

# Course Syllabus

## EGM 3520: Mechanics of Materials

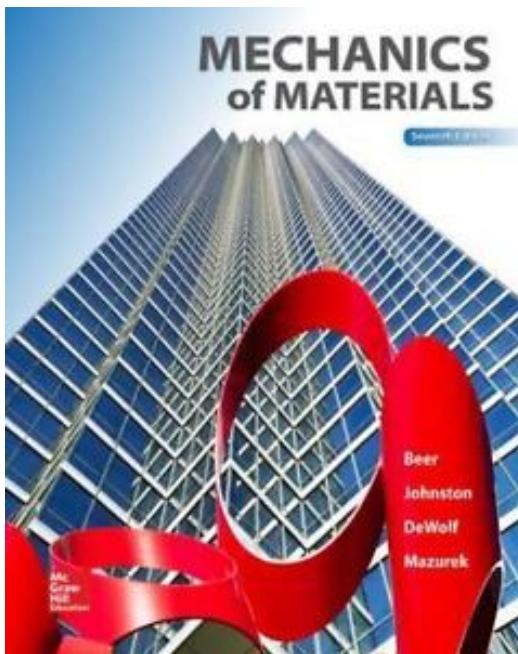
Spring 2023 Syllabus

*Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on announced in class and on CANVAS.*

**Catalog Description:** Credits: 3; Stress and strain at a point, stress-strain-temperature relations and mechanical properties of materials. Systems subject to axial load, torsion, and bending. Design concepts, indeterminate structures, and applications.

**Pre-requisites and Co-requisites:** Prerequisites: Statics EGM 2511 (or EGM 2500) and Calculus III MAC 2313.

**Textbook:** Beer, F., Johnston, E.R., DeWolf, J., and Mazurek, D.F., "Mechanics of Materials", **7th edition**, McGraw Hill.



**Materials and Supply Fees:** None

**Instructor:** Dr. Malisa Sarntinoranont

Department of Mechanical & Aerospace Engineering


**E-mail:** msarnt@ufl.edu

**Office phone:** 392-8404

**Office Hours:** Dr. S Office Hours (MWF 3-4:30 pm) in 497 Wertheim

**Lecture times and days:** 7th and 8th Period MWF in Weil 270

**Teaching Assistant Office Hours:** Office hours with teaching assistants are posted on the CANVAS home page.

**Course Online Resources:** E-Learning/CANVAS system (<https://lss.at.ufl.edu/>  [\(https://lss.at.ufl.edu/\)](https://lss.at.ufl.edu/)—all documents, homework, grades, etc. will be posted on this system.

**Course Topics:**

Chap 1 Concept of Stress

Chap 2 Stress and Strain

Chap 3 Torsion

Chap 4 Pure Bending

Chap 5 Analysis and Design of Beams for Bending

Chap 6 Shearing Stresses in Beams and Thin-Walled Members

Chap 7 Transformations of Stress and Strain

Chap 8 Principal Stresses Under a Given Loading

Chap 9 Deflection of Beams

Chap 10 Columns

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**Course Objectives:** The purpose of the course is to provide students with the means of analyzing and designing various machine and load bearing structures. Upon completion of this course each student should have:

1. Basic understanding of engineering mechanics and the ability to apply this understanding to analyze and solve a given problem.
2. Basic understanding of material properties and mechanical deformation.
3. The ability to apply advanced science and engineering principles in the design and analysis of structures to support loads within a given limit of safety.

**Contribution of course to meeting the professional component:**

EGM 3520 supports several program outcomes enumerated in the Mission Statement of the Department of Mechanical and Aerospace Engineering (MAE). Specific MAE program outcomes supported by this course include: Being able to work professionally in mechanical systems areas including the design and realization of such systems. **(ME Program Outcome M4).**

Mathematics (25%), Engineering Sciences (50%), Engineering Design (25%)

### Relationship of course to program outcomes:

This course achieves the following Accreditation Board for Engineering and Technology (ABET) outcomes [note that the outcome number corresponds to the respective ABET outcomes (a) through (k):

(i) Apply knowledge of mathematics, science, and engineering [**high coverage; method of assessment is homework and 3 exams to measure Outcome**]

(ii) Design a system, component or process to meet desired needs [**low coverage; method of assessment is homework and exam problems related to design of trusses, frames and machines for desired functionalities**]

(iii) Identify, formulate, and solve engineering problems [**high coverage; method of assessment is homework and 3 exams to measure Outcome**]

(iv) Understand professional and ethical responsibilities [**medium coverage; method of assessment is class examples and homework assignments of practical applications and designs involving professional engineering ethical application of proper engineering principles learned in statics**]

(v) Use the techniques, skills and modern engineering tools necessary for engineering practice [**low coverage, no formal assessment to measure Outcome**].

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**Assessment Methods:** Your grade for this course will be determined based on your performance on homework and exams as follows:

**Homework (15%):** Homework in this class is important. Graded homework assignments are due approximately every class. The role of homework problems is to build analytical skills you will need in real world practice, rather just helping prepare to take exams. TAs have been instructed to look at the problem solving process and explanations, not just answers.

**Rules:** Homework is to be turned in electronically on the Canvas website by **6 pm on the date indicated on your assignment sheet**.

- **No late homework accepted** unless documented per University policy
- Random problems from each homework assignment will be graded.
- Your three worst homework scores will be dropped. **Please note that these drops account for any absences excused or otherwise.**
- Written homework must adhere to the following format.
  - It should be written and photographed/ scanned clearly
  - Include a **clear problem statement**
  - **Include appropriate free-body diagram**

- Each problem should be on a single sheet of paper
- **Solution must be inside a box** with appropriate significant digits.
- Working in groups is permitted and encouraged. However, **copying homework is not permitted.**
- **Use of online help or solution manuals to complete homework is considered cheating and a violation of the honor policy.** If you are caught, this policy will be fully enforced.

