

西安交通大学《产品设计创新材料》课程教学大纲

一、课程基本信息

I. Basic Information

课程名称 Course Title	产品设计创新材料		
	Materials for Product Design and Innovation		
课程编号 Course Number			
课程学分 Credits	2	总学时 Credit Hours	32
学时分配 Assignment of Credit Hours	理论:__ 实验:__ 上机:__ 课外: (课外学时不计入总学时) Lecture: <u>24</u> Studio: <u>8</u> Practice in the IT room: Extracurricular: (Extracurricular hours do not count towards the total number of hours.)		
课程类型	<input type="checkbox"/> 公共课程 Public Course <input type="checkbox"/> 通识课程 General Education Course <input type="checkbox"/> 学科门类基础课 <input type="checkbox"/> 专业大类基础课 <input checked="" type="checkbox"/> 专业核心课 Specialized Core Course <input type="checkbox"/> 专业选修课 Specialized Elective Course <input type="checkbox"/> 集中实践 Intensive Practice		
开课学期	<input type="checkbox"/> 1-1 <input type="checkbox"/> 1-2 <input type="checkbox"/> 2-1 <input checked="" type="checkbox"/> 2-2 <input type="checkbox"/> 3-1 <input type="checkbox"/> 3-2 <input type="checkbox"/> 4-1 <input type="checkbox"/> 4-2 <input type="checkbox"/> 5-1 <input type="checkbox"/> 5-2		
先修课程 Prerequisites	basic knowledge of the physics and proprieties of materials		
教材、参考书及其他资料 Materials (Textbook,	[序号] 作者 1, 作者 2.教材名称.出版地: 出版者, 出版年. 例: [1] 刘国钧, 陈绍业.电路分析.北京: 高等教育出版社, 1994. [1] Johnson K., Ashby, M. F., Materials and Design: The Art and Science of Material Selection in Product Design.		

Bibliography or Referencing and Supplementary Materials)	<p>Butterworth-Heinemann, 2013.</p> <p>[2] Lefteri, C. Making it. Manufacturing techniques for product design. Lorenz King, 2007.</p> <p>[3] Solanki, S. (2018) Why Materials Matter. Responsible Design for a Better World. Prestel, 2018.</p> <p>[4] Franklin, K., Till, C., Radical Matter: Rethinking Materials for a Sustainable Future. Thames & Hudson Ltd, 2019.</p> <p>[5] Antonelli, P., Mutant materials in contemporary design. New York: MoMa, 1995</p>
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二、课程目标及学生应达到的能力

II. Course Objectives and Expected learning outcomes

(工科专业对标工程教育认证标准中专业毕业要求的 12 条具体指标点，其他专业对标行业/评估标准中专业毕业要求的具体指标点)

1. To develop the future designer's knowledge on proprieties of the most applied and innovative materials in the design field.
2. To establish a quantitative and qualitative understanding between design parameters and material proprieties
3. To learn about the design-driven materials innovation approach and how to apply it.
4. To understand the importance of environmental sustainability with respect to materials' origins, energy consumption, fabrication process, recyclability, or compostability.
5. To develop the future designer's awareness of the material innovation trends in product design.

课程目标与专业毕业要求的关联关系

Correlation between course objectives and graduation requirements

for the program

毕业要求：

Students of this program should meet the following graduation requirements:

A. Master extensive theories on engineering and technology, humanities, social sciences, natural sciences, etc., demonstrate high scientific literacy, strong humanistic and artistic dispositions, and physical and mental well-being;

B. Have solid theoretical knowledge of industrial design, and master the knowledge related to product and its development, design, aesthetics, engineering, technology, management, planning, teamwork, professional ethics, etc.;

C. Master methods and skills of industrial design and related fields, be able to apply multidisciplinary knowledge into reality, and have strong expression, creation, practical, problem analysis and solving skills in the field of design;

D. Have good communication skills, teamwork spirit, a strong sense of social responsibility, and international vision, and be capable of applying interdisciplinary knowledge pioneering work.

