructors:

Nagaraj Arakere

NEB 139

Email: nagaraj@ufl.edu

352-392-7303

Office Hours: TBD

Shannon Ridgeway

scer@ufl.edu

Office Hours: Tu/W/Th during open lab times, NSC 316

***Teaching Assistants:***

Please contact through the Canvas website

TBD

***Course Description***

Experimental characterization of the mechanical properties of engineering materials, precision instruments, computer based data acquisition, statistical uncertainty analysis, preparation of engineering reports. Credits: 3

***Course Pre-Requisites / Co-Requisites***

EGM3520, EGM3344, ENC2210 or ENC 3254

***Course Objectives***

In this course you will develop a working knowledge of experimental techniques and equipment commonly used in engineering practice. You will become familiar with the design and implementation of various sensors, statistical data analysis, experimental planning and computer based data acquisition. You will also refine your report writing skills.

***Materials and Supply Fees***

See course catalog/UF registrar

***Professional Component (ABET):***

This course prepares graduates to apply knowledge of mathematics, science, and engineering, with a focus on experimental design, uncertainty, data acquisition, and technical reporting of results.

**Relation to Program Outcomes (ABET):**

| <b>Outcome</b>  | <b>Coverage*</b> |
|---|------------------|
| 1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics  | High             |
| 2) an 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                   | Low              |
| 3) an ability to communicate effectively with a range of audiences  | High             |
| 4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | High             |
| 5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives   | High             |
| 6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions  | High             |
| 7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies   |                  |

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not significantly addressed by this course.

**Required Textbooks and Software**

- Mechanics of Materials Laboratory Course, Subhash and Ridgeway. ISBN: 9781681733333
- We will use LabVIEW extensively. We will provide a LabVIEW license key to you that is paid for through the course lab fee.

**Additional Recommended Materials**

Statics textbook, Mechanics of Materials textbook

**Course Schedule**

See table at end of syllabus.

**Attendance Policy, Class Expectations, and Make-Up Policy**

Class attendance is required. Most labs cannot be made up, some may be with prior arrangement and special circumstances.

The course web site, accessible through Canvas (elearning.ufl.edu) via your Gatorlink login, will be the primary point of contact and support for the students. Course announcements, class discussions, laboratory assignments, and grades will be posted on the course website.

**Laboratory Reports:** A laboratory report is associated with most laboratory class meetings. Each assignment will be posted on the Canvas course website before the laboratory class dealing with the material topic occurs. Assignments will also be submitted via the course website and will be due according to the date shown on the website. Assignment format will be covered in class and an example will be provided. Work submitted that is not readable will receive a zero. The format is to follow published

formatting rules available on the class website. A maximum length may be set in the lab report assignment. Discussion items detailed in the lab assignment are to be covered in the report. An overall grade will be assigned to the report work, and the average of the overall lab report grade makes up 40% of the course grade. Each lab report will be weighted equally.

**Homework/Quiz/Pre-lab:** The Homework/Quiz/Pre-lab grade will be used to address issues as they arise. Any pre-labs assigned must be completed before lab work starts (you may not be allowed to enter the lab if the work is not finished).

**Exams:** Two in class exams will be administered. Exams are held in the same class room as the lecture hall. No makeup exams will be given. You must attend the scheduled exam time. Each exam is weighted 20% of the course grade. DSR students will take the exam in the lab and must register with DSR.

**Final design report:** A report will be submitted detailing the work done for the final project. The report is to follow published formatting rules available on the class website, and cover instructions provided in the final project assignment posted on the class website.

Assignments submitted outside the posted times will not be accepted for any reason. In addition, there will be NO scheduled make-up laboratories. It is the student's responsibility to honor and respect the given deadlines and meeting times.

If you do not submit your assignment when it is due, you can still submit it via Canvas for two more days (unless the assignment restricts this policy). Unless you have prior written (email is fine) permission to submit a late assignment, the penalties for late submission will be as follows:

- Late submissions within one hour of the deadline: 5% of your earned grade.
- Late submissions past one hour but within 24 hours of the deadline: 20% of your earned grade.
- Late submissions past 24 hours but within 48 hours of the deadline: 50% of your earned grade.
- Past 48 hours, your assignment will not be graded.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

### **Writing Requirement:**

The writing assignments/student products for this course are designed to meet the minimum requirements of the University Writing Requirement credit of **6,000 words**. To satisfy this requirement, at least three of the individual lab report assignments (4 minimum to be assigned) must meet minimum word count and be marked Satisfactory based on the Writing Rubric. Submitted assignments short of the minimum word count will receive zero credit for the writing component grade.

**The writing requirement ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning. Course grades have two components: To receive writing credit, a student must receive a grade of "C" or higher on 3 lab reports and have a satisfactory completion of the writing component of the course.**

The instructor will evaluate and provide feedback on the student's written assignment in accordance with both the UF writing rubric and the course content rubric for that particular assignment, including, but not limited to, grammar, punctuation, usage of standard written English, clarity, coherence, and organization.

