Mechanics of Materials
EGM 3520 Section 1601

Class Periods: Monday/Wednesday/Friday, Period 4, 10:40 – 11:30 am
Location: WEIL 270
Academic Term: Fall 2016

Instructor
Douglas Spearot, Ph.D.
Email: dspearot@ufl.edu
Phone: 352-392-6747
Office Hours: Monday/Wednesday/Friday, 9:15 – 10:15 am, NEB 133

Teaching Assistants
To be determined – contact information will be communicated through Canvas.

Course Description
Introduction to stress and strain at a point, stress-strain-temperature relations and mechanical properties of materials. Analysis of systems subjected to axial load, torsion load and bending. Design concepts, indeterminate structures and applications.

Course Pre-Requisites / Co-Requisites
EGM 2511 (not EGM 2500) and MAC 2313
Engineering Mechanics: Statics and Analytical Geometry/Calculus III

Required Textbooks and Software
Mechanics of Materials, Seventh Edition
Beer, F.P.; Johnston, Jr., E.R.; DeWolf, J.T.; and Mazurek, D.F.
http://www.mheducation.com/highered/product.0073398233.html

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

1. A basic understanding of engineering mechanics and the ability to apply this understanding to analyze and solve a given problem.
2. A 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.

Professional Component (ABET)
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 the area of mechanical systems including the design and realization of such systems [ME Program Outcome M4].

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

Relation to Program Outcomes (ABET)
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)]:

(a) Apply knowledge of mathematics, science, and engineering [high coverage; method of assessment is homework and three exams to measure Outcome (a)].

(c) 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].

(e) Identify, formulate, and solve engineering problems [high coverage; method of assessment is homework and three exams to measure Outcome (e)].

(f) 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].

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

Assessment Methods

Your grade for this course will be determined based on your performance on homework, quizzes, and exams as follows:

Homework 15%
Your 3 worst homework assignments will be dropped.

Homework is to be submitted electronically on the Canvas website prior to class. Working in groups is permitted. However, copying homework is NOT permitted. Written homework must adhere to the following format: Each problem should be on a single sheet of paper, with a clear problem statement, appropriate free-body diagram, and the solution with appropriate significant digits inside a box. Use of solution manuals or websites to complete homework is considered cheating and a violation of the honor policy, and will be fully enforced.

Homework in this class is VERY IMPORTANT. The problem solving skills you develop in doing the homework are skills that are difficult to test on an exam. They are much more like the skills you will need in the real world than those you develop during exam preparation. TAs have been instructed to look for problem solving process and explanations, not just answers.

Quizzes 10%
Quizzes will be given in the first 15 minutes of class on assigned days. Your worst quiz will be dropped. The purpose of the quizzes is to assess your understanding of course topics in a format that can be considered as practice for the exams.

Exams 25% **(3)**
Exams will be two hours in length given on the assigned days. Exams will be scheduled at the same time as the other sections of Mechanics of Materials.

Grading Scale
An example numerical grading scheme is shown below. This information should only be used as a general guide as the course instructor reserves the right to adjust the final numerical grading demarcations. Course grades will be "curved" if necessary – this decision will not be made until the end of the semester once all exams and homework assignments are graded.

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, <60 = E

Additional information regarding letter grades and associated grade points may be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Attendance Policy, Class Expectations, and Make-Up Policy
Class attendance is highly recommended, but is not mandatory. Excused absences for homework submission, quizzes and exams must be consistent with university policies in the undergraduate catalog and require appropriate documentation. Homework extensions and make-up quizzes/exams will be provided for excused absences in which notification is provided before the assignment date.
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

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, which must be presented 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 feedback on the quality of instruction in this course by completing online evaluations at: https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at: https://evaluations.ufl.edu/results/.

University Honesty Policy
UF students are bound by The Honor Pledge, "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 in this class.

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 regarding 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
If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center
http://www.counseling.ufl.edu/cwc or 352-392-1575; or contact the University Police Department: 352-392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Contact the Student Health Care Center at 352-392-1161.

University Police Department
Contact UFPD at 352-392-1111 (or 9-1-1 for emergencies) or http://www.police.ufl.edu/.

Academic Resources

E-learning technical support
Call 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. You may also find answers to common problems at https://lss.at.ufl.edu/help.shtml.

