AE 1350 Introduction to Aerospace Engineering (2-0-2)

Catalog Data: AE 1350: Introduction to Aerospace Engineering. Introduction to the field of aerospace engineering, basic aerospace systems and disciplines and a working vocabulary of the field. Demonstration of conceptual design through examples. Wind Tunnel and industry visits.

Textbook: At the level of John D. Anderson, Jr., *Introduction to flight*, McGraw-Hill Book Co.,FIFTH edition, 2005.
Richard S. Shevell, Fundamentals of Flight, Prentice Hall, Second Edition, 1989.

Reference: None

Coordinator: R.G. Loewy, Professor of A.E.

Goals: The purpose of this course is to promote an understanding of the field and a higher level of motivation among students by providing an overall perspective before they begin their more specialized courses. A broad base is developed into which subsequent courses can be integrated in depth.

Expected Outcomes: Students will acquire: background and history of aerospace engineering; a working vocabulary; an introduction to underlying theory, the operational environment and operational aspects; an understanding of the basic systems and design concepts; experience with computer applications.

Topics:
1. Introduction, historical background, nomenclature, graphics (2 classes)
2.,The design process, design quantities, specifications, units, flight mechanics for flat earth, round earth. (3 classes)
3. Properties of fluids, nature of fluid forces, fundamental fluid mechanics, the atmosphere and atmospheric models (3 classes)
4.Two dimensional lift, drag, moments and pressure distributions; viscous and compressibility effects, the speed of sound and three dimensional lift and drag (4 classes)
5. Horizontal and vertical take-offs and landings, space vehicle launch, staging, orbit, and reentry (3 classes)
6. Introduction to airplane performance, power required, descents, rate of climb, range and endurance; equilibrium, stability and control; design implications. (4 classes)
7. Propulsion systems: propeller, turbojet, turbofan, rocket, ramjet, and SCRAMJET. (2 classes)
8. Aerospace structures, flight loads, introduction to structural design. (2 classes)
9. Empty weight estimation and the conceptual design process (4 classes)
10. Tests (3 classes).
Revised by: R.G. Loewy Date: May 22, 2007