

# AE 6115 - Syllabus

## Fundamentals of Aerospace Structural Analysis- 3 Credits

### General Information

#### Description

Overview and fundamentals of aerospace structural analysis, including virtual work and energy methods, beam theory, and behavior of thin-walled structures.

#### Pre- &/or Co-Requisites

COE 3001

#### Course Goals and Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Solve for the stresses and displacements in a structure using Euler-Bernoulli beam theory. The structure may be either determinate or indeterminate and loaded under a combination of axial, shearing, bending and torsional loads.
- 2) Apply virtual work and energy methods for solving the deformation and stresses in a structure. Derive critical loads for structures using energy methods.
- 3) Apply energy methods to develop approximate solutions for structural components.

### Course Requirements & Grading

**Note: Graded components of a course may vary with each offering. The example below is typical but subject to change.**

#### Description of Graded Components

- Quiz 1: 15%
- Quiz 2: 20%
- Quiz 3: 25%
- Final Exam: 40%

#### Grading Scale

- Final grades are assigned based on a curve. The curve is generally "B" centered. I announce letter grade ranges after every exam.

### Topics Covered

**Note: The exact topics covered in a course may vary with each offering. The example below is typical but subject to change.**

- 1) Three-dimensional Euler-Bernoulli beam theory. Introduction to Timoshenko beam theory.
- 2) Torsion of beams
- 3) Bending and shear of thin-walled structures
- 4) Virtual work principles
- 5) Energy methods
- 6) Rayleigh-Ritz method for beam bending

## Course Materials

**Note:** Course materials may vary with each offering. The example below is typical but subject to change.

### Textbook

“Structural Analysis: With Applications to Aerospace Structures” - Olivier A. Bauchau and James I. Craig

### Course notes

- Course notes will be delivered during the lecture on the whiteboard.
- Past lecture notes are available electronically.