

The University of Texas at Tyler
College of Engineering
Course Objectives, Syllabus, and Course Policy
SPRING 2022 (January 10-April 30, 2022)

COURSE: MENG 5305.001 – Advanced Mechanics and Applied Elasticity -
Lectures: UT Tyler Campus, Thursdays 5:30 -8:15 pm scheduled in
RBN3039 & MENG 5305.040-Houston Engineering Center C203.

TEXT: Ansel. C. Ugural and Saul K. Fenster : Advanced Mechanics of Materials
and Applied Elasticity, 16th Edition, Pearson, NJ, 2015 (ISBN
978013485928-6).

INSTRUCTOR: Dr. M. Sathyamoorthy, Office – Engineering RBN3006 – 903 565 5939 –
msathyamoorthy@uttyler.edu-- You can walk in anytime for help. Please
wear your mask when you enter my office. If you are not wearing mask, I
will meet with you outside the office. HEC students are encouraged to
send me emails with their questions and may also request Zoom sessions
ahead of time during office hours.

COURSE INFORMATION

Concepts from the theory of elasticity and topics from advanced solid mechanics, including exact solutions for bending and torsion, energy methods, and thin plates

ABOUT THE COURSE

This course provides an overview of several advanced topics concerning mechanics of structures and material. Topics include elasticity theory, failure theories, bending of beams, curved beam behavior, beams on elastic foundations, torsion, numerical and energy methods in mechanics, and behavior of thin plates. Students at Houston Engineering Center will take this class by Zoom and it will be a face-to face class for UT Tyler campus students.

PRE-REQUISITES

MENG3306-Mechanics of Materials

COURSE SYLLABUS & TOPICS COVERED

The following syllabus describes the course contents. A flexible lecture schedule will be used to adjust the material covered to suit the background, interest and response of the students in order to maximize the overall benefits.

- Chapter 1: Analysis of Stress - Sections: 1.1 to 1.11
- Chapter 2: Strain & Mechanical Properties - Sections: 2.1 and 2.16
- Chapter 3: Problems in Elasticity - Sections: 3.1 to 3.12
- Chapter 4: Failure Criteria - Sections: 4.1 to 4.11
- Chapter 5: Bending of Beams - Sections: 5.1 to 5.16
- Chapter 6: Torsion of Prismatic Bars- Sections: 6.1 to 6.12

Midterm-exam in class on March 3

- Chapter 7: Numerical Methods (FEM) - Sections: 7.6 to 7.11
- Chapter 8: Thick-walled Cylinders and Rotating Disks - Sections: 8.1 and 8.11
- Chapter 9: Beams on Elastic Foundation - Sections: 9.1 to 9.8
- Chapter 10: Application of Energy Methods – 10.1-10.11

Final Comprehensive Exam in class during final exam week- date to be announced

ATTENDANCE:

Regular attendance is required. Attendance will be taken in each class for my records. If you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made on homework, exams etc.

HOMEWORK:

Homework is considered to be very important to fully understand the course material. Completing your homework is an absolute necessity to do well in this course. Therefore, you are required to complete the homework assignments on your own in a timely manner. Homework turned in late will not be accepted. Homework assignments from the textbook are posted in Canvas with due dates. Solutions will be posted in Canvas immediately after the due date for each HW set.

EXAMS:

Exams are open-book. You are allowed to use the textbook. Also, you may use a one-sheet (2 pages), self-written notes (cheat sheet with no problem solutions of any kind) for reference in the mid-term and the final examination. The cheat sheet will be collected with exam papers. No other course material is allowed in exams. Exams will be given after completing a reasonable amount of material from the text book as shown earlier. If you miss any exam without getting **prior approval from me at least one week before the test date**, your exam score will be counted as zero in the calculation of your final course grade. If you were given an official excuse (for emergency reasons only such as sickness and reasons beyond your control), then the percentage will be added to your final exam. **Please note that there are no makeup exams.**

FINAL GRADES:

Final course grade is based on:

Midterm-exam	30%
Homework	10%
Project Presentation & Technical Report	20%
Final Comprehensive Exam	40%
Total	100%

NOTE

Course syllabus, course material such as handouts and statement of problems solved in class, homework assignments and homework solutions will all be posted in Canvas.

