Strength of Materials – MEC K250 & MEC K252
Fall 2011 Syllabus
MEC 250 (Lecture): Room B208, Monday, 1:00 – 3:45 pm
MEC K252 (Lab): Room B204, Monday, 3:46 – 5:25 pm

Instructor: Prof. Wanda Short
Office: C 128
Email: wshort@trcc.commnet.edu
Telephone: (860) 885-2349 office
Office Hours: Tues/Thur 1:00 – 2:00 PM; Wed 3:00 – 4:00 PM; Other Dates/Times by Appointment

Course Descriptions:

MEC* K250; 3 CREDIT HOURS; STRENGTH OF MATERIALS
Prerequisite: MEC K114. Co-requisite: MEC* K252*
This course instills knowledge of moments of inertia, torsion, bending, and columns, and how it applies to stress and the structural properties of materials. The relationship of these properties to common engineering problems is reviewed.

MEC* K252; 1 CREDIT HOUR; STRENGTH OF MATERIALS LABORATORY
Prerequisites: MEC K114. Corequisites: MEC* K250*
This laboratory is intended to reinforce the principles of Strength of Materials and Statics by a combination of different physical experiments whereby deflection of materials can be measured, as well as calculating appropriate reactions and determining the strength of materials utilizing a series of equipment as part of this laboratory exercise.

Lecture Text Book:
Mott, Robert L., Applied Strength of Materials, 5th Edition, Pearson/Prentice Hall Publishers, 2008;
ISBN: 9780132368490

Laboratory Manuals:
Hi-Tech Education Instructions Manuals, P.A. Hilton Ltd:

1) HST1/0 Tensile Modulus of Elasticity,
2) HST2/3 Torsion of Rods and Tubes
3) HST1/4 Equilibrium of a Beam
4) HST1/11 Bending Moment Apparatus
5) HST2/4 Deflection of Beams & Cantilevers
6) HST2/12 Column Buckling Failure
7) HAC20 Two Channel Digital Strain Meter

Course Objectives:

After completing this course, students should be able to:

1. Determine the internal reactions of rigid, static members.
2. Identify and determine normal, shear, and bearing stresses from direct loadings on a member.
3. Understand and use the relationships of stress, strain, elastic modulus, Poisson's Ratio, material strengths and factors of safety to analyze and design simple members.
4. Determine thermal expansion/contraction and/or thermal stresses when analyzing and designing members.
5. Analyze and design circular shafting based on angular twist.
6. Determine beam stresses and beam deflections and safely design beams for strength and stiffness requirements.
7. Draw shear and moment diagrams.
8. Analyze beams for transverse shear.
9. Analyze and safely design simple columns.
10. Determine stresses from 2-D combined loadings and use stress elements to represent the results.
11. Determine principle stresses and maximum shear stress from 2-D combined loadings and use Mohr's Circle to determine orientations of the principle stress element and the maximum shear stress element.

Instructor Assistance:

Seeking help from the instructor outside of class is encouraged if you are having difficulty understanding course material. Feel free to Email/call for an appointment during office hours.

Academic Integrity:

Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to success in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor. A grade of "0" may be assigned upon infraction of this policy.

Attendance:

This course is designed in such a way that a student should get more from the in-class activities than from the textbook alone. Therefore, students are expected to attend class regularly. Though students will not be penalized for non-attendance, they will be responsible for material covered in their absence. It will be the student's responsibility to determine what assignments have been missed and to ensure that they are made up in a timely manner. Attendance will be noted for each class and may be used for extra-credit of 1 to 3 points in determining final grades.

Class Room Policies:

Cell phones brought to class shall be off and out of site (no texting). Language and behavior that is disrespectful, or disruptive, to others is unacceptable; Students should refer to their Student Handbook for examples of such behavior as well additional school policies.

Assignments

Assignments missed for any reason cannot be made up unless **prior** arrangements have been made with the instructor. Assignments not received on date due may result in alternate assignment with reduction of grade.

