UNIVERSITY OF RHODE ISLAND
CVE 220 MECHANICS OF MATERIALS
SUMMER 2016 – SESSION II

Instructor: George Tsiatas
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Class Days/Times: Online Course
Credits: 3
Prerequisites: MCE 262 (Statics)

CATALOGUE DESCRIPTION:

Mechanical properties of materials; analysis of members under axial, torsional, and transverse loads; stress and strain; beam deflections, and introduction to statically-indeterminate beams and buckling of columns. Pre: MCE 262.

COURSE OBJECTIVES:

The objective of this course is to develop the formal theory of linear elastic mechanics including equilibrium, kinematics and constitutive equations. Applications in structural members subject to axial, torsional and flexural deformations.

COURSE OUTCOMES:

Students who successfully complete CVE 220 will be able to:

- Calculate normal and shear stresses and strains in structures under linear, elastic conditions.
- Use results of a tension test to determine properties of different materials.
- Utilize basic properties of materials such as modulus of elasticity and Poisson's ratio to solve problems related to isotropic elasticity.
- Calculate stresses, strains and deformations in axially loaded members under various loads and temperature effects.
- Calculate stresses, strains and deformations in circular shafts and thin-walled tubes under torsion.
- Draw shear and bending moment diagrams of beams.
- Calculate bending and shear stresses in beams
- Calculate the principal stresses and their corresponding directions at a point in a structural member subject to various forces.

- Determine deflections of beams.
- Determine the buckling load of simple columns.
- Solve simple indeterminate problems.

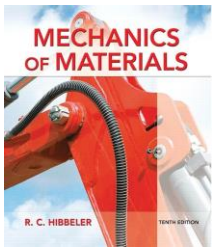
ABET OUTCOMES:

Outcome 1: An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics

Outcome 4: An ability to communicate effectively with a range of audiences

Outcome 5: 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

REQUIRED TEXTBOOK:



Mechanics of Materials, 10th edition, by R.C. Hibbeler, Pearson, 2017 (available in hardcopy, loose-leaf or eText)

TECHNOLOGY REQUIREMENTS:

You will be using the URI Course Management System by Sakai. Computer access to the internet is required in order to successfully navigate this course. Firefox is the recommended browser for Sakai compatibility and can be downloaded free from www.mozilla.com/firefox. You will require additional plug-ins (Adobe Reader, Adobe Flash, Real Player, QuickTime). These are all free downloads. Internet Explorer for Windows, safari as well as Google Chrome are also options. Be sure to turn off pop-up blocker. **You will also need the ability to scan your work into pdf documents and upload them on the course site**.

SAKAI HELP:

Here is the link for Sakai help: https://sakai.uri.edu/portal/help/main.

In the Sakai menu on the left you will see Sakai Documentation at the bottom of the menu. If you click on it, it will take you to the help pages. You can also call the Help Desk at 401-874-4357.

Remember to use Firefox as your browser as there have been compatibility issues with Internet Explorer and Safari. Firefox works on both PC and Mac platforms.

CLASSROOM PROTOCOL:

For this online course, Sakai is our "classroom." In the online learning environment, "attendance" is measured by your PRESENCE in the site as well as your CONTRIBUTIONS to the site. The importance of regular log-ins and active participation cannot be overstated. You are expected to contribute in the forum discussions for each Unit as well as the 3 Case Studies and the Group Project.

I will gauge your participation by your regular, on-time forum postings and responses, and timely assignment submissions. If you've never taken an online course, "hanging out" on Sakai will take some getting used to, and it will be easy to forget about the course from time to time. I recommend that you check out the Online Learn Orientation at http://web.uri.edu/learningonline/online-learning-orientation/. This short orientation will provide you with an introduction to the important aspects of taking an online course. I further recommend that you get in the habit of daily attendance online to maximize your successful completion of the course. Please refer to the **Schedule of Readings, Assignments, Quizzes, Exams** at the end of this syllabus and on the Sakai site for details on how and when you will be expected to contribute to the course.