Below is the writing rubric which will be used to judge mechanics and flow of the written student product. Each student product will also carry a content based rubric. The student products carry two grades, one for the writing mechanics, and one for the content mechanics. Students must satisfactorily meet both rubrics for a passing assignment.

|                                   | <b>SATISFACTORY (Y)</b>   | <b>UNSATISFACTORY (N)</b>   |
|-----------------------------------|---|---|
| <b>CONTENT</b>                    | Papers exhibit at least some evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.  | Papers either include a central idea(s) that is unclear or off- topic or provide only minimal or inadequate discussion of ideas.<br>Papers may also lack sufficient or appropriate sources.                 |
| <b>ORGANIZATION AND COHERENCE</b> | Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.  | Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader. |
| <b>ARGUMENT AND SUPPORT</b>       | Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.  | Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.   |
| <b>STYLE</b>                      | Documents use a writing style with word choice appropriate to the context, genre, and discipline. Sentences should display complexity and logical sentence structure. At a minimum, documents will display a less precise use of vocabulary and an uneven use of sentence structure or a writing style that occasionally veers away from word choice or tone appropriate to the context, genre, and discipline. | Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction. Documents may also use words incorrectly.        |
| <b>MECHANICS</b>                  | Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper's argument or points.   | Papers contain so many mechanical or grammatical errors that they impede the reader's understanding or severely undermine the writer's credibility.   |

### Writing Resources, Style, and Format:

- Reports for this course will follow the format posted on the class website.
- The writing style manual by Alley is recommended for student use:

**The Craft of Scientific Writing** by Michael Alley, 3<sup>rd</sup> Edition, Springer, 1998.

This writing reference may also be accessed online at <http://www.writing.engr.psu.edu/csw.html>.

- Students are also encouraged to utilize the university's Writing Studio for assistance as needed. More information on the Writing Studio is available at this link: [www.writing.ufl.edu](http://www.writing.ufl.edu).

### Evaluation

| Assignment                    | Total Points         | Percentage of Final Grade |
|-------------------------------|----------------------|---------------------------|
| Homework and in-class quizzes | Varies By Assignment | 10%                       |
| Lab Reports (4)               | 100 each             | 40%                       |
| Midterm Exams (2)             | 100 each             | 30%                       |
| Final Project Report          | 100                  | 20%                       |
|                               |                      | 100%                      |

### Grading Policy

| Percent     | Grade | Grade Points |
|-------------|-------|--------------|
| 93 - 100    | A     | 4.00         |
| 90.0 - 93   | A-    | 3.67         |
| 87 - 89.9   | B+    | 3.33         |
| 83 - 86.9   | B     | 3.00         |
| 80.0 - 82.9 | B-    | 2.67         |
| 77 - 79.9   | C+    | 2.33         |
| 73 - 76.9   | C     | 2.00         |
| 70.0 - 72.9 | C-    | 1.67         |
| 67 - 69.9   | D+    | 1.33         |
| 63 - 66.9   | D     | 1.00         |
| 60.0 - 62.9 | D-    | 0.67         |
| 0 - 59.9    | E     | 0.00         |

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Questions regarding grades must be brought to your lab instructor within 7 days after return of the grades to the class. A typed note explaining your concern/issue must be submitted when a grading issue is brought for reconsideration. The note may be in the form of an email to the grader (preferred, emails on Canvas), [scer@ufl.edu](mailto:scer@ufl.edu) (Shannon Ridgeway), or printed and hand delivered to Shannon Ridgeway, Lab instructor.

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter to present to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. A violation of the honor code will result in academic sanctions (typically a failing grade assigned for the course) and further disciplinary action. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Software Use and Copyrighted Material***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use and the use of copyrighted material. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

## ***Campus Resources:***

### ***Health and Wellness***

#### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

#### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

### ***Academic Resources***

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.

**Schedule:**

**EML 3301C: MECHANICS OF MATERIALS LAB  
COURSE SCHEDULE (Spring 2020)**

| Week              | Lecture   | Lab   | Assignment             | Due* |
|-------------------|---|---|------------------------|------|
| 1<br>1/6 - 1/12   | Drop add / Intro to MOM lab, Data acquisition<br>LabVIEW programming and OOTB DAQ | LabVIEW installation  |                        |      |
| 2<br>1/13 - 1/19  | Circuits and Wheatstone bridge<br>Uncertainty                                     | LabVIEW Lab 1   | Lab-1 Report<br>(LR-1) |      |
| 3<br>1/20 - 1/26  | Lab report format<br>Uncertainty  | Wheatstone bridge using breadboard                                  |                        |      |
| 4<br>1/27 - 2/2   | Strain gages (I)  | Mounting strain gages   | Lab-2 Report<br>(LR-2) | LR-1 |
| 5<br>2/3 - 2/9    | Strain gages (II)<br>Stress-Strain response                                       | Instrumented cantilever beam  |                        |      |
| 6<br>2/10 - 2/16  | Tensile test theory (MoM review)  | Load controlled/ LVDT tensile testing                               | Lab-3 Report<br>(LR-3) | LR-2 |
| 7<br>2/17-2/23    |   | Tensile, compression, testing<br>of metals, ceramics and composites |                        |      |
|                   |   | Using Instron machine   |                        |      |
| 8<br>2/24 - 3/1   | Exam-1 Review<br>Exam-1 (2/27 in class)   |   |                        |      |
| 3/2-3/8           | Spring Break, work on lab 3   |   |                        |      |
| 9<br>3/9 - 3/15   | Adhesive  | Double Lap Shear adhesive   | Lab-4 Report<br>(LR 4) | LR-3 |
| 10<br>3/16 - 3/22 | Impact  | Charpy Impact   |                        |      |
| 11<br>3/23 - 3/29 | Final Project:  |   | Final Project          | LR-4 |
| 12<br>3/30 - 4/5  | Final Project   | Testing   | Report                 |      |
| 13<br>4/6 - 4/12  | <b>Final Project</b>  |   | (FRP)                  |      |
| 14<br>4/13 - 4/19 | <b>Exam 2 Review</b><br><b>Exam-2 (4/16 in class)</b>                             | Final Project testing   |                        |      |
| 4/20-4/26         | <b>Final Project Report due on 4/22, 5 pm</b>                                     |   |                        | FRP  |

Lab Reports are due Monday of the week noted, at 10:55 pm (Canvas takes precedence).  
Exams are in class (WEIM 1064) during regular lecture time.  
DRC students must report to NSC 316 at 8 am on exam days.