

Course Title	Mass and Balance				
Course Code	AVM222				
Course Type	Compulsory				
Level	Bachelor (1 st cycle)				
Year / Semester	2 nd Year / 2 nd Semester				
Instructor's name	TBA				
ECTS	4	Lectures / week	3 Hours /14 Weeks	Laboratories / week	None
Course Purpose and Objectives	<p>The purpose of the Mass and Balance course is to provide the student with the knowledge required in order to be able to understand the mass related terms and apply the appropriate calculations for efficiently and safely planning the loading of an aircraft. The course aims in providing information regarding all the necessary terms and concepts relating to mass and balance, analyze the necessary considerations with regard to structural limitations and controllability of the aircraft and provide the students with knowledge on how to carry out the necessary calculations and properly manage the loading of the aircraft.</p>				
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 mass and balance terms. • Explain the purpose of carrying out mass and balance calculations. • Apply mass and balance calculation techniques in order to efficiently and safely load an aircraft. • Interpret and understand mass and balance documentation. • Determine the CG position of an aircraft using different methods and under different loading parameters. • Apply techniques to re-position the CG as required for correct balance of the aircraft. • Apply cargo handling techniques to securely load an aircraft. 				
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"> • Mass Definitions • Purpose of mass and balance considerations: Mass limitations (Importance in regard to structural limitations, 				

	<p>Importance in regard to performance), Centre of gravity (CG) limitations (Importance in regard to stability and controllability, Importance in regard to performance).</p> <ul style="list-style-type: none"> • Loading: Terminology (Mass terms, Load terms-including Fuel Terms), Mass limits (Structural limitations, Performance limitations, Cargo compartment limitations), Mass calculations (Maximum masses for Take-off and Landing, Allowed traffic load and fuel load, Use of standard masses for passengers, baggage and crew). • Fundamentals of CG Calculations: Definition of centre of gravity, Conditions of equilibrium (Balance of Forces and Balance of Moments), Basic calculations of CG. • Mass and Balance details of aircraft: Contents of mass and balance documentation (Datum, moment arm, CG position as distance from datum, CG position as percentage of Mean Aerodynamic Chord (% MAC), Longitudinal CG limits, Lateral CG limits, Details of passenger and cargo compartments, Details of fuel system relevant for Mass and Balance considerations), Determination of aircraft empty mass and CG position by weighing (Weighing of aircraft (general aspects), Calculation of mass and CG position of an aircraft using weighing data), Extraction of basic empty mass and CG data from aircraft documentation (Basic Empty Mass (BEM) and/or Dry Operating Mass (DOM), CG position and/or moment at BEM/DOM, Deviations from standard configuration) • Determination of CG position: Methods (Arithmetic method, Graphic method, Index method), Load and Trim Sheet (General considerations, Load sheet and CG envelope for light aeroplanes, Load sheet for large aeroplanes, Trim sheet for large aeroplanes, Last minute changes), Intentional re-positioning of CG (Re-positioning of CG by shifting the load, Re-positioning of CG by additional load or ballast) • Cargo handling: Types of cargo (general aspects), Floor area load and running load limitations in cargo compartment, Securing of load.
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>Examinations</td><td>90%</td></tr><tr><td>Participation</td><td>10%</td></tr><tr><td></td><td>100%</td></tr></table>	Examinations	90%	Participation	10%		100%
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	100%						
Language	English						