### **Quizzes (10%)**

- 6 quizzes will be given. Quizzes will be the **last 15 min of class** on assigned days.
- **The lowest quiz score will be dropped. Please note that these drops account for any absences excused or otherwise.**
- No makeup quizzes are allowed unless absence documented per University policy.
- Quiz problems will be similar to the homework and include conceptual questions. Students are permitted to use a calculator for quizzes. Relevant formulas will be provided; no additional materials are allowed.

### **Exams (50%)**

- 2 exams (20% each) will be given as indicated on the schedule. Exams will be nighttime exams and two hours in duration.
- Exams will be scheduled at the same time as all other sections of Mechanics of Materials (except the final exam).
- All exams will include comprehensive topics covered in class to date. Problems will be similar to homework and quiz problems but will include longer, comprehensive questions as well.

### **Final Exam (25%)**

- The final exam will include comprehensive topics covered in class.

### **Proposed grading scale**

93-100 = A, 90-92.9 = A-, 87-89.9 = B+, 83-86.9 = B, 80-82.9 = B-, 77-79.9=C+, 73-76.9=C, 70-72.9 = C-, 67-69.9=D+, 63-66.9 = D, 60-62.9 = D-, <60 = E

*N.B. A grade of C- will not be a qualifying grade for critical tracking courses. Furthermore, in order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better).*


*For more information on grades and grading policies, please visit:*

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

[\(https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx\)](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

**Re-grading Policy:** Any re-grade requests must be submitted in an e-mail or in writing within two weeks after return of the graded paper. The written request must explain in detail what you want the grader to do and where you believe he/she has made a mistake in grading.

**Attendance and Excused Absences:** Even though attendance is not required, it is extremely important that students attend the class regularly. If you miss a lecture you are responsible for finding out from a classmate what we did in class. If you have a documented and excusable absence for a sustained period (> 1 week) please contact the professor to make any special arrangements.

**Homework extensions and make-up quizzes/exams** will be provided for excused absences in which notification is provided **before** the assignment date. For excused absences or exam conflicts, students must contact Dr. Sarntinoranont a week in advance of the exam to make special arrangements. Unless there is a documented excused absence, e.g., extreme medical emergency or family crisis, no credit will be given for a missed exam. It is the student's responsibility to make sure he/she is available to take the exam. <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>   
[\\_ \(https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx\)](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx).

**Miscellaneous Policies:** Students will be held responsible for knowledge of all scheduling and policy announcements made in class.

**Academic Honesty:** 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. If you have any questions or concerns, please consult with the instructor or TAs in this class. If you have any concerns, please consult with Dr. Sarntinoranont at anytime during the course.

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**Course Evaluations:** 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/>  [\\_ \(https://gatorevals.aa.ufl.edu/students/\)](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/>  [\\_ \(https://ufl.bluera.com/ufl/\)](https://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>   
[\\_ \(https://gatorevals.aa.ufl.edu/public-results/\)](https://gatorevals.aa.ufl.edu/public-results/).

**Software Use:** All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. 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 peers to the highest standards of honesty and integrity.


**In-Class Recording:** Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

**Student Privacy:** There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information

see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>   
(<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>)

**Accommodations For Disabilities:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>  (<https://disability.ufl.edu/students/get-started/>). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**Commitment To A Safe And Inclusive Learning Environment:** The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this

class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:


- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@ufl.edu) (<mailto:jpennacc@ufl.edu>)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu) (<mailto:taylor@eng.ufl.edu>)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu) (<mailto:nishida@eng.ufl.edu>)

### ***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) (<mailto:umatter@ufl.edu>). 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>  (<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)** at Student Health Care Center, 392-1161.

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

**Sexual Discrimination, Harassment, Assault, Or Violence:** If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu) (<mailto:title-ix@ufl.edu>).



Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

<https://lss.at.ufl.edu/help.shtml>  (<https://lss.at.ufl.edu/help.shtml>).

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling.

<https://www.crc.ufl.edu/>  (<https://www.crc.ufl.edu/>).

**Library Support**, <http://cms.uflib.ufl.edu/ask>  (<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/>  (<https://teachingcenter.ufl.edu/>).

**Writing Studio**, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

<https://writing.ufl.edu/writing-studio/>  (<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) 

([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> 

(<http://www.distance.ufl.edu/student-complaint-process>).

## Course Summary:

Date	Details	Due
Wed Jan 11, 2023	 <a href="#">TA Office Hours - EGM3520</a> <a href="https://ufl.instructure.com/calendar?event_id=2737331&amp;include_contexts=course_472854">https://ufl.instructure.com/calendar?event_id=2737331&amp;include_contexts=course_472854</a>	11:45am to 12:45pm
Thu Jan 12, 2023	 <a href="#">TA - Mechanics of Material</a> <a href="https://ufl.instructure.com/calendar?event_id=2739153&amp;include_contexts=course_472854">https://ufl.instructure.com/calendar?event_id=2739153&amp;include_contexts=course_472854</a>	7pm to 9pm
Fri Jan 13, 2023	 <a href="#">TA Office Hours - EGM3520</a> <a href="https://ufl.instructure.com/calendar?event_id=2737332&amp;include_contexts=course_472854">https://ufl.instructure.com/calendar?event_id=2737332&amp;include_contexts=course_472854</a>	11:45am to 12:45pm
	 <a href="#">Homework 1</a> <a href="https://ufl.instructure.com/courses/472854/assignments/5531841">https://ufl.instructure.com/courses/472854/assignments/5531841</a>	due by 6pm