CVEG 2063 - Mechanics of Materials
P02--------SPRING 2016

Department of	Civil & Envir. Engineering	College of Engineering

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Office Hours:	MWF 11.00 AM -12.00 Noon
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Course Location:	*WILSON 109 K*
Class Meeting Days & Times:	MW 8-9.20
Course Abbreviation and Number:	CVEG 2063
Catalog Description:	Mechanical behavior of engineering materials, plane stress, plane strain, stress-strain relationship, shear and moment, torsion, flexural, column and combined loadings. Introduction to deflections, concepts of stress at a point; stresses in pressured containers; and theories of failures and thermal stress.

Prerequisites:	CVEG 2043
Co-requisites:	None

Required Text:	"MECHANICS OF MATERIALS", by R. C. Hibbeler, 9 th ed. Prentice Hall.

References	"Mechanics of Materials" by Ferdinand Beer, Jr., E. Russell Johnston, John DeWolf,& David Mazurek, McGraw-Hill 2011

Access to Learning Resources:	PVAMU Library:
	    phone: (936) 261-1500;
	    web: http://www.tamu.edu/pvamu/library/
	University Bookstore:
	    phone: (936) 261-1990;
	    web: https://www.bkstr.com/Home/10001-10734-1?demoKey=d

Course Goals or Overview:	
	To develop in students the ability to understand and analyze the behavior of materials under the action of loads and their engineering applications.

Course Objectives/Accrediting Body *ABET* **Standards Met:** *SACS and ABET*

To provide the student with a clear and thorough understanding of the
theory and applications of Mechanics of Material specifically:

1. to develop the ability to apply knowledge of mathematics, science and engineering
2. to develop the ability to identify, formulate, and solve engineering problems

		Civil Engineering Program Objectives		ABET Criteria
At the end of this course, the student will demonstrate				
1	an ability to apply knowledge of mathematics, science, and engineering	1 and 2		a
2	an ability to identify, formulate, and solve engineering problems	1 and 2		e

EXPECTED OUTCOME FOR THIS COURSE

Course Evaluation Methods

Based on the topics above, this course will utilize the following instruments to determine student grades and proficiency of the learning outcomes.

Exams - written tests designed to measure knowledge of presented course material
H.W. Assignments - homework assignments designed to supplement and reinforce course material
Class Participation – daily attendance and participation in class discussions

TRIBUTION: **GRADE SCALE:**

Home work/Assignment	15%	90-100	A
Attendance	5%	80-89	B
3 Tests @ 15%	45%	70-79	C
Class Participation	5 %	60-69	D
Final Exam (Comprehensive)	30%	0-59	F

Total 100%

Professional Organizations
ASCE < www.asce.org>

NOTES:
1. Grade will be computed on an absolute scale, i.e., no curve. Final grade will be determined by total points earned.
2. No make-up test/exam will be given in the course. If you miss a test/exam, you will receive zero credit for that test/exam. If you have an excused absence, notify the instructor ahead of time.
3. Assignment is due on assigned date at the beginning of the class. Late assignments **will not be accepted**.
4. Attendance below 70% will results in an "F" in the course. Remaining absent for four or more classes may constitute sufficient reasons to receive a failing grade in the course. Attendance in the scheduled classes is a requirement for the course. **SEE ATTACHED "ATTENDANCE POLICY"**.

5.   Any form of cheating, plagiarism and/or academic dishonesty will result in an "F" in the course for the individual(s) involved.
6.   If you fail to take the final exam, you will receive an automatic "F" in the course.
7.   **NO FOOD, NO ELECTRONIC DEVICES, NO CELL PHONE USE ALLOWED** during class, tests & exams.
8.   **NO ELECTRONIC COPY OF TEXT BOOK ALLOWED** in class.
9.   See the following pages for detailed lesson schedule.
10.   See **"TEXTBOOK POLICY"** below.

SPECIAL NOTES ON HOMEWORK:

All assignments must be submitted to complete the course. The following areas will be graded:
1.   Completeness: Did you work all parts of the assignment?
2.   Accuracy: Did you get the "correct" answer and indicate the units?
3.   Format and Neatness: Is your presentation of the solution easy to follow, legible and in a professional manner?

