

School of Business and Management Sciences / Aviation Management

2024 - 2025 Academic Year

MASS and BALANCE

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
MASS and BALANCE	HVY3214343	Spring Semester	3+0	3	5
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	Turkish				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Elective				
Course Coordinator	Assist.Prof. Özlem İLDAY				
Name of Lecturer(s)	Assist.Prof. Özlem İLDAY				
Assistant(s)					
Aim	It is aimed that the student will be able to comprehend the importance of the balance factor in the loading of aircraft, learn the basic principles, make the required calculations, and finally fill in the load manifests and load & trim sheets.				
Course Content	This course contains; Introduction to Mass and Balance, General notes, aircraft definitions, unit conversions, Mass and balance theory, gravity, balance arm, moment, reference plane, beam balance, Factors affecting mass and balance in aircraft, forces in steady level flight, center of gravity constraints, Weight definitions and limits, structural limits, performance limits, Weighing of aircraft, Floor loading, Weighing of aircraft and floor loading applications, Load shifting, load addition, load subtraction, Load shifting, load addition, load subtraction, practice questions and answers, Mean Aerodynamic Chord (MAC), JAR-Ops1 Requirements, mass and balance documents, last minute changes, mass values for crew, mass values for passenger and baggage, Loading Manifests (SEP1), examples, Loading Manifests (MEP1), examples, Loading Manifests (MRJT), load & trim sheet, examples.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
1 - Will be able to understand the theory of mass and balance.			16, 9	A	
1.1 - Knows general concepts, aircraft definitions, unit conversions.			16, 6, 9	A	
1.2 - Defines the concepts of gravity, balance arm, moment, reference plane, beam balance.			16, 9	A	
2 - Will know the importance of aircraft loading and the location of the aircraft's center of gravity in terms of flight safety.			16, 6, 9	A	
2.1 - Explains weight definitions and limits, structural limits, performance limits.			16, 9	A	
2.2 - Performs aircraft weighing and floor loading processes and calculations.			16, 6, 9	A	
3 - Will be able to define the factors affecting mass and balance in aircraft, forces in level flight, center of gravity constraints.			16, 6, 9	A	
3.1 - Explains the factors affecting mass and balance in the aircraft.			16, 9	A	
3.2 - Explains the forces acting on the aircraft and the center of gravity limits.			16, 9	A	
4 - Will be able to determine the location of the center of gravity by making the required calculations while the aircraft is being loaded.			16, 6, 9	A	
4.1 - Calculates take-off and landing masses of aircraft.			16, 6, 9	A	
4.2 - Determines the location of the center of gravity.			16, 6, 9	A	
5 - Will be able to prepare load manifest forms and graphics, fill out the load and trim sheet.			16, 6, 9	A	
5.1 - Fills out the loading manifest form and graphics.			16, 6, 9	A	
5.2 - Fills out the load and trim sheet.			16, 6, 9	A	
Teaching Methods	16: Question - Answer Technique, 6: Experiential Learning, 9: Lecture Method				
Assessment Methods	A: Traditional Written Exam				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Introduction to Mass and Balance, General notes, aircraft definitions, unit conversions				
2	Mass and balance theory, gravity, balance arm, moment, reference plane, beam balance				
3	Factors affecting mass and balance in aircraft, forces in steady level flight, center of gravity constraints				
4	Weight definitions and limits, structural limits, performance limits				
5	Weighing of aircraft				
6	Floor loading				
7	Weighing of aircraft and floor loading applications				
8	Load shifting, load addition, load subtraction				
9	Load shifting, load addition, load subtraction, practice questions and answers				
10	Mean Aerodynamic Chord (MAC)				
11	JAR-Ops1 Requirements, mass and balance documents, last minute changes, mass values for crew, mass values for passenger and baggage				
12	Loading Manifests (SEP1), examples				
13	Loading Manifests (MEP1), examples				
14	Loading Manifests (MRJT), load & trim sheet, examples				
Evaluation Methods		Weight(%)			
Midterm Exam		40			
General Exam		60			

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Resources

"CAP-696 Mass and Balance Manual (Aeroplanes)", Civil Aviation Authority - Safety Regulation Group, 2006

Harekat Performans (Operational Performance), Dr. Cem ÇETEK, Anadolu Üniversitesi Yayınları, 2016