Airplane Preliminary Design
Instructor: Willem A.J. Anemaat

Description
This course provides an overview of the fixed-wing airplane design decision-making process and the relation of design to manufacturing, maintainability and cost-effectiveness. It is applicable to jet transport, turboprop commuter transport, military (trainers, fighter bomber, UAV) and general aviation aircraft. The design process covers sizing (weight, wing area, thrust/power), aerodynamics, weight and balance, stability and control and cost. Numerous examples are shown. Lessons learned and “what to watch out for” are discussed.

Highlights
• Review of drag polar breakdown for subsonic and supersonic airplanes
• Preliminary sizing of airplane take off, empty and fuel weights for a given mission specification
• Performance constraint analyses
• Preliminary configuration selection
• Fundamentals of fuselage and wing layout design
• High-lift and lateral control design considerations
• Fundamentals of power plant integration
• Fundamentals of landing gear layout design
• Class I weight and balance prediction
• Class II weight, balance and moment of inertia prediction
• Fundamentals of static longitudinal stability
• Deep stall and how to design for recoverability
• Take-off rotation and the effect of landing gear location
• Review of dynamic stability concepts and prediction methods
• Unusual configurations
• Design optimization
• Cost

Who should attend?
Aeronautical engineers, mechanical engineers and electrical engineers needing to learn more about design. Pilots with some engineering background, government research laboratory personnel, engineering managers and educators.

“The course is very rich in history and details. It should be taken by every preliminary design engineer.”
—Rodrigo F. Souza, Embraer, S.A.