SPECIAL NOTES ON EXAM/TESTS:

1.   The Final Exam will be prepared by the College FE TQM Team in FE Exam Format and will carry 25% of the course grade.
2.   Your Instructor will explain and illustrate the examination procedure and format. **REMEMBER ABOUT 30% OF YOUR GRADE MAY BE DETERMINED BY FE EXAM FORMAT. PLEASE GET USED TO THE FE EXAM PROCEDURE.**

TEXTBOOK POLICY

Students must acquire the textbook that is listed as "required" on the course syllabus. Electrical version of textbook is **not** accepted. The textbook must be acquired by the 10th class day. Students are not allowed to share textbooks with other students who are currently registered in the same class. Failure to acquire (or show proof of purchase) the required textbook by the 10th class day will result in the student being administratively dropped from the course. The University will assess financial obligations for the course to the student as with any other dropped class according to the fee schedule. In addition, your financial aid may be affected by the subsequent registration action(s).

COURSE OUTCOMES/OBJECTIVES

1. Introduction	1-1 To comprehend the history of developing mechanics of materials.
	1-2 To review the system equilibrium conditions
2. Axial Loaded members	2-1 To understand the concept of stress and force as well as strain and deformation
	2-2 To relate stress or strain for linear elastic materials under axial loads by intro modulus of elasticity.
	2-3 To calculate stress and deformation in an axially loaded member.
3. Mechanical Properties of Materials	3-1 To understand the shape of stress-strain diagrams for different kinds of materials.
	3-2 To recognize certain technical terms important in characterizing the behavior of materials.
	3-3 To comprehend the significance of factor of safety and allowable stress in engineering design.
	3-4 To predict the effects of temperature or of geometrical discontinuities in a body.
	3-5 To understand the concept of energy to formulate mechanics

problem.

5. Shear and Moment in Beams

5-1 To understand the concept of internal in beams or frame.
5-2 To evaluate the shear force and bending moment in any cross section
    of a beam or frame.
5-3 To comprehend the relationship among load, shear and
    moment.
5-4 To be able to construct the shear diagram from load diagram
    and moment diagram from shear and load diagram or vice versa.

6. Flexural Stress

6-1 To identify the assumptions used to derive the flexural formula.
6-2 To evaluate the flexural stress at any point on a section subjected
    to bending moment.
6-3 To recognize the potentially critical locations on a beat at
    which the stresses must be considered.
6-4 To determine the flexural stresses at any sections of composite
6-5 To learn the effect of initial curvature of a beam on flexural stresses.

7. Shear/Stress Caused by
    Transverse Loading

7-1 To understand the concept of shear stresses in beams subjected to
    bending moment.
7-2 To compute the distribution of shear stresses in the axial direction and over the
    cross sections of beams.
7-3 To comprehend the variation of shear flow along sections either
    parallel or normal to the applied shear forces.
7-4 To define shear center and to determine its location for various cross sections.

4. Torsion

4-1 To identify the basic assumptions in the derivation of torsion formula.
4-2 To learn how internal stresses resist the twisting of circular shaft.
4-3 To apply torsion formula to calculate the shear stress and shear/ strain stress
and angle of twist of circular shaft.
4-4 To modify the torsion formula for solid noncircular shaft and for thin-walled
non-circular tube.

10. Deflection of Beams

10-1 To review the basic principles of geometry pertaining of the
    deflection, shape and curvature of a straight beam.
10-2 To understand the relationship between bending moment and
    deflection of a beam.

11. Columns

11-1 To comprehend that members subjected to axially compressive
    forces may fail due to buckling.
11-2 To understand the limitation of Euler's buckling formula.
11-3 To study the effects of end constraints on the buckling loads.
11-4 To familiarize design formulas proposed by various organization
    and to learn how to use them to design columns.

16 WEEK CALENDAR FOR SPRING 2016

WEEK	TOPIC	HOMEWORK (To be assigned in class)
1.	Equilibrium Conditions Stress	
2.	Simple Connection Strain	
3.	Mechanics Properties of Materials The stress-strain diagram	
4.	Axial Load – Elastic Deformation Statically Indeterminate axially Load member Thermal Stress **TEST 1 (Tentative date: 9/17)**	
5.	Torsion Angle of Twist	
6.	Indeterminate torque-loaded Member Shear and Moment	
7.	Shear and Moment Diagrams Graphical method for constructing Shear and Moment Diagram	
8.	Bending Stress Flexure formula Unsymmetrical Bending	
9.	Shear Stress The shear formula Shear flow **TEST 2 (Tentative date:10/22)**	
10.	Combined loading Plane-Stress Transformation Mohr's Circle	
11.	Absolute maximum Shear Stress Plane Strain Transformation	
12.	Design of Beams and shafts Basis for beam design	
13.	Deflection of Beam by integration	
14.	Deflection of Beam by moment area method **TEST 3 (Tentative date:11/26)**	
15.	Buckling of Column Critical load	

16.	Column with Various Supports **Final Exam**	

University Rules and Procedures

Disability statement (See Student Handbook):
Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:
1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.

