Central Connecticut State University ENGR 257: Mechanics of Materials 3 credits E-II 2012 Sell-hur

Fall 2013 Syllabus

Course Description: The analysis of simple and combined stress, torsion, flexure and deflection of beams, continuous and restrained beams, combined axial and bending loads, and columns.

Course Prerequisites: ENGR 251 (C- or higher), MATH 221 (C- or higher)

Section: 70 Course Hours: Monday and Wednesday, 5:55 – 7:10 pm Room: Copernicus Hall, NC 22409

Instructor:	Steven Kirstukas, Ph.D.	Office: Copernicus Hall, Room 23515
Email:	kirstukas@ccsu.edu	Phone: (860) 832-1837
Drop-In Office Hours:	M/W : 10:45 AM – 11:30 AM, T : 1:30 PM – 3:30) PM, R : 7:00 PM – 8:30 PM

Please use the office hours to see me if you are having a problem with some aspect of the course. Do not hesitate to ask for assistance. If you need to meet outside of the drop-in times, contact me to arrange a time that suits you.

Learning Outcomes: Upon the completion of this class, the student will be able to:

- Apply basic knowledge of mathematics (calculus), sciences, and engineering principles to solve technical problems.
- > Identify, formulate, and solve technical problems.
- ▶ Use engineering method and format for problem solving and solution presentation.
- > Use both customary and international (SI) units of measurement to solve mechanics of materials problems.
- Analyze any mechanics of materials problem in a simple and logical manner and apply to its solution a few well-understood basic principles.
- > Determine the stresses, normal and shear, in beams and structures.
- > Develop shear and bending moment diagrams for beams along with the determination of resulting stresses.
- Determine if a structure is acceptable for a given set of loading conditions.
- > Undertake follow-up courses in machine design and finite element analysis as required by discipline.

Required Textbook:

Beer, Johnston, DeWolf and Mazurek., 2012, Mechanics of Materials, 6th Ed., McGraw-Hill, ISBN: 978-0-07-338028-5.

Required Materials: Engineering paper; a calculator capable of performing trigonometric and exponential functions and square and cube roots; a protractor, ruler or scale.

Web page: Moodle will be used to disseminate selected material and to communicate messages to the class. Sign up at <u>http://moodle.ccsu.edu</u> and then "enroll" in the particular group for this class.

Performance Criteria

Reading Assignments: Shall be completed per assigned schedule.

- **Homework Assignments:** Shall be completed using the engineering method for problem solving and solution presentation according to the assigned schedule and should be retained for exam preparation. Improper use of solution manuals is prohibited. My policy is that working with classmates/tutors is OK.
- **Examinations:** Shall be taken per assigned schedule. Appropriate use of the engineering method for problem solving and solution presentation is expected. Final exam shall be FE style.

Academic Integrity: The CCSU policy for Academic Integrity can be found online at:

http://web.ccsu.edu/academicintegrity/UndergradAcadMisconductPolicy.htm . Please read it carefully. As this policy clearly states, plagiarism and other forms of cheating are forbidden.

Special Needs: Please contact me privately to discuss your specific needs if you believe you need course accommodations based on the impact of a disability, medical condition, or if you have emergency medical information to share. I will need a copy of the accommodation letter from Student Disability Services in order to arrange your class accommodations. Contact Student Disability Services, Willard Hall 101-04, if you are not already registered with them. Student Disability Services maintains the confidential documentation of your disability and assists you in coordinating reasonable accommodations with your faculty.

Attendance: Students shall arrive for class on time. Attendance is very important and checks will be made and may be considered in "borderline" cases. If you are unable to attend class on the day of a test, notify the instructor <u>before</u> the class meeting. Make-up tests are possible for excused absences only and must be scheduled with the instructor. Be prepared to provide documentation to justify the absence.

Assessment Criteria: Grading is based on the appropriate use of the engineering method for problem solving and solution presentation, application of correct theories (formulae) to any problem solution with follow-through to final results properly expressed in numerical form with appropriate units. Final exam is FE style.

Grade Computation:	
Exams 1 – 8:	80 %
Final Exam:	20 %

<u>Class Schedule</u> : (Instructor reserves the right to modify this syllabus.	Students will be notified of any changes.)
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Week	Date	Торіс	Problems Assigned
1			
	8/28	C1: Introduction – Quick Review of Statics, The Concept of Stress (All of Chapter 1)	1.3, 1.10, 1.16, 1.31, 1.40, 1.45
2	9/2	Labor Day - No Classes	
	9/4	C2: Axial Stress and Strain	2.1, 2.14, 2.19, 2.25,
3	9/9	(Sections 2.1-2.3, 2.5-2.12, 2.14, 2.15, 2.17, 2.18)	2.35, 2.42, 2.47, 2.61, 2.68, 2.77,
	9/11		2.97, 2.106, 2.109
4	9/16	C3: Torsion (Sections 3.1-3.8)	
	9/18	Exam 1 (C1 & C2)	
5	9/23		3.1, 3.14, 3.20, 3.26, 3.33, 3.37,
	9/25		3.49, 3.51, 3.64, 3.75, 3.78, 3.84
6	9/30		
	10/2		
7	10/7	C4: Pure Bending (Sections 4.1-4.7 and 4.12-4.14)	4.4, 4.14, 4.19, 4.25, 4.38, 4.44, 4.53, 4.64,
/	10/9	Exam 2 (C3)	4.100, 4.107, 4.118, 4.121, 4.127,
8	10/14		4.137, 4.144, 4.153,
	10/16		
0	10/21	C5: Analysis and Design of Beams for Bending	5.8, 5.19, 5.22, 5.33,
2	10/23	(Sections 5.1-5.5)	5.40, 5.48, 5.54, 5.65, 5.77, 5.79, 5.91
10	10/28	C6: Shearing Stresses in Beams and Thin-walled Members	6.2, 6.12, 6.18, 6.24, 6.34, 6.36, 6.46, 6.52,
10	10/30	Combined Exam 3 & 4 (C4 & C5)	
11	11/4	(Sections 6.1-6.4)	6.63, 6.69, 6.78, 6.83
11	11/6	C7: Stress and Strain Transformations	7.2, 7.12, 7.17, 7.24, 7.32, 7.43,
12	11/11	(Sections 7.1 -7.6 and 7.9)	7.45, 7.59, 7.68, 7.76, 7.81, 7.92,
	11/13	Exam 5 (C6) C8: Principal Stresses	7.98, 7.108, 7.116, 7.121,
13	11/18	C9: Deflection of Beams (Sections 9.1-9.8)	9.3, 9.10, 9.19, 9.27,
	11/20	Exam 6 (C7 & C8)	9.37, 9.41, 9.54, 9.59,
14	11/25		9.65, 9.75, 9.79, 9.87,
14	11/27	Thanksgiving Recess - No Classes	
15	12/2	C10: Columns (Sections 10.1-10.4,10.6 and 10.7)	10.2, 10.11, 10.19, 10.26
	12/4	Combined Exams 7 & 8 (C9 & C10)	
16	12/9	Last day of classes - Review	
	12/11	Final Exam	