Final Grade – The student's final grade will be based on the average of quizzes and the final exam which will account for 80% of your grade. Assigned homework and a portfolio will make up the remaining 15% and 5%, respectively. Attendance will be noted for each class and may be used for extra-credit of 1 to 3 points in determining final grades.

Home work will receive a grade of 0, 1, 2, 3, or 4

- Not Attempted = 0
- Minimal Attempt = 1
- Moderate Attempt and Poor Results = 2
- Moderate Attempt and Fair results = 3
- Good Attempt and Largely Correct results = 4

Late homework, unless otherwise excused, will be marked at 25% off.

Quizzes – Students will be allowed one 8 1/2 x 11 sheet of paper, double-sided, for formulas and conversion factors only (no definitions or other written notes).

Students must have their **calculators, cell phones will not be allowed** as a substitute; failure to bring a calculator will result in lost points as many questions will be impossible to answer without one. Quizzes will be based on lecture material and all assigned sections of the text, and homework.

Portfolio Course Requirements – Students will assemble a **notebook**, to be made up of lecture notes, assignments, reports, papers and quizzes.

Laboratory Grading Policy:

Final grades will be based on the averages of laboratory report grades.

Withdrawal:

A student who finds it necessary to discontinue a course must complete a "Withdrawal Request Form" available in the Registrar's office within the time limits of the semester calendar. Students who do not withdraw, but stop attending will be assigned an "F" signifying a failing grade.

Disabilities Statement:

If you are a student with a disability and believe you will need accommodations for this class, you must contact the Disabilities Counseling Services at 860/823-2830. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. The instructor cannot provide accommodations until an accommodation letter from the Disabilities Counselor is received.

Three Rivers
COMMUNITY COLLEGE

Strength of Materials – MEC K250 (Lecture)
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Room B208, Monday, 1:00 – 3:45 pm

Course Schedule

Date	Class #	Topics	Reading	Events
Aug 29	1	Class Canceled Due to Hurricane Irene Aftermath		
Sep 5		Labor Day Holiday		
Sep 12	2	Basic Concepts in Strength of Materials	1-1 to 1-11	
Sep 19	3	Designing Properties of Materials	2-1 to 2-11, 2-13	HW #1 due
Sep 26	4	Direct Stress, Deformation, and Design	3-1 to 3-9, 3-14	HW #2 due **Quiz 1**
Oct 3	5	Torsional Shear Stress and Torsional Deformation	Chapter 4	HW#3 due
Oct 10	6	Shearing Forces and Bending Moments in Beams	5-1 to 5-5	HW #4 due
Oct 17	7	Shearing Forces and Bending Moments in Beams	5-6 to 5-9	HW #5 due **Quiz 2**
Oct 24	8	Centroids and Moments of Inertia of Areas	6-1 to 6-6	HW #6 due
Oct 31	9	Centroids and Moments of Inertia of Areas	6-8 to 6-11	HW #7 due
Nov 7	10	Shearing Due to Bending	7-1 to 7-4 7-6 to 7-11	HW #8 due **Quiz 3**
Nov 14	11	Shearing Stresses in Beams	8-1 to 8-4 8-6 to 8-7	HW #9 due
Nov 21	12	Deflection of Beams	9-1 to 9-6	HW #10 due
Nov 28	13	Combined Stresses	10-1 to 10-10	HW #12 due **Quiz #4**
Dec 5	14	Columns	11-1 to 11-13	Review Problems Due
Dec 12	15	**Final Exam**	Comprehensive	

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Strength of Materials – MEC K252 (Lab)
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COURSE TOPICS/CONTENT
1) Static Equilibrium of Beams
2) Axial Elasticity
3) Use of Strain Gages to Measure Axial Strain
4) Internal Moments in Beams
5) Torsion of Shapes
6) Use of Straw Gages to Measure Torsional Strain
7) Beam Deflections
8) Use of Strain Gages to Measure Strain in Beams
9) Failure of Columns

10) Truss Analysis (tentative)