ONLINE LEARNING:

The best way to begin this course is to view the **START HERE** video, read the syllabus and the other topics listed under START HERE.

This course is divided into 10 units with about two units per week. There is also a "Unit 0" to be completed before the start of the course. This unit reviews some of the background information from Statics as a refresher in order to bring everyone up to speed with the prerequisite material.

Each of the 10 **Units** on Sakai contains the learning objectives for that unit/lesson, assigned readings, videos, and links to other important content on the internet, written assignments, quizzes, and discussion activities.

SCHEDULE OF TOPICS

UNIT	Topic	Readings	Assignments
0	Prerequisites from statics: forces, supports, free body diagrams, equilibrium, statically determinate vs statically indeterminate structures.	Hibbeler: 1.1, 1.2 Watch the Statics Review video under START HERE	Practice problems on statics Practice Quiz Introduce yourself to the class
1	Introduction. Tension, compression, shear and associated stresses and strains. Mechanical properties of materials.	Hibbeler: 1.3, 1.4, 1.5, 2.1, 2.2, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6	Practice problems Discussion Forum for Unit 1 Quiz 1 Case Study #1: Hyatt Walkway Collapse
2	Axially Loaded Members, thermal effects, indeterminate problems.	Hibbeler: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6	Practice problems Discussion Forum for Unit 2 Quiz 2
3	Torsional deformation of circular shafts. Torsion formula. Angle of twist. Indeterminate problems. Power transmission. Torsion of thin-walled tubes.	Hibbeler: 5.1, 5.2, 5.3, 5.4, 5.5	Practice problems Discussion Forum for Unit 3 Quiz 3 Case Study #2: Engineering ethics and professionalism
4	Beams, shear force and bending moment diagrams.	Hibbeler: 6.1, 6.2	Practice problems Discussion Forum for Unit 4 Written Assignment 1 Quiz 4
5	Bending deformations. The flexure formula. Bending and shear stresses.	Hibbeler: 6.3, 6.4, 7.1, 7.2	Practice problems Discussion Forum for Unit 5 Quiz 5 Case Study #3: George Washington Bridge
6	Beam stresses continued. Applications with combined stresses. Pressure vessels.	Hibbeler: 6.6, 7.3, 8.1, 8.2	Practice problems Discussion Forum for Unit 6 Quiz 6

7	Stress transformations.	Hibbeler: 9.1-9.3	Practice problems Discussion Forum for Unit 7 Quiz 7 Group Project assigned
8	Stress transformations continued. Mohr's circle. Applications	Hibbeler: 9.4, 9.5	Practice problems Discussion Forum for Unit 8 Written Assignment 2 Quiz 8
9	Beam displacements. The double integration method. Introduction to buckling of columns.	Hibbeler: 12.1, 12.2, 13.1-13.3	Practice problems Discussion Forum for Unit 9 Quiz 9
10	Review		Group Project is due Final Exam

ASSIGNMENTS AND GRADING POLICY

9 Quizzes on sakai	45%
2 Written Assignments	4%
Final Comprehensive Exam on sakai	24%
3 Case Studies	12%
Group Project	5%
Participation in discussions and forums	10%

GRADING SCALE:

A (≥92), A- (90-91), B+ (87-89), B (83-86), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D+ (67-69), D (60-66), F (≤60)

DESCRIPTION OF ASSIGNMENTS:

For each unit students will study all reading assignments, online video presentations and other information posted on sakai.

For each unit there will be a Quiz on sakai based on the material covered in the specific unit.

There are two written assignments. Students need to convert high quality scans of their work into pdf files and upload them on the course sakai site.

The final exam will be comprehensive. Both the final exam and the 9 quizzes will be timed.

There are three individual case studies:

Case Study 1 relates to the collapse of the Kansas City Marriott Walkway.

Case Study 2 relates to engineering ethics and professionalism.

Case Study 3 relates to George Washington Bridge.

