

Course Title	Principles of Flight				
Course Code	AVM225				
Course Type	Compulsory				
Level	Bachelor (1 st cycle)				
Year / Semester	2 nd Year / 2 nd Semester				
Instructor's name	TBA				
ECTS	6	Lectures / week	3 Hours /14 Weeks	Laboratories / week	None
Course Purpose and Objectives	The purpose of the Principles of Flight course is to provide the student with all the relevant knowledge regarding the principles that govern the ability of an aeroplane to fly and the means of controlling this flight. The course aims in providing training on subjects relating to subsonic and high-speed aerodynamics, aeroplane stability in flight, flight controls, flight limitations, propellers and other flight mechanics.				
Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • Define all the relevant laws of subsonic and high-speed aerodynamics. • Explain how flight stability is achieved and describe the attributes that affect it. • Explain how the different controls affect flight and analyse the cross-effects between them. • Describe the limitations that define the boundaries of flight. • Explain how propellers generate thrust and describe the effects that certain conditions have on them; • Describe a number of other flight mechanics that may affect the flight under certain conditions. 				
Prerequisites	AVM111	Co-requisites	None		
Course Content	<p>The material included in this course cover the following subjects:</p> <ul style="list-style-type: none"> • Subsonic Aerodynamics: Basics, laws and definitions (units of measurement for mass, acceleration, weight, velocity, density, temperature, pressure, force, wing loading and power, Newton's Laws, air density, static pressure, dynamic pressure, Bernoulli's equation (apply the equation to a Venturi), pitot-static system (IAS), Equation of Continuity, IAS, CAS, EAS, TAS.), Airflow, Aerodynamic forces and moments on aerofoils, Shape 				

	<p>of an aerofoil section, Wing shape, Two-dimensional airflow around an aerofoil, Coefficients (C_l, C_d), Three-dimensional airflow about an aeroplane, Total drag, Ground effect, The relationship between the lift coefficient and speed in steady, straight and level flight, The stall, CL_{MAX} augmentation, Means to reduce the $CL - CD$ ratio, The boundary layer, Aerodynamic degradation.</p> <ul style="list-style-type: none"> • High Speed Aerodynamics: Speeds (Speed of sound, Mach number), Shock waves, Effects of exceeding M_{crit}, Buffet onset, Means to influence M_{crit}, • Stability: Static and dynamic stability, Static and dynamic longitudinal stability, Static directional stability, Static lateral stability, Dynamic lateral/directional stability, Effects of altitude on dynamic stability. • Control: General, Pitch (longitudinal) control, Yaw (directional) control, Roll (lateral) control, Roll/yaw interaction, Means to reduce control forces, Mass balance, Trimming. • Limitations: Operating limitations, Manoeuvring envelope, Gust envelope. • Propellers: Conversion of engine torque to thrust, Relevant propeller parameters, Propeller efficiency versus speed, Effects of ice on propeller, Engine failure, Design features for power absorption, Secondary effects of propellers. • Flight mechanics: Forces acting on an aeroplane, Asymmetric thrust, Particular points on a polar curve. 						
Teaching Methodology	Face-to-face						
Bibliography	<ul style="list-style-type: none"> • Bristol ATPL (A) Groundschool Manual & CBT Software 						
Assessment	<table border="1"> <tr> <td data-bbox="472 1314 1011 1388">Examinations</td> <td data-bbox="1011 1314 1213 1388">90%</td> </tr> <tr> <td data-bbox="472 1388 1011 1461">Participation</td> <td data-bbox="1011 1388 1213 1461">10%</td> </tr> <tr> <td data-bbox="472 1461 1011 1514"></td> <td data-bbox="1011 1461 1213 1514">100%</td> </tr> </table>	Examinations	90%	Participation	10%		100%
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Language	English						