

## 课程大纲

### COURSE SYLLABUS

1.	<b>课程代码/名称</b> <b>Course Code/Title</b>	<b>MSE5004 纳米材料学 Introduction to nanomaterials</b>
2.	<b>课程性质</b> <b>Compulsory/Elective</b>	专业选修课
3.	<b>课程学分/学时</b> <b>Course Credit/Hours</b>	2/32
4.	<b>授课语言</b> <b>Teaching Language</b>	英文/English
5.	<b>授课教师</b> <b>Instructor(s)</b>	程春 副教授
6.	<b>是否面向本科生开放</b> <b>Open to undergraduates or not</b>	否
7.	<b>先修要求</b> <b>Pre-requisites</b>	材料科学基础
8.	<b>教学目标</b> <b>Course Objectives</b>	
	<p>The purpose of this course is to provide a general background of the field of modern nanoscience and nanotechnology for undergraduate level students. Fundamental topics such as fundamentals of nanoscale chemistry and physics, nanoscale building-blocks, synthesis and characterization of nanomaterials, prototype devices based on nanomaterials will be introduced. This course also covers applications of various nanomaterials and devices in electronic, chemical, biological, medical, food industries.</p> <p>本课程是为了达到让本科阶段的学生了解现代纳米科学和技术通识背景的目的。一些基础专题诸如:纳米尺度物理化学基本原理, 纳米尺度结构单元, 纳米材料的合成与表征, 纳米材料的原型作品将会被一一介绍。这门课还包括各种纳米材料和器件在电子, 化学, 生物, 制药, 食品行业中的应用。</p>	
9.	<b>教学方法</b> <b>Teaching Methods</b>	
	<p>传统教师授课和开放式教学结合, 采用授课人提出的 334 加 1 的模式将课堂教学与实验, 特别是科研实践相结合的模式, 进行教学方法的创新, 培养学生的实践能力; 部分内容引入优质慕课课程在线完成教学;</p> <p>In the course, the traditional classroom teaching will be combined with open teaching. Specially, A novel "334+1" teaching mode that the instructor develops is applied in the course. It comprehensively connects the content teaching in course with the exploratory research in lab. This innovation in teaching method is expected to largely improve the practical ability of graduates. In additional, some content of the course will be self-taught by students through MOOC course online.</p>	
10.	<b>教学内容</b> <b>Course Contents</b>	
	<b>Section 1</b>	Introduction-I
	<b>Section 2</b>	Introduction-II
	<b>Section 3</b>	Synthesis and Fabrication of Nanomaterials-I
	<b>Section 4</b>	Synthesis and Fabrication of Nanomaterials-II
	<b>Section 5</b>	Nanoscale building-blocks-I
	<b>Section 6</b>	Nanoscale building-blocks-II
	<b>Section 7</b>	Characterization of Nanomaterials-I
	<b>Section 8</b>	Characterization of Nanomaterials-II

	<b>Section 9</b>	Characterization of Nanomaterials-III
	<b>Section 10</b>	Chemistry and Physics of Nanomaterials-I
	<b>Section 11</b>	Chemistry and Physics of Nanomaterials-II
	<b>Section 12</b>	Devices-I
	<b>Section 13</b>	Devices-II
	<b>Section 14</b>	Applications-I
	<b>Section 15</b>	Applications-II
	<b>Section 16</b>	Applications-III
<b>11.</b>	<b>课程考核 Course Assessment</b>	
	出勤 (Attendance) 5% + 课堂表现 (Class Performance) 5% +项目 (Projects) 90%	
<b>12.</b>	<b>教材及其它参考资料 Textbook and Supplementary Readings</b>	
	1.Nanostructures and Nanomaterials: Synthesis, Properties and Applications, G. Cao and Y. Wang, World Scientific Publishing Co., London, 2011. 2.纳米材料和器件导论 (第2版), 郭子政,时东陆编著, 清华大学出版社, 2010 3.Introduction to Nanoscience and Nanotechnology(kindle edition), Chris Binns, Wiley-Blackwell, 2010 4.Introduction to Nanoscience (kindle edition), Stuart Lindsay, OUP Oxford, 2009	