Under the Group project, student groups will be formed (3-4 members each). Each group will prepare questions for a Jeopardy Board related to mechanics of materials. A template will be provided and each group will have to identify categories and prepare questions (and answers). I will investigate the possibility of carrying the Jeopardy activity online but at a minimum students will discuss the "boards" of other teams.

Students are expected to contribute in the Discussion Forums for every Unit, for the Case Studies and the Group Project.

ASSIGNMENTS/QUIZZES/EXAMS NOT SUBMITTED BY THE DEADLINE WILL RECEIVE A GRADE OF ZERO. Please back up your work on a flash drive, email to yourself, and/or store in a cloud. **It is a good idea to have a back-up plan in case of computer problems.**

ACADEMIC SUPPORT SERVICES

Office of Disability Services

Any student with a documented disability is welcome to contact me early in the semester so that we may work out reasonable accommodations to support your success in this course. Students should also contact Disability Services for Students, Office of Student Life, 330 Memorial Union, 401-874-2098.

From the University Manual: **6.40.10 and 6.40.11 Accommodations for Qualified Students With Disabilities.**

> Students are expected to notify faculty at the onset of the semester if any special considerations are required in the classroom. If any special considerations are required for examinations, it is expected the student will notify the faculty a week before the examination with the appropriate paperwork.

PROFESSIONAL CONDUCT

Cheating and plagiarism are serious academic offenses, which are deal with firmly by the College and University. Scholastic integrity presumes that students are honest in all academic work. **Cheating** is the failure to give credit for work not done independently (i.e., submitting a paper written by someone other than yourself), unauthorized communication during an examination, or the claiming of credit for work not done (i.e., falsifying information). **Plagiarism** is the failure to give credit for another person's written or oral statement, thereby falsely presuming that such work is originally and solely your own.

If you have any doubt about what constitutes plagiarism consult the URI Student Handbook, and University Manual sections on plagiarism and cheating at http://web.uri.edu/manual/chapter-8/chapter-8-2/#8_27_10 (sections 8.27.10-8.27.21)

Students are expected to be honest in all academic work. A student's name on any written work, quiz or exam shall be regarded as assurance that the work is the result of the student's own independent thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples of academic dishonesty.

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation;
- Claiming disproportionate credit for work not done independently;
- Unauthorized possession or access to exams;
- Unauthorized communication during exams;
- Unauthorized use of another's work or preparing work for another student;
- Taking an exam for another student;
- Altering or attempting to alter grades;
- The use of notes or electronic devices to gain an unauthorized advantage during exams;
- Fabricating or falsifying facts, data or references;
- Facilitating or aiding another's academic dishonesty;
- Submitting the same paper for more than one course without prior approval from the Instructor.

Honesty is expected in work done in any academic setting including online, internships, co-ops, study abroad, independent studies, research projects, practica, or other experiential placements.

Please note the following section from the **University Manual:**

> **8.27.17.** Instructors shall have the explicit duty to take action in known cases of cheating or plagiarism. The instructor shall have the right to fail a student on the assignment on which the instructor has determined that a student has cheated or plagiarized. The circumstances of this failure shall be reported to the student's academic dean, the instructor's dean, and the Office of Student Life. The student may appeal the matter to the instructor's dean, and the decision by the dean shall be expeditious and final.

Such action will be initiated by the instructor if it is determined that any written assignment is copied or falsified or inappropriately referenced.

Any good writer's handbook as well as reputable online resources will offer help on matters of plagiarism and instruct you on how to acknowledge source material. If you need more help understanding when to cite something or how to indicate your references, PLEASE ASK.

Please note: Students are responsible for being familiar with and adhering to the published "**Community Standards of Behavior: University Policies and Regulations"** which can be accessed in the **University Student Handbook.**

Please note:

Course content and outlines, exams, and assignments created by instructors should be considered the instructors' intellectual property. They should not be distributed, shared in any public domain or third party website, or sold without prior written consent of the instructor.