MECH 153- Aerospace Structures

Course Type: Junior level.

Catalog Description:
This introductory course presents the application of fundamental theories of elasticity and stress analysis to aerospace structures. Course topics include fundamentals of elasticity, virtual work and matrix methods, bending and buckling of thin plates, component load analysis, and airframe loads, torsion, shear, and bending of thin-walled sections. (4 units)

Prerequisites: CENG 43 and 43L-Mechanics III: Strength of Materials, and Laboratory

Co-requisite: None

Textbook:

Recommended (Optional) Texts:

Course Objectives:
The objective of this course is to
1) understand general design concepts for aerospace structures: components and airframe
2) identify, formulate, and solve aerospace structural engineering problems.

Tentative Topics Covered:
1. Fundamentals of elasticity (Chps. 1,2)
2. Virtual work and Matrix method (Chps. 4 and 6)
3. Thin plate theory (Chps. 7-9)
4. Loads on structural components and airframe loads (Chps. 12 and 14)
5. Bending, shear and torsion of thin-walled beams (Chps. 16-19)
6. Wings and fuselages with structurally significant skin (shear flow).
Class/laboratory schedule: Lecture three times per week for one hour and 5 minutes each; there is no lab associated to this course.

Contribution of the course to curriculum component: Contributes one-quarter course to the engineering science component.

Learning Outcomes:
Students will be able to:

- Apply the concepts of linear elasticity and solid mechanics to solve complex structural problems. (assessed by homework, quizzes, and exams)
- Determine the component and airframe loads under given loading conditions. (assessed by homework, quizzes, and exams)

Relationship of course to program outcomes:

This course contributes heavily under categories:

- Apply knowledge of math science and engineering (A)
- Ability to identify, formulate and solve engineering problems (E)

This course contributes moderately under categories:

- Ability to use techniques, skills, & modern engineering tools necessary for engineering practice (K)
- Ability to communicate effectively (G)

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