2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.

3. Fabrication: use of invented information or falsified research.

4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy:
Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

Excused Absences
Absences due to illness, attendance at university approved activities, and family or other emergencies constitute excused absences and must be supported by documentation presented to the instructor prior to or immediately upon the student's return to class. Students are always responsible for all oral and written examinations as well as all assignments (e.g., projects, papers, reports).

Excessive Absences

Accumulation of one week of unexcused absences (for the number of clock hours equivalent to the credit for the course) constitutes excessive absenteeism. The instructor is not required to accept assignments as part of the course requirement when the student's absence is unexcused.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Civil Engineering Program Educational Objectives

Graduates from the Civil Engineering program will:
1. Have careers in civil engineering or related fields that lead to increasing levels of responsibility and leadership
2. Obtain professional licensure/certifications
3. Complete graduate studies in civil engineering or related fields
4. Engage in professional development and service

Mapping of Program Educational Objectives (PEOs) onto Student Outcomes (SOs)

PEO ID	Objectives	CVEG Student Outcomes										
	Graduates from the Civil Engineering program will:	a	b	c	d	e	f	g	h	i	j	k
PEO 1	have careers in civil engineering or related fields that lead to increasing levels of responsibility and leadership	X	X	X	X	X	X	X	X	X	X	X
PEO 2	obtain professional licensure/certifications	X		X		X						X
PEO 3	complete graduate studies in civil engineering or related fields	X	X	X		X		X	X	X	X	X
PEO 4	engage in professional development and service						X	X	X	X	X	X

Mapping: CVEG Courses Vs. PEOs Vs. Student Outcomes {Fall 2015 Degree Plan}

Course No	Course Title	CVEG Program Educational Objectives				CVEG Student Outcomes										
		1	2	3	4	a	b	c	d	e	f	g	h	i	j	k
CVEG 1011	Intro to Engineering	X			X						M			M		
CVEG 1021	Intro to Civil Engineering	X	X		X							M				M
CVEG 2001	Emerging Issues in CE Prof	X	X		X				M							M
CVEG 2043	Engineering Mechanics I	X	X			M				M						
CVEG 2061	**Materials & Dynamics Lab**	X	X			M		M								
CVEG 2063	Mechanics of Materials I	X	X			M				M						
CVEG 2081	**Surveying & Geospatial Concepts**	X	X				D								M	
CVEG 3023	Geotechnical Engineering	X	X				M					M				
CVEG 3031	**Concrete & Steel Lab**	X					M					M				
CVEG 3043	Environmental Engineering	X	X				M D			M						
CVEG 3051	**Professional Engineering I**	X	X		X						M			M		
CVEG 3053	Transportation Engineering	X	X							M			M			
CVEG 3063	Hydraulics	X	X		M		M D									
CVEG 3073	Structural Analysis I	X	X							M						M
CVEG 3083	Steel Design	X	X	X	X			M								M
CVEG 4013	Reinforced Concrete	X	X	X	X			M								M
CVEG 4021	**Geotechnical Engineering Design Lab**	X	X							M			M			
CVEG 4043	Environmental Eng Design	X	X	X	X			M						M		
CVEG 4053	Transportation Eng Design	X	X	X	X			M							M	
CVEG 4063	Water Resources Eng.	X	X	X	X			M			M			M		
CVEG 4072	**Systems Engineering and Uncertainty**	X		X												
CVEG 4141	**Engineering Management & Ethics**	X	X		X						M				M	
CVEG 4472	Sr. Design & Professionalism I	X	X	X	X			M	M		M			M		
CVEG 4482	Sr. Design & Professionalism II	X	X	X	X			M				M	M		M	

X means the Program Objective is achieved

M means that the skills described in the program outcome is covered in greater details and measured in the course.

D design of experiments

* Evidence needs to be collected to satisfy CE Program Criteria explaining basic concepts in Management, Business, Public Policy and Leadership.