

Courses in English Course Description

Department	03 Mechanical, Automotive and Aeronautical Engineering
Course title	Composite Materials, Mechanics and Construction
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	The purpose of this module is to deliver to the student the necessary engineering competencies to be able to apply composite materials. After taking this unit the student should be able to: <ul style="list-style-type: none">- Understanding of fibre design and orientation, fibre preforms and textiles- Calculate stiffness, stresses and strains in composite materials (laminate theory)- Predict failure and safety factors-Design and calculation of load introduction elements- Analysis of damages, knowledge of damage tolerance principal Knowledge about fundamental manufacturing methods
Prerequisites	Chemistry, Polymer technique, Engineering Mechanics
Recommended reading	Scriptum, Schürmann: „Konstruieren mit Faser-Kunststoff-Verbunden“, Stephan Tsai “Composite Design“, Autar K. Kaw „Mechanics of Composite Materials“.
Teaching methods	Course lecture
Assessment methods	Exam according to the legal framework of the degree program in which this course is offered. Approved aides for the examination will be published by means of the examination announcement.
Language of instruction	English
Name of lecturer	Prof. Dr. Alexander Horoschenkoff
Email	alexander.horoschenkoff@hm.edu
Link	
Course content	Material and calculation aspects: Material characteristics and their experimental determination, laminate theory and failure calculation (Tsai Wu and Puck), interlaminar and intralaminar stresses, fibre types and properties, semi finish products (non crimp fabric, prepreg etc.), damage and failure analysis (micro-crack, fibre breakage, delamination) Design aspects and structural mechanics: Design and calculation of girders and beams, leaf springs and vessels Principal manufacturing methods: Prepreg and autoclave manufacturing method, high pressure RTM, winding
Remarks	