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 load definition and operational envelopes, metallic and composite material selection and comparison, applied elasticity, failure theories, stiffened shear panels, thin-wall open and closed-cell torsion pressure vessels, unsymmetical beam bending, shear center, and bending of plates.
   b. **Prerequisites:** SE-2, SE 101B (or MAE 130B), SE 110 A (or MAE 131A)
   c. **Selected Elective** Course
6. **Specific Goals for the Course:**

Letters in parentheses relate to the department's student outcomes

- To provide a general introduction to the wide range of structural systems that can be studied using aerospace structural analysis techniques (a, b, c, f, I, j, k)
- To introduce the student to the different types of loadings experienced by air vehicles and space vehicles (a, b, c, e, j, k)
- To teach students the fundamentals of materials engineering and identify the important material properties for these weight critical structures (a, b, c, e, k)
- To teach students a wide range of analysis techniques used to design and determine the behavior of thin-wall aerospace structural components (a, b, c, e, f, g, h, i, j, k, AE12, AE13, AE14)

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, 9/5/2012