

1.5 Modelling and Simulation (MAS)

Module leader:	Prof. Dr.-Ing. Uwe Apel		
ECTS points:	6 ECTS	Workload (h):	180
Type of module and position in the course of study:	Mandatory module taught in the 1. semester	Contact hours (h):	56
Scope und frequency of teaching:	14 classes in winter term	Self-study (h):	124
Type of module and position in other study programs or continuing education offers:	-		
<p>Learning outcomes:</p> <p>Upon completion of this module students will be able to ...</p> <p>Knowledge and understanding (extension, consolidation and understanding of knowledge)</p> <ul style="list-style-type: none"> ▪ <i>Implement a basic understanding of the role and methodology of modelling and simulation within the aerospace community</i> ▪ <i>Extend the basic knowledge of flight controls and the development of models</i> ▪ <i>Understand the necessity of simulations for training purposes</i> <p>Using, applying and generating knowledge (applying and transferring knowledge, Scientific innovation)</p> <ul style="list-style-type: none"> ▪ <i>Perform mathematical abstraction of real scenarios</i> ▪ <i>Develop aircraft simulation models</i> <p>Communication and cooperation</p> <ul style="list-style-type: none"> ▪ <i>Enhancement of collaboration and cooperation abilities by conducting a project in a team setup</i> <p>Reflection of academic and professional identity</p> <ul style="list-style-type: none"> ▪ <i>Conduct critical reviews of simulations by a comparison with real aircraft models</i> 			
<p>Course content:</p> <ul style="list-style-type: none"> ▪ Introduction to simulation and simulators ▪ Motion ▪ Visualization ▪ Databases for simulations ▪ Simulation for training purposes <ul style="list-style-type: none"> • General considerations • Regulations and Requirements for training and simulators • Methods ▪ Modelling <ul style="list-style-type: none"> • Flight physics and equations of motion • Aerodynamics • Modelling and data representation; data sources and their validation ▪ Components of simulation systems <ul style="list-style-type: none"> • Flight control systems • Navigation systems • Visualization systems ▪ Development of an aircraft simulation model <ul style="list-style-type: none"> • Develop a flight model • Develop models and create simulation models • Validation of simulation model by a comparison with practical flight models 			
	English		
Prerequisites:	None		
Preparation/literature:	To be presented and discussed in the first session of the course		
Further information:	Aulis platform to be used		

Courses of the module				
Course title	Teaching staff	Contact hours per week	Learning and teaching methods	Examination method(s), scope and duration
Modelling and Simulation MAS	Dennis Zimmer	2	S	PA
Modelling and Simulation MAS	Dennis Zimmer	2	Project	PA