毕业要求 课程目标	A	B	C	D
1	H	H	L	L

2	L	M	H	H
3	L	M	H	H
4	L	H	M	M
5	L	M	L	H

注：毕业要求中 A、B、C、D、E、F、G、…对应毕业要求中各项具体内容。课程目标与专业毕业要求的关联关系用 H/M/L 标注。

Note: A, B, C and D indicate the specific aspects of the graduation requirements. H, M and L refer to a strong, medium and weak correlation between the course objectives to the graduation requirements respectively.

三、教学内容简介

III. Description of teaching contents

章节顺序	章节名称 Chapter Title	知识点 Teaching Points	参考学时 Credit Hours
1	Materials of product design	1. The evolution of materials and their application in product design 2. Different typologies of materials 3. The correlation between material properties and product performances	14
2	Sustainability and Circular Materials	1. The correlation between product sustainability and material application. 2. the importance of sustainability and environment with respect to materials' origins, energy consumption, fabrication process, recyclability, or compost ability. 3.the circularity of materials and resources.	8
3	The Design-driven material innovation approach	1. The perception of materials and sense making 2. The relationship between the technical and sense-aesthetic dimensions of materials. 3. The design-driven material innovation approach to enrich product experience.	8
4	Material innovation	1. The role of material innovation in product design 2. Current trends of materials innovation	2

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四、教学安排详表

IV. Teaching Arrangements

序号 Teaching contents	学 时 分配 Credit Hours	教学方 式 Teaching Methods	教学要求 (知识要求及能力要求) Learning Objectives (knowledge objective & ability objective)	对课程目 标的支撑 关系 Related to which Course Objective
1 Materials of product design	14	Theory	1. Known different typologies of materials 2. Grasp the differences among the typologies of materials and their characteristics 3. To understand the evolution of materials and their application in the design history 4.To understand the correlation between material proprieties and product performances	1-2
2 Sustainabili ty and Circular Materials	8	Theory	1.To understand the correlation between product sustainability and materials. 2.To get the importance of sustainability and environment with respect to materials' origins, energy consumption, fabrication process, recyclability, or compost ability. 3.To rich awareness of the needed circularity of materials and resources.	4
3 The Design- driven material innovation approach	8	Theory & Practices	1.To understand the relationship between the technical and sense-aesthetic dimensions of materials. 2. Learn how to apply the design-driven material innovation approach to enrich product experience.	2-3
4 Material innovation	2	Theory	1.To understand the role of material innovation in product design 2.To develop awareness of the current material innovation trends.	1-5

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号。

The column *Related to which Course Objective* can be filled in with the number of the corresponding course objective in Part II.

五、实践环节

V. Studio/Lab

实验编号 No.	实验名称 Subject Name	实验内容 Contents	教学方法 Teaching Methods	对课程目标的 支撑关系 Related to which Course Objective
1	Design-driven material innovation approach	Applying the Design-driven material innovation approach	workshop	2-3
2				
3				

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号

The column *Related to which Course Objective* can be filled in with the number of the corresponding course objective in Part II.

六、课外学时分配

VI. Extracurricular Practice

章节顺序	内容 Contents	参考学时 Credit Hours	对课程目标的 支撑关系 Related to which Course Objective
1			
2			
...			

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号。

The column *Related to which Course Objective* can be filled in with the number of the corresponding course objective in Part II.

七、考核方式及成绩构成

VII. Evaluation and Composition of Grades

平时： ___%, (包含: xxxx)

实验 (上机): ___%; (包含: xxx)

期末: ___%

e.g. ___% for usual performance (including xxxx),

___% for mid-term examinations (including xxxx)

and ___% for final examinations.

<本部分构成及考试方式可根据具体课程定制> Depending on the

course

大纲制定者: Marinella Ferrara

大纲审核者:

最后修订时间: _____年__月__日