The University of Texas at El Paso
College of Engineering
Department of Mechanical Engineering
Syllabus

Course Prefix and Number: AERO 4312
Course Title: Aircraft Design
Credit Hours: 3

Prerequisite Courses:
AERO 3323: Structural Analysis
MECH 3352: Engineering Analysis
AERO 3312: Aerodynamics I

Course Description:
The design of aircraft follows a distinct process but one that varies widely with vehicle application and requirements. This course introduces the broad aircraft design process including sub-system interactions, then leads students through specific design tasks. These tasks include sizing of structures and control surfaces, wing loading and structural supports, aircraft configuration, weight distribution, and human considerations.

Learning Outcomes:

- Critically analyze alternative aircraft configurations and design choices
- Apply engineering analysis to the aircraft design process
- Identify requirements data sources for aircraft design and evaluation
- Apply computational analysis and modelling in the aircraft design process

Required Materials: Daniel P. Raymer, 2012, *Aircraft Design: A conceptual approach,* American Institute of Aeronautics and Astronautics Inc., Reston, VA, USA.

Course Schedule:

Week 1-2	Aircraft Design Process History and Overview
Weeks 3-4	Aircraft sizing
Weeks 3-4	Turbine engines, components, thermodynamic cycles; nozzle theory, thermochemistry, afterburners
Weeks 5-7	Aircraft configuration and geometry
Weeks 6-9	Rocket equation, de Laval nozzles, solid rockets, liquid rockets, hybrid rockets, turbomachinery, rocket staging
Week 10-11	Aircraft loading, including wing loading
Weeks 12	Aircraft weight estimates and distribution
Week 13-14	Subsystem integration, including propulsion system, landing gear, and control devices
Week 15	Human factors in aircraft design