Please review all the material posted in Canvas on a regular basis. Final course grades will be determined on the basis of the class average. Class average for each exam will be announced in class and will also be posted in Canvas after each exam. If your overall score is at the overall class average, you will get a “B” grade. The cut off for “A” grade is Class average + 10 points. I will use Canvas to post announcements and contacting students by e-mail.

CALCULATOR POLICY:

Use your own scientific calculator **TI-30X IIS** or any FE Exam approved calculator at each exam. You are not be allowed to use any other calculator or store any class material in the calculator during the exams. You cannot use i-phones, i-pads, i-watches or other electronic devices during the exams. I strongly recommend that you buy the TI-30X IIS calculator before the classes begin and get familiar with its use before the first examination.

Cheating of any kind in homework, technical report and exams will not be tolerated. If you try to cheat, your score in the exam will be “0” and the incident will be reported to the University for scholastic dishonesty and further disciplinary action. Likewise any cheating will result in a “0” score for homework and technical report.

UNIVERSITY, COLLEGE, AND DEPARTMENT POLICIES:

UT Tyler Honor Code Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Student Standards of Academic Conduct Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, or material which has been submitted within a different course without explicit approval of the instructor, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

“Cheating” includes, but is not limited to:

- copying from another student’s test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials, or devices and instruments allowing access to materials, which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes” as well as cell phones, to name a few. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student or person during a test or other assignment without explicit authorization;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, or removing material from the exam location, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
- “Plagiarism” includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.
- “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- All written work that is submitted will be subject to review by plagiarism software.
- Penalty for any related infractions will be decided at the discretion of the instructor including, but not limited to, granting of a failing grade in part or the course or in the entire course.

Students Rights and Responsibilities To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link:

<http://www.uttyler.edu/wellness/rightsresponsibilities.php>

□ **Information for Classrooms and Laboratories:** Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its [Honor Code \(Links to an external site.\)](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the

[UT Tyler COVID-19 Information and Procedures](#) (Links to an external site.) website to review protocols, check symptoms, and report possible exposure. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

Recording of Class Sessions Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

Campus Carry We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

UT Tyler a Tobacco-Free University All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Disability/Accessibility Services In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence.

Social Security and FERPA Statement It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

UT Tyler Resources for Students

- UT Tyler Counseling Center (903.566.7254)

COURSE OUTLINE

MENG5305- Spring 2022-Course Outline

NOTE: This is a flexible schedule and adjustments may be made as needed.

Chapter	Topic	Classes on	Homework Due on
Chapter 1	Analysis of Stress	January 13	January 24
Chapter 2	Strain & Mechanical Properties	January 20	January 31
Chapter 3	Problems in Elasticity	January 27	February 7
Chapter 4	Failure Criteria	February 3	February 14
Chapter 5	Bending of Beams	February 10, 17	February 21
Chapter 6	Torsion of Prismatic Bars	February 24	February 28
	Midterm Exam-March 3	In Class	
Chapter 7	Numerical Methods (FEM)	March 17	March 21
Chapter 8	Thick-walled Cylinders and Rotating Disks	March 24	March 28
Chapter 9	Beams on Elastic Foundation	March 31	April 4
Chapter10	Application of Energy Methods	April 7	April 11
Chapter13	Bending of Thin Plates	April 14	April 18
	Project Presentations in Class	April 21	
	Final Comprehensive exam	To be scheduled	In Class

COURSE OBJECTIVES: By the end of this course students will be able to:

1. Idealize and analyze practical problems in mechanics
2. Discuss failure theories pertinent to brittle and ductile materials
3. Analyze open and closed sections under torsional loading
4. Analyze beams subjected to un-symmetric bending
5. Analyze curved beams
6. Analyze beams on elastic foundations
7. Formulate and solve problems in plane elasticity