

Mechanics of Materials

EGM3520

Last Updated 5/12/2024

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

Academic Term: 2023 Summer C

Class Periods: M, W, F; Period 4; 12:30pm-1:45pm

Instructors:

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Office Hours: M, W, F; 1:45-2:45pm

Teaching Assistant:

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Course 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.

Course Pre-Requisites / Co-Requisites

Statics EGM 2511 (or EGM 2500) and Calculus III MAC 2313.

Course Objectives

This course provides 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.

Relation to Program Outcomes (ABET):

| Outcome | Coverage* |
|---|-----------------|
| 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | High [Assessed] |
| 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 | |
| 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the | Low |

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|---|--|
| impact of engineering solutions in global, economic, environmental, and societal contexts | |
| 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 | |
| 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | |
| 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 covered or assessed in the course.

Recommended Textbooks and Software

F. Beer, E. R. Johnston, J. DeWolf, D. F. Mazurek, Mechanics of Materials, 8th Edition, McGraw Hill, 2019.
ISBN-13: 978-1260113273

Required Computer:

Students must have their own computer whose specifications meet or exceed the capabilities required by the College (<https://www.eng.ufl.edu/students/resources/computer-requirements/>) and MAE Department (<https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/>).

Course Topics

Chapter 1: Concept of Stress

Chapter 2: Stress and Strain

Chapter 3: Torsion

Chapter 4: Pure Bending

Chapter 5: Analysis and Design of Beams for Bending

Chapter 6: Shearing Stresses in Beams and Thin-Walled Members

Chapter 7: Transformations of Stress and Strain

Chapter 8: Principal Stresses Under a Given Loading

Chapter 9: Deflection of Beams

Attendance Policy, Excused Absences, & Extra Credit for Attendance

Attendance is not mandatory. But it's highly recommended. Students attending via Zoom must keep their video on for the whole class period to get the attendance credit.

Extra Credit: Attendance is not mandatory. But it's highly recommended. Attendance will be taking for every class. You must keep your zoom video on for the whole class period to get the attendance credit. The total extra credit for attendance is 5 points in your final grade.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/h>

Evaluation of Grades

| Assignment | Percentage of Final Grade |
|--------------------------|----------------------------------|
| Homework Sets (25) | 10% |
| Quizzes (6) | 20% |
| Exams (3 - Equal Weight) | 70% |
| Attendance bonus | 5% |
| TOTAL | 105% |

Assessment Methods

Homework (10%):

- About 25 homework sets will be given.
- No late homework will be accepted.
- The worst 3 homework assignments will be dropped. Note, these drops account for any absences excused or otherwise.
- Written homework must adhere to the following format.
 - All submitted homework should be clearly photographed/scanned.
 - Submit each homework as a single pdf on Canvas.
- Copying homework is not permitted.
- Use of online help or solution manuals to complete homework is cheating, a violation of the honor policy, and will be fully prosecuted.

Quizzes (20%)

- 6 quizzes will be given. The worst one will be dropped.
- Quizzes will be 15 min at the beginning of class on assigned days.
- The worst quiz will be dropped. Note, this drop accounts for any absences excused or otherwise.
- No makeup quizzes for any students.
- Quiz problems will be similar to homework.
 - Students are permitted to use a calculator for quizzes.
 - Relevant formulas will be provided.
 - No additional materials are allowed.

Exams (70%)

- 3 exams (equally weighted) will be given as indicated on the schedule.
- Exams will be nighttime exams and two hours in duration.
- No makeup exams for any students.
- Exams are comprehensive and will topics covered in class to date.
- Problems will be like homework and quiz problems but will include longer more comprehensive questions as well.

Grading Policy

| Percent | Grade | Grade Points |
|----------------|--------------|---------------------|
| 93.4 - 100 | A | 4.00 |
| 90.0 - 93.3 | A- | 3.67 |
| 86.7 - 89.9 | B+ | 3.33 |
| 83.4 - 86.6 | B | 3.00 |
| 80.0 - 83.3 | B- | 2.67 |
| 76.7 - 79.9 | C+ | 2.33 |
| 73.4 - 76.6 | C | 2.00 |
| 70.0 - 73.3 | C- | 1.67 |
| 66.7 - 69.9 | D+ | 1.33 |
| 63.4 - 66.6 | D | 1.00 |
| 60.0 - 63.3 | D- | 0.67 |
| 0 - 59.9 | E | 0.00 |

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

More information on the University of Florida grading policy can be found at the following URL: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Grade Definitions

A : Student demonstrated course mastery in all regards and with distinction.

- A- : Student performed outstandingly in all regards and is exceptional.
- B+ : Student performed with excellence in the course.
- B : Student showed high command of course content.
- B- : Student has done a commendable job with course content.
- C+ : Student demonstrated ample grasp of course content.
- C : Student demonstrated adequate grasp of course content.
- C- : Student demonstrated fair grasp of course content.
- D+ : Student met fair course expectations.
- D : Student attained below average expectations.
- D- : Student met minimal expectations to pass.
- E : Student failed to meet minimal expectations to pass.

Policies on Sources of Truth, Professional Communication, AI Use, & Regrade Requests

1. Online platforms, notably GroupMe, provide venues for course discussion that exclude the instructor and EGM3520 Teaching Team. Discussion platforms beyond UF-sanctioned Learning Management Systems will not be monitored or curated by the instructors. Thus, information propagated through these platforms is often incorrect. It is each student's responsibility to verify information obtained from these external discussion services with reputable reference sources or UF-affiliated subject matter experts. Erroneous information obtained from external discussion platforms used in EGM3520 will be marked incorrect on graded assignments and assessments.

2. The EGM3520 MS Teams General Channel is shared by the whole class and the teaching Team for information propagation. Individuals or teams who post comments or files not relevant to EGM3520 in the General Channel will be penalized one letter grade for each infraction.

3. Unauthorized use of ChatGPT or similar natural writing AI's is prohibited in EGM3520 and is defined as Cheating by the UF Honor Code, section (a)2, https://regulations.ufl.edu/wp-content/uploads/2021/12/4-040_2021-12-06.pdf :

“(a) Cheating. A Student shall not use or attempt to use unauthorized materials or resources in any academic activity for academic advantage or benefit. Cheating includes but is not limited to:

2. Using any materials or resources, through any medium, which the Faculty has not given express permission to use and that may confer an academic benefit to the Student.”

Material suspected of being AI-generated will be vetted through a detection algorithm. If this tool deems the material to be AI-generated, a 0 will be given on the suspected assignment.

4. Regrade requests must be submitted in an Email to the person who performed the grading within two weeks after return of the graded paper. The written request must explain in detail where you believe a mistake in grading was made and what action you request.

Students Requiring Accommodations

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/> . 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.

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/>.

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.

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://sccr.dso.ufl.edu/process/student-conduct-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.

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
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students 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 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: <https://registrar.ufl.edu/ferpa.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 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: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

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

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

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/state-authorization-status/#student-complaint>.