

课程大纲

COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	SDM5003 /工程复合材料结构及功能化技术 SDM5003 / Engineering Composite Structures and Functional Technology
2.	课程性质 Compulsory/Elective	专业选修课 Elective
3.	课程学分/学时 Course Credit/Hours	3 学分 / 64 学时 3 Credit / 64 Hours
4.	授课语言 Teaching Language	英文 English
5.	授课教师 Instructor(s)	周利民 Limin Zhou
6.	是否面向本科生开放 Open to undergraduates or not	否 No
7.	先修要求 Pre-requisites	材料力学 Mechanics of Materials
8.	教学目标 Course Objectives	
	<p>为学生提供先进复合材料结构与性能的知识。使学生了解复合材料的加工、制造以及制造和环境对其性能的影响及复合材料所能承受的广泛的设计灵活性。</p> <p>To provide students with knowledge of mechanical behaviour of advanced composite materials. To enable students to understand the processing, fabrication and influence of fabrication and environment on properties of composite materials and the wide design flexibility that composites can afford.</p>	
9.	教学方法 Teaching Methods	
	<p>课堂讲授与课程项目相结合; 引导学生对相关文献和书籍进行自学; 将学习内容在课堂上进行分享与讨论; 使学生获得与课堂上学习主题相关的更加深入的实践经验。</p> <p>Combining classroom teaching and project development; Guiding students to self-study the relevant literature and books; Sharing and discussing the learning content in the classroom; Enabling students to gain more in-depth practical experience related to the learning topics in the classroom.</p>	
10.	教学内容 Course Contents	
	Section 1	复合材料简介 Introduction to Composite Structures - Classification and characteristics of composite materials. - Mechanical behaviour of composite materials. - Reinforcements. Matrix materials. Green composites
	Section 2	复合材料界面 Composite Interfaces - Fibre-matrix interfaces. - Interfacial properties. - Stress transfer through composite interfaces.

Section 3	层合板应力应变关系 Lamina Stress-strain Relationships - Lamina and laminate theories. - Transformation and prediction of elastic parameters. - Load-deformation relationship.
Section 4	连续纤维增强层合板的分析 Analysis of Continuous Fibre-Reinforced Lamina and Laminates - Macromechanical behaviour of a lamina. - Macromechanical behaviour of a laminate.
Section 5	复合材料的加工与制造 Processing and Fabrication of Composite Materials - Structural composites and their processing technology. - Manufacture of laminated fibre-reinforced composite materials. - Influence of fabrication and environment on properties.
Section 6	复合材料的失效分析、设计与应用 Failures, Design, and Applications of Composites - Failure theories. Design optimization. - Engineering applications of composites.
Section 7	纳米复合材料 Nanocomposites
Section 8	智能复合材料 Intelligent Composites
Section 9	储能复合材料 Composites for Energy Storage
Section 10	嵌入纳米材料传感器的复合材料 Composites with Embedded Nanomaterial Sensors
Section 11	电子封装用复合材料 Composites for Electronic Packaging
11. 课程考核 Course Assessment	
平时作业 Homework	20%
期中考试（开卷） Midterm Exam (Open Book)	20%
项目报告 Project Report	20%
项目介绍 Presentation (Individual)	40%
12. 教材及其它参考资料 Textbook and Supplementary Readings	
References:	
1. Gibson, Ronald F., Principles of Composite Material Mechanics , second edition, CRC Press, 2012.	
2. A. Brent Strong, Fundamentals of Composites Manufacturing - Materials, Methods and Applications , Society of Manufacturing Engineers, latest edition.	