ME 6769 – Linear Elasticity

Spring 2020
Tue: 11:00 AM-12:30 PM / Thu: 11:00 AM-12:30 PM

Credit: 3-0-3 (3 credits, 3 hours per week)

Prerequisites: Graduate standing; Principles of Continuum Mechanics (ME6201) or equivalent (recommended); Mechanics of Deformable Bodies (COE3001) or equivalent (recommended)

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Office Hours: Tue: 9:00-11:00 AM / Thu: 9:00-11:00 AM (or by appointment)


Objectives: This class will introduce governing equations of linear elasticity and will focus on solutions of boundary value problems in two and three dimensions using several formulations and methods.

Topics: -Review of continuum mechanics and field equations (3 weeks):
  Strain, stress, strain compatibility, stress equilibrium, linear elasticity constitutive law, uniqueness of solution, boundary conditions.
  -Two-dimensional elasticity (9 weeks):
    *Plane strain, plane stress, Airy stress function method,
    *Problems in Cartesian coordinates: rectangular beams, general solution,
    *Problems in polar coordinates: circular hole problems, Michell general solution, contact problems
    *Singular solutions: dislocations, cracks, Kelvin problem.
  - Three-dimensional elasticity problem (2 weeks)
Assignments: Homework assignments will be graded and the solutions will be handed out. No late assignments will be accepted (except acceptable reason). All class handouts will be given in class, and, will be available in Dr Berbenni’s office.

Evaluation: 30% Homework
30% Mid-term
40% Final Exam

Grading Scale
Your final grade will be assigned as a letter grade according to the following scale:
A  90-100%
B  80-89%
C  70-79%
D  60-69%
F  0-59%

Important dates:
1st day: To be defined (introductive lecture)
Mid-term examination: To be defined
Drop day: To be defined
Recess week: To be defined
Final examination: 3 hours (the final date will be defined later during the semester). The final examination week is (to be defined).

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Student-Faculty Expectations Agreement:
At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.