Credits: 3 hours lecture

Instructor: Sara McCaslin, Assistant Professor of Mechanical Engineering

Text(s): None assigned
Additional Material: Class handouts

Course Information

Catalog Description: Study of the physical and mathematical principles relating to the behavior of continuous media and interrelationships between fluid and solid mechanics. Topics include compatibility, constitutive relations, isotropy and orthotropy, field equations, and ME applications.

Prerequisites: MENG 3306 or Consent of Instructor

Required, Elective, Selected: Elective

Course Goals

Instructional Outcomes: By the end of this course students will be able to:
1. Define a continuum in an engineering context
2. Be able to interpret and apply the basic concepts of tensors and index notation
3. Correctly apply compatibility conditions
4. Demonstrate an understanding of the foundations for constitutive equations
5. Apply isotropy and orthotropy to simplify constitutive equations
6. Understand the principles involved in deriving field equations
7. Recognize the limitations of current engineering models when applied to real fluids and solids

Relationship to Program Outcomes (only items in dark print apply)[2]: This course supports the following Master of Science in Mechanical Engineering Program Outcomes, which state that our students will:

1. Apply fundamental knowledge of specialized mechanical engineering concepts and modern engineering tools in solving engineering problems. [1-7]
2. Demonstrate independent self-learning and research capabilities for solving engineering problems. [7]

Topics Covered
- Fundamental equations (direct method)
• Use of Autodesk Multiphysics Simulation software
• Bars, beams and planar elements
• Isoparametric elements
• Solids and solids of revolution
• Applications in stress analysis and in one or more of the following areas: fluid analysis, thermal analysis, and modal analysis

Prepared By: Sara McCaslin
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