Career Resource Center
Located in the Reitz Union and offers career assistance and counseling. Call 352-392-1601 or https://www.crc.ufl.edu/.

Library Support
Information on various ways to receive assistance using the libraries or finding resources. http://cms.uflib.ufl.edu/ask.

Teaching Center
Located in Broward Hall and provides general study skills and tutoring. Call 352-392-2010 or 352-392-6420 or https://teachingcenter.ufl.edu/.

Writing Studio
Located at 302 Tigert Hall. Provides help brainstorming, formatting, and writing papers. Call 352-846-1138 or https://writing.ufl.edu/writing-studio/.

On-Campus Student Complaints
https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

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

Date	*Topics*	*Sections Covered*	*Homework Collected*
8/22	Statics review	Statics Review, 1.1	---------------
8/24	Stress	1.1, 1.2	Handout
8/26	Stress components	1.3, 1.4	1.12, 1.18, 1.22
8/29	Design considerations	1.5	1.32, 1.34
8/31	Strain	2.1, **Quiz 1**	1.60, 1.66
9/2	Axial deformation	2.1	2.1, 2.4
9/5	--------------------------	Labor Day Holiday	---------------
9/7	Statically indeterminate	2.2, 2.3	2.15, 2.23, 2.27
9/9	3D Hooke's Law	2.4 – 2.7	2.41, 2.46, 2.58
9/12	Stress concentrations	2.8, 2.10, 2.11	2.64, 2.71, 2.79
9/14	Plastic deformation	2.12, **Quiz 2**	2.95, 2.99
9/16	Torsional stresses	3.1	2.101, 2.105
9/19	Gears & statically ind.	3.2, 3.3	3.3, 3.12, 3.17
9/21	Design of shafts	3.4, 3.5	3.37, 3.50
9/23	Elastoplastic shafts	3.6, 3.7	3.64, 3.76, 3.87
9/26	Exam preparation	Review	3.94
9/28	Chapters 1-3	*Exam 1*	---------------
9/30	Pure bending	4.1, 4.2	---------------
10/3	Bending deformation	4.2, 4.3	4.1, 4.6
10/5	Composite beams	4.4, 4.5	4.8, 4.9
10/7	Elastoplastic beams	4.6, 4.7	4.41, 4.51
10/10	Transverse loading	5.1	4.63, 4.71, 4.100
10/12	V and M diagrams	5.2, **Quiz 3**	5.1, 5.2
10/14	--------------------------	Homecoming	---------------
10/17	Design of beams	5.3	5.51, 5.56
10/19	Shear flow in beams	6.1	5.68, 5.73, 5.87
10/21	Shear stresses in beams	6.1, 6.2	6.1, 6.4
10/24	Thin walled members	6.3, 6.4	6.10, 6.18, 6.24
10/26	Stress transformations	7.1	6.31, 6.36
10/28	Mohr's circle	7.2 – 7.4	7.7, 7.18
10/31	Exam preparation	Review	---------------
11/2	Chapters 4-6	*Exam 2*	---------------
11/4	Failure criteria	7.5	7.32, 7.44, 7.67
11/7	Pressure vessels, plane strain	7.6, 7.7	7.77, 7.87
11/9	Measurement of strain	7.8, 7.9	7.106, 7.114, 7.140
11/11	--------------------------	Veterans Day Holiday	---------------
11/14	Combined loading	8.1, 8.3	7.139, 7.146
11/16	Combined loading	8.3, **Quiz 4**	8.32, 8.39
11/18	Beam deflections	9.1	8.43, 8.45
11/21	Statically ind. beams	9.2	9.3, 9.13
11/23	--------------------------	Thanksgiving Holiday	---------------
11/25	--------------------------	Thanksgiving Holiday	---------------
11/28	Singularity functions	9.3	9.19, 9.28
11/30	Superposition	9.4, **Quiz 5**	9.40, 9.44
12/2	Column buckling	10.1	9.65, 9.91
12/5	Design of columns	10.3	10.6, 10.24
12/7	Exam preparation	Review	10.59, 10.62
12/16	Chapters 7-10	*Exam 3*	---------------

* Any changes to the course schedule and homework problems will be communicated in-class and electronically