1. **Course Number and Name:** SE 160A: Aerospace Structural Mechanics I
2. **Credit and Contact Hours:** 4 hours of classroom instruction per week.
3. **Instructor:** John B. Kosmatka
4. **Textbook:**
    - *Kosmatka, J.B.; Aerospace Structural Mechanics (Course Reader for SE-160A, volume I and II), UCSD Book Store, 2012.*
    - *Kosmatka, J.B.; Aerospace Structural Mechanics - Appendices, UCSD Book Store, 2006.*
5. **Specific Course Information:**
    a. **Catalog Description:** Aircraft and spacecraft flight loads and operational envelopes, three-dimensional stress/strain relations, metallic and composite materials, failure theories, three-dimensional space trusses and stiffened shear panels, combined extension-bend-twist behavior of thin-walled multicell aircraft and space vehicle structures, modulus-weighted section properties, shear center.
    b. **Prerequisites:** SE 105 or MAE 21 and SE 101B or MAE 30B and SE 110A or MAE 131A.
    c. **Selected Elective** Course
6. **Course Objective:**
    - To provide a general introduction to the wide range of structural systems that can be studied using aerospace structural analysis techniques.
    - To introduce the student to the different types of loadings experienced by air vehicles and space vehicles.
    - To teach students the fundamentals of materials engineering and identify the important material properties for these weight critical structures.
    - To teach students a wide range of analysis techniques used to design and determine the behavior of thin-wall aerospace structural components.
7. **List of Topics to be Covered:**
    - Aircraft/spacecraft structural definitions and examples, safety factor, margins of safety, and weight distributions
    - Aircraft, helicopter, launch vehicle, and spacecraft load definitions, and flight envelopes
    - Three-dimensional stress and strains definitions and transformations
    - Materials properties of metallics and laminated composites. Comparison and selection.
    - Failure theories for metallics and composites, stress concentration and fatigue effects
    - Three-dimensional truss analysis, shear-stiffened panels, and pressure vessels
    - Combined extension-bending-torsion-shear behavior of open-cell and closed multi-cell beam structures
    - Modulus-weighted section properties, shear center and shear lag

Person Who Prepared This Description and Date of Preparation

John B. Kosmatka, 3/18/2025