EM 303 - 001, Mechanics of Deformable Solids, Winter 2019
Jan. 2-18, 2019 9:00 AM – 12:15 PM
EBS 1103

Course Description: Study of fundamental principles and physical laws governing the response of mechanical components to external forces. Concepts of stress, equivalent systems, rigid body equilibrium, stress-strain and deformation, torsion, internal forces and bending moments, shear and bending moment diagrams, flexural loading, Mohr's circle and pressure vessels are presented. Prerequisites: Math 137, EM 221/222 ≥C (statics).

Textbook: *Mechanics of Materials*, any edition, Ferdinand P. Beer, E. Russell Johnston, Jr. and John T. DeWolf, Mcgraw-Hill. OR *Mechanics of Materials*, any edition, Timothy E. Philpot, Wiley.

I will be using the new 7th edition of Beer/Johnston/DeWolf, the text in the bookstore for spring semester. It's cheap to rent on Amazon, but the text is a GREAT book you should want to keep. Any of these books are fine, we can work problems from any textbook edition.

Instructor: Joel Lenoir, Mechanical Engineering, office in CEBS #2118
Phone 270-745-6858, joel.lenoir@wku.edu
Office Hours: As needed for student help: call me at 270-791-1590 if I am not here.

Calculator: You must have an NCEES approved calculator to take this course:
http://ncees.org/exams/calculator-policy/

Goals: To equip students with the fundamental principles and skills necessary to determine the stresses and deformations of typical structural components subjected to external forces. Prepare students for designing systems within strength limitations.

Course Outcomes: By the end of the course students will be able to:

- determine normal and shear stresses in mechanical components under known loads
- determine deflections under axial and transverse load conditions
- model the variation of stresses in structural members
- determine the locations and magnitudes of maximum stresses and deflections
- model column stability and determine buckling conditions

ACADEMIC DISHONESTY:
As an engineering student at WKU, you are expected to refrain from any form of academic dishonesty or deception such as cheating, stealing, plagiarism or lying on assignments, homework, quizzes, tests or exams. Furthermore, you understand and accept the potential consequences of punishable behavior, as stated in the WKU Catalog. Failing grades on exams, assignments, and the entire course are included as potential scenarios for academic dishonesty.

Title IX Misconduct/Assault Statement

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy (#0.2070) at
https://wku.edu/eoo/documents/titleix/wkutitleixpolicyandgrievanceprocedure.pdf and

Discrimination and Harassment Policy (#0.2040) at
https://wku.edu/policies/hr_policies/2040_discrimination_harassment_policy.pdf.

Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to

report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121.

*Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and **MUST** report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159*.

Ogden Student Course Attendance Statement

The faculty and staff of Ogden College of Science and Engineering are committed to providing you with learning experiences and opportunities. You must assume ownership of your education and be an active participant in the classroom and laboratory to take advantage of these opportunities. **Active participation requires you to attend.** Scientific studies have shown that attendance during scheduled classroom and laboratory meetings is directly correlated to your performance on assignments and exams and the potential to earn higher grades. Additionally, if you do not regularly attend class, you are missing important information about course topics, due dates, and assignment details that are crucial to your success in the course. Therefore, as a student enrolled in an Ogden course, you are expected to attend every class meeting and to inform your instructor regarding the reasons for any absences as soon as practical. **Your instructor may incorporate class attendance/participation as part of the grading criteria.**

ADA Accommodation Statement

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located inDowning Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu . Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Week	Topics (partial description)
1	1. Types of Stress; Normal and Shear 3. Hooke's Law; tensile properties 4. Evaluation of deformation 5. Shear Stress Distribution from Torsion 6. Angle of Twist, Gears and Shafts 7. Indeterminate Systems 8. Stress Concentration, Saint Venant's Principal 9. Plastic Deformation 10. Pure bending; Stress Distribution **Exam 1 on Friday @ 9:00-10:30 AM**
2	1. Shear and Moment Diagrams 2. Non-Centric Axial Loading 3. Transverse Shear Stresses 4. Shear Flow in Beams **Exam 2 on Friday @ 9:00-11:00 AM**

3	1. Combined stresses and Mohr's Circle 2. Singularity Functions and Equation of Elastic Curve 3. Indeterminate Beams, Superposition 5. Euler's Formula, Buckling 5. End Constraints, Slenderness Ratio **FINAL EXAM ON FRIDAY**

Grading:	Exams (2 @ 300 pts each)	60 %
	Final Exam (400 pts)	40 %
	Total	100 %

Grading Scale: A = 90-100, B = 80-89.9, C = 70-79.9, D = 60-69.9, F = 0-59.9

YOU MAY NOT RECEIVE A PASSING GRADE IN THE COURSE IF YOU FAIL THE FINAL EXAM!!!

COURSE CONDUCT AND POLICIES

A grade of zero will be given for all unexcused absences from quizzes and exams and for projects not turned in on time. If you have a legitimate excuse, let me know in advance via e-mail or phone. No make-up work will be given except as required by University Policy. See the instructor prior to any anticipated absence or problems. If you miss an exam with a legitimate approved excuse with prior notice, the LOWER of either the other exam or the final exam (on a pro-rated percent basis) will be used to substitute. Assignments not meeting these standards may not receive credit. If the grader feels that the problem is not clearly organized and does not follow a logical path or if the solution is incomplete, no points will be awarded.

PROFESSIONAL CONDUCT:

It is expected that all students be present in each lesson, will be courteous of others' ideas, and otherwise will conduct themselves in a professional manner in accordance with the WKU Student Handbook. Conduct determined to be unacceptable may result in the loss of points. **Notify the instructor in advance of any absence for in- or out-of-class activities.** Use of any form of tobacco or alcohol in the classroom is considered inappropriate for this classroom. Cell phones and other devices should be turned off or otherwise left at home. If you need to answer your phone during class, you need to leave the room; re-admittance may or may not be permitted. Other activity that diminishes the professional quality of the class-room will not be tolerated.

CLASSROOM CONDUCT POLICY:

In an effort to create and foster a better learning environment in the classroom, the following policies have been adopted. **Failure to comply with the policies and procedures above and below may result in a FIVE (5) point deduction from the student's final grade in the course.**

1. All cell phones are to be turned off during class.
2. All unnecessary classroom disturbances are prohibited.
3. Use of computers during class is strictly limited to course related activities.
4. Activities that diminish the professional quality of the classroom will not be tolerated.