The University of Texas Rio Grande Valley
Department of Mechanical Engineering

MECE 3321: Mechanics of Solids – Fall 2018

Course Information

Section	Day-Location-Time	Instructor	Instructor Email	Office
01	TR – EENGR 1.236 1:40 PM – 2:55 PM	Jesse Sanchez, MSE	jose.j.sanchez01@utrgv.edu	EPOB 1.104d
02	TR – EMAGC 1.202 3:05 PM – 4:20 PM	Mataz Alcoutlabi, PhD	mataz.alcoutlabi@utrgv.edu	EENGR 3.262
03	TR – EENGR 1.236 10:50 AM – 12:05 PM	Samantha Ramirez, MSE	samantha.ramirez@utrgv.edu	EPOB 1.104a

Pre-requisites: "C" or better in Calculus II (MATH 2414) and Statics (MECE 2301)

Catalog Description: This course covers internal forces and deformation of solids, concepts of stress and strain, formulas for stress and deflection for elastic bars, shafts, and beams, stress and strain transformation, and theories of failure.

Required Materials: Modified Mastering Engineering subscription (see Homework)

Recommended Textbook: *Mechanics of Materials*, Hibbeler, R.C., Prentice Hall Inc., Upper Saddle River, New Jersey. (10^{th} edition)

Course Outcomes and Assessment:

The student should be able to

1. Define the study of mechanics of materials and the concepts of internal loadings, normal and shear stress, and allowable stress (factor of safety); and design members subjected to an axial load or direct shear.
2. Define the concepts of normal and shear strain and be able to calculate the normal and shear strain in a structure under axial loading.
3. Define the concepts of the stress-strain diagram (including the difference of stress-strain diagrams between various materials) and Poisson's ratio.
4. Design statically determinate and indeterminate axially loaded members including the case of thermal stresses.
5. Design statically determinate and indeterminate torsional loaded members including noncircular shafts.

6. Draw shear and bending moment diagrams for beams and shafts using the analytical and graphical method and calculate normal and shear stresses for straight members with symmetric cross-sections subjected to bending loads.
7. Calculate the shear stress in a beam having a prismatic cross section and made from a homogeneous linear elastic material.
8. Derive the equation of the elastic curve for deformation of a member using superposition (including statically indeterminate beams) and use this equation to find the deflection and/or slope at any point along the length of the member.
9. Analyze members or structures where there are combinations of various different types of loadings (axial, torsion, bending, and shear) applied simultaneously to a member or structure and solve for circumferential (or hoop) stress and longitudinal (or axial direction) stress in "thin" walled vessels under pressure.

Grading Policy

3 Exams	45% (15% each)
Comprehensive Final Exam	25%
Quizzes	15%
Homework	10%
Supplemental Instruction	5%

EXAMS

Exams will be given outside of class on the dates shown in the tentative course content schedule.

- Absolutely no programmable calculators, calculator covers, cell phones, laptops, iPads, iPods, or any other smart technology devices are allowed during exams.
- You only have 24 hours to contest your exam grade after it is returned.

QUIZZES

There will be an in-class quiz over 1 problem from the homework.

- Quizzes will be administered in the first 10-15 minutes of class using the following formats:
    - Paper
    - Quizizz (App)
    - Kahoot (App)

Loss of homework assignment credit if:

- A hard copy of the homework is not submitted
- The hard copy of the homework is copied directly from the solution manual
- If you do not receive a passing grade on the corresponding quiz
    - Note: A passing quiz grade is subject to the instructor's discretion.

HOMEWORK

Required Modified Mastering Engineering will be utilized for homework assignments.

- Registration link is found in BlackBoard Learn.

Absolutely no late assignments will be accepted

A hard copy of each homework assignment will be submitted in class the day the assignment is due in Mastering Engineering using the following format on the MECE Homework Paper (Found on my website), engineering paper, or graph paper.

- Problem statement & picture (hand drawn or copy/pasted)
- Summarized knowns, unknowns to be found, and possible equations to use
- Free body diagram(s)
- Calculations in appropriate units
- Final boxed answer in correct units

LECTURE

This course will be BYOD (bring your own device). You will need to be sure to have access to either Quizizz or Kahoot for lecture problems and quizzes.

SUPPLEMENTAL INSTRUCTION

Supplemental instruction will be available in this class. All students are expected to attend at least four SI sessions before the first exam to be eligible for the SI participation points. If you score below a 70 on any exam, you must attend 6 sessions before the following exam. (e.g. If you score a 62 on Exam 2, you must attend 6 SI sessions before Exam 3.)

Attendance

- Attendance will be taken every time the class meets. Any student arriving to class **5 minutes** after the class has started will not be allowed in class. Students will be allowed a **maximum** of **three** absences for the whole semester for classes meeting twice a week. **Five points** will be deducted from the final grade (100%) for each absence exceeding the maximum allowable unless documentation justifying that absence is provided.
- Students **will not** be permitted to leave the classroom during lectures and exams except for **extreme emergencies**.

Course Calendar

Module 0: Statics Review

Module 1: Internal Loads	**Exam: Friday, September 28, 2018 2:00 PM**
A: Free Body Diagram Method	1.1 – 1.2
B: Normal and Torsion	
C: Shear & Bending Moment Diagrams	6.1 – 6.2

Module 2: Stress	**Exam: Friday, October 26, 2018 2:00 PM**
A: Stress, Stress Concentrations, Pressure Vessels	1.3 – 1.7, 4.1, 4.7, 8.1
B: Shear Stress Due to Torsion	5.1-5.3, 5.6, 5.8
C: Normal Stress Due to Bending	6.3 – 6.4
D: Shear Stress Due to Shear Force	7.1 – 7.2
E: Combined Loading	8.2

Module 3: Strain	**Exam: Friday, November 16, 2018 2:00 PM**
A: Strain	2.1 – 2.2
B: Material Properties	3.1 – 3.6
C: Axial Deformation	4.2
D: Angle of Twist	5.4
E: Beam Deflection	12.1, 12.5

Module 4: Statically Indeterminate Situations	
A: Axial and Thermal	4.3 – 4.6
B: Torsion and Beam Deflection	5.5, 12.6, 12.9

Comprehensive Final Exam	**Exam: See Final Exam Schedule for Fall 2018**

Scholastic Integrity:

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

Drop Policy:

Students can withdraw from a course through the *Office of the Registrar* on or prior to:

- September 12, 2018: Last day to drop a class before it appears on the transcript and counts toward the “6-drop” limit.
- November 14, 2018: Drop/Withdrawal Deadline; last day for students to drop the course and receive a “DR” grade. After this date, students will be assigned a letter grade for the course that will count on the GPA.

Course Drops:

According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the "3-peat rule" and the "6-drop" rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

Students with Disabilities:

If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. **Brownsville Campus**: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

Sexual Harassment, Discrimination, and Violence:

In accordance with UT System regulations, your instructor is a "responsible employee" for reporting purposes under Title IX regulations and so must report any instance, occurring during a student's time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

Course Evaluation:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Online evaluations will be available November 15, 2018 – December 5, 2018. Students who complete their evaluations will have priority access to their grades.