

Course Title	Aircraft Design			
Course Code	ME415			
Course Type	Technical Elective			
Level	BSc (Level 1)			
Year / Semester	3 rd or 4 th year / Fall			
Teacher's Name	Professor Varnavas C. Serghides			
ECTS	6	Lectures / week	3	Laboratories / week
Course Purpose	<p>This course aims to teach the students the iterative multidisciplinary approach which is adopted by the Aerospace Industry for carrying out the conceptual and preliminary design of advanced modern and future aircraft. This complex creative process starts from only a simple set of operational requirements and finishes with a fully defined aircraft design by integrating several other engineering disciplines subject to strict practical constraints. A similar approach may be used for the design of any advanced technology product, that's why every engineering student can benefit from the vast knowledge gained from this course.</p>			
Learning Outcomes	<p>Upon the successful completion of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Recognise various aircraft types and match their design characteristics to their operational roles 2. Describe the various stages of the design process 3. Define the appropriate criteria, constraints and pertinent airworthiness regulations for a new design 4. Interpret the contents of a target specification 5. Develop a baseline configuration 6. Perform an initial sizing analysis 7. Select the correct powerplant and integration method 8. Determine the required main systems and plan their locations 9. Calculate the overall design parameters of the fuselage, flying surfaces, flight controls, high-lift devices and undercarriage 10. Perform an aerodynamic analysis 11. Determine the structural arrangement and estimate the weight, balance and stability 12. Estimate the main performance and cost parameters and compare to initial targets 			
Prerequisites	None		Corequisites	None
Course Content	<ul style="list-style-type: none"> • Introduction and Course Overview • Design Process and Tools • Aircraft Types and Roles 			

	<ul style="list-style-type: none"> • Design Criteria and Constraints • Future Aircraft Concepts • Airworthiness Requirements and Standards • Design Target Specification • Baseline Configuration Development • Initial Sizing Process • Powerplant Selection • Powerplant-Airframe Integration • Systems Packaging • Fuselage Design • Flying Surface Design • High-Lift Device Selection and Design • Flight Control Surface Design • Undercarriage Layout and Design • Aerodynamic Analysis • Structural Layout, Loads and Aeroelastics • Weight and Balance Estimations • Stability and Control, Handling Qualities • Performance Estimation • Cost Estimation
Teaching Methodology	<ul style="list-style-type: none"> • This course is presented with the aid of several PowerPoint slides, photos and videos, while the whiteboard is used for detailed analytical work. Copies of all the slides presented during the course are available on the university's e-learning platform. The course material is further enhanced with numerous real aircraft design case studies, relevant recent research results, examples and detailed practical explanations. Question and answer sessions augment the overall student interest and learning experience. The recommended references provide further reading material.
Bibliography	<p><u>RECOMMENDED REFERENCES</u></p> <ol style="list-style-type: none"> 1. Raymer, D.P., Aircraft Design – A Conceptual Approach, American Institute of Aeronautics and Astronautics, 2012 2. Torenbeek, E., Synthesis of Subsonic Airplane Design, DUP, 1982 3. Stinton, D., The Design of the Aeroplane, American Institute of Aeronautics and Astronautics, 2001 4. Fielding J.P., Introduction to Aircraft Design, Cambridge University Press, 1999
Assessment	<ul style="list-style-type: none"> • Assignments (15%) • In-class Tests (25%) • Final Exam (60%)
Language	English