Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and 25 copies. Attach a course syllabus to each.*

1. This request is submitted by the Department of Mechanical Engineering

2. Course prefix, number and complete title MEEN 657 Viscoelasticity of Solids and Structures I

3. Course description (not more than 50 words) Linear, viscoelastic mechanical property characterization methods, time-temperature equivalence, multiaxial stress-strain equations; viscoelastic stress analysis: the correspondence principle, approximate methods of analysis and Laplace transform inversion, special methods; static and dynamic engineering applications; nonlinear behavior

4. Prerequisite(s) Graduate Classification Cross-listed with MEMA 651

5. Is this a variable credit course? ☐ Yes ☐ No If yes, from ______ to ______

6. Is this a repeatable course? ☐ Yes ☐ No If yes, this course may be taken ______ times. Will the course be repeated within the same semester/term? ☐ Yes ☐ No

7. Has this course been taught as a 489/689? ☐ Yes ☐ No If yes, how many times? ______ Indicate the number of students enrolled for each academic period it was taught.

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix Course # Title (exclude punctuation)
    MEEN 657 VISCO-E LSTY OF SOL & ST I

    Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
    0 3 0 0 0 3 1 4 19 0 0 0 6 1 9 2 0 0 8 - 0 9 0 1 0 3 6 6

   Do not complete shaded area.

Approval recommended by:

Head of Department 11/7/2007

Head of Department of cross-listed course) Date

Submitted to Coordinating Board by:

Dean of College Date

Director of Academic Support Services Date Effective Date

* Attach a syllabus according to the guidelines on the Internet site www.tamu.edu/admissions/oaras. To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
MEEN 657 Viscoelasticity of Solids and Structures I

Course description: Mechanical and mathematical basis for modeling linear viscoelastic materials, which focus on polymeric solid materials; characterization of viscoelastic material properties from experimental tests; applications of stress and deformation relationships for viscoelastic structural members subjected to axial, torsional, and bending loads.

Course goals: To provide the mechanical and mathematical basis for modeling linear viscoelastic materials, which focus on polymeric solid materials.

Prerequisite: Mechanics of Materials (CVEN 305, or equivalent)

Instructor: Anastasia Muliana
Office: Engineering Physics Building (ENPH), Room 224
e-mail: amuliana@neo.tamu.edu

Grading: Weekly homework 30%, Mid-term exam 40%, and Final project 30%


Other relevant books are listed below:


Topic list (14 week semester):

Week 1-2: Fundamental viscoelastic phenomena: to introduce several responses of viscoelastic materials, i.e. creep, relaxation, and their relations. (Chapters 1 and 4)

Week 3-6: Constitutive model of linear viscoelastic materials (One Dimensional Model): to use differential equations (spring-dashpot mechanical analogs), hereditary integrals, and correspondence principle (Laplace transform) to form linear viscoelastic constitutive models. (Chapters 2, 3, and 5)

Week 7: Sinusoidal loading on linear viscoelastic materials (one dimensional problem): to determine stress and strain histories under sinusoidal loadings. (Chapter 6)

Week 8-10: Constitutive model for three dimensional responses of linear isotropic viscoelastic materials: to determine shear and bulk (volumetric) mechanical properties of viscoelastic materials, understand stress and strain histories, and study effect of viscoelasticity on stress and strain principal directions. (Chapter 7)

Week 11: Measurement of viscoelastic behavior: to learn how to characterize viscoelastic material properties from the experimental tests (creep, relaxation, and dynamic mechanical measurements).

Week 12-13: Temperature effects on viscoelastic material behavior: to understand mechanical responses of viscoelastic materials at different temperatures, introduce the time-temperature superposition principle, and form constitutive material models of thermo-viscoelastic material models. (Chapter 11)
Week 14: Viscoelastic responses in structures: to determine stress and deformation relationships for viscoelastic structural members subjected to axial, torsional, and bending loads. (Chapter 8)

Americans with Disabilities Act (ADA) Policy Statement

The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the University Curriculum Committee by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for information.

The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall or call 845-1537.

Academic Integrity Statement

Aggie Honor Code

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not excuse any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/.