

Module description: Aircraft Systems - Propulsion Systems and Performance			
Module Code	t.BA.AV.ACSYS-PP-EN.19HS		
ECTS Credits	4		
Language of Instruction/Examination	English		
Organizational Unit	ZAV		
Module Coordinator	Wilm Friedrichs		
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.		
Module Characteristic	Type 3c*** 2 lecture lessons per semester week each yearly starting-class + 2 lab lessons per semester week and class		
Module Description	The Propulsion Systems and Performance module deals with the principles of propulsion and flight performance of fixed wing aircraft.		
Module Content	<ul style="list-style-type: none"> Propulsion Systems Introduction to aircraft propulsion systems Jet engines Mode of operation Thermodynamic analysis Thrust, fuel consumption, efficiency Components and secondary systems Performance and control Propellers Froude's theory Performance parameters Blade element theory Operation and control Piston engines Mode of operation Thermodynamic analysis Power, fuel consumption, efficiency Components and secondary systems Performance and control Flight performance Steady Flight Equation of Motion Level Flight Thrust Required (Drag Polar) Thrust for constant mass and variable altitude Thrust for constant altitude and variable mass Minimum Thrust -> L/D max Power Required Speed Stability Maximum Velocity Drag Divergence Range and Endurance for Propeller Aircraft Range and Endurance for Jet Aircraft Climbing Flight Maximum Climb Angle Maximum Rate of Climb Time to Climb Gliding Flight Best Glide Speed Accelerated flight Equation of Motion Turning Flight Pull-Up Manoeuvre Energy Concept V-n Diagram Takeoff Performance 		
Prerequisite Knowledge			
Learning Objectives (Competences)	Students...	Competencies	Taxonomies
	The students can analyse the thermodynamic cycle of an aircraft engine to calculate thrust, power, fuel consumption and efficiency	M	K2, K3, K4
	The students know the physical principles and quantities that define airplane performance	F	K1
	The students understand and can explain the physical foundations, the technical principles and the functions of aircraft propulsion systems	F	K1, K2
	The students understand the optimisation possibilities connected to aircraft performance	M	K2
	The students understand the performance based limitations in the operation of an airplane	M, F	K2
	The students know the factors that influence airplane performance and can calculate it taking into account all the relevant aspects	F, M	K1, K2, K3
	The students are able to understand aircraft technical literature (Aircraft Operating Manuals, System Manuals)	F	K2

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Performance Assessment	End-of-module exam	Assessment	Length (min.)	Weighting	Form
	written exam	Grade	90	100	acc. to module agreement
	Performance assessment during the semester		Assessment	Length (min.)	Weighting
	Lab <i>Preparation of, active participation in, and dissemination of one lab session, including preparation and submission of a report</i>	predicate		0	acc. to module agreement
Classroom Attendance Requirement	None Participation in one lab				
Learning material					
Comments					