

Course Title	Aircraft Performance			
Course Code	ME416			
Course Type	Technical Elective			
Level	BSc (Level 1)			
Year / Semester	3 rd or 4 th year / Spring			
Teacher's Name	Professor Varnavas C. Serghides			
ECTS	6	Lectures / week	3	Laboratories / week
Course Purpose	<p>Aircraft Performance is the engineering discipline concerned with the estimation and analysis of the full operational mission characteristics of an aircraft. This course aims to introduce the students to the process of aircraft performance estimation and to teach them not only the underlying principles but also various design-oriented and operational methodologies for the detailed calculation of the cruise, point and field performance characteristics of fixed-wing aircraft. A similar approach may be used for the performance evaluation of any advanced vehicle, that's why every engineering student can benefit from the skills and knowledge acquired 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. Explain how atmospheric properties vary and state the associated airspeed definitions 2. Analyse the impact of aerodynamics, propulsion and weight on aircraft performance 3. Derive the equations of motion for an aircraft in flight 4. Calculate the aircraft cruise performance, including its range and endurance 5. Determine the climbing, descending and gliding characteristics and estimate their optimal values 6. Perform level turning and manoeuvrability analysis, including energy considerations 7. Describe the operating envelope and explain the various operational constraints 8. Analyse the aircraft field performance and compute the relevant take-off and landing runway requirements and velocities 			
Prerequisites	None	Corequisites	None	
Course Content	<ul style="list-style-type: none"> • Introduction and Course Overview • The Standard Atmosphere 			

	<ul style="list-style-type: none"> • Airspeed Definitions • Aerodynamic, Propulsive and Weight Considerations • Future Aircraft Concepts • Equations of Motion • Steady Level Flight • Range and Endurance • Steady Climbing and Descending Flight • Level Turning Flight • Gliding Flight • Energy-Manoeuvrability Methods • Optimal Climb Trajectories • Operating Envelope • Operational Constraints • Manoeuvrability in the Horizontal and Vertical Planes • Takeoff Analysis • Landing Analysis
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 performance 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. Anderson, J.D., Aircraft Performance & Design, McGraw-Hill International Editions Series, 1999 2. Raymer, D.P., Aircraft Design – A Conceptual Approach, American Institute of Aeronautics and Astronautics, 2012 3. Eshelby, M.E., Aircraft Performance: Theory and Practice, American Institute of Aeronautics and Astronautics, 2000
Assessment	<ul style="list-style-type: none"> • Assignments (15%) • In-class Tests (25%) • Final Exam (60%)
Language	English