

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	MSE5010 有机与生物材料 Organic and Biological Materials
2.	课程性质 Compulsory/Elective	必修 Compulsory
3.	课程学分/学时 Course Credit/Hours	3/48
4.	授课语言 Teaching Language	双语 Bilingual
5.	授课教师 Instructor(s)	王湘麟 Prof. hsing-lin wang
6.	先修要求 Pre-requisites	有机化学、物理化学。高分子化学有学过更好，但非必须先修。 Organic chemistry, physical chemistry. Polymer chemistry is preferred, but not mandatory

7. 教学目标 Course Objectives

本课程将向研究生介绍当前有机、高分子及生物材料的广阔领域及其应用。专为有机/高分子化学、物理、生物化学、材料科学等专业的学生设计。这门学科的本质是这样的：课程有效整合有机化学、生物学和材料科学。学生的目的是掌握独特的物理和化学性质的有机聚合物（与无机材料），和生物材料及其用途，了解材料的结构和物理性质之间的关系，并利用各种表征技术，确定在不同的长度尺度下材料的结构与秩序。最后，本课程还介绍了有机和生物材料在化学和生物传感器，光学和电子器件中的应用。这些材料将展示他们如何实现在光电器件的国家的最先进的性能，并赋予其生物相容性和生物活性。在完成这门课程的学习后，学生们应该熟悉有机和生物材料的前沿研究课题，并能用批判性思维阅读文献

This class introduces graduate students to the broad field of current organic, polymer and biological materials and their applications. It is designed for students who have a basic background in organic/polymer chemistry, physics, biochemistry as well as materials science. The nature of this subject is such that the course must integrate organic chemistry, biology, and materials science. The purpose for students is to master unique physical and chemical properties of organic, polymeric (versus inorganic materials), and biological materials and their uses, to understand the relationship between materials' structure and physical properties, and to employ various characterization techniques to determine materials structure and order at various length scale. Finally, the course also introduces applications of organic and biological materials in chem- and biological sensors, optical and electronic devices. The materials will show how that they realize the state-of-the-art performance in opto-electrical devices and impart their biocompatibility and bioactivity. After finishing the study of this class, the students are expected to be familiar with the frontier research topics in organic and biological materials and can read the literature with critical thinking.

8. 教学方法 Teaching Methods

- 1) 每单周一次 Lecture， 双周两次 Lectures;
- 2) 理论课程和视频录像： Theoretical courses and video demos
- 3) 学生学术报告一次 40 分钟： Presentation

该课程旨在让学生掌握有机和生物材料的基本知识。同时，它是在该领域的前沿研究课题紧密结合，更重要的是，班上的很大一部分将用于在 MSE 在南方科技大学部学院的研究领域，如有机光电材料及其在有机电子器件中的应用，以及生物材料生物医学中的应用。要求学生熟悉有机电子和生物医学。除了理论研究外，学生将参与前沿研究。目前 MSE 的研究设施为学生提供出色的平台进行此方面研究。

The class is designed for students to master the fundamental knowledge in organic and biological materials. At mean time, it is tightly combined with frontier research topics in the field, and more importantly, a significant portion of the class will be devoted to the field of faculty research in the department of MSE at SUSTC, such as organic opto-electrical materials and their application in organic electronic device, as well as the application of

biological materials in biomedical. The student is required to be familiar with organic electronics and biomedical. Except to the theoretical study, the students will be highly encouraged to participate in frontier research. The current research facility at MSE provides the students excellent platform to carry out such research.

9. 教学内容 Course Contents

Section 1	有机与生物材料总论 (1周) Organic and biological materials (1 weeks)
Section 2	有机与高分子材料的化学合成 (2周) Chemical synthesis of organic and polymeric materials (2 weeks)
Section 3	导电高分子材料 (2周) Conductive polymer materials (2 weeks)
Section 4	有机半导体材料 (3周) Organic semiconductor materials (3 weeks)
Section 5	有机纳米材料 (2周) Organic nanomaterials (2 weeks)
Section 6	生物材料 (2周) Biomaterials (2 weeks)
Section 7	化学和生物传感器 (2周) Chemical and biological sensors (2 weeks)
Section 8	论文讨论 (2周) Discussion (2 weeks)

10. 课程考核 Course Assessment

课堂表现: 20%+ 期中考试: 20%+ 期末考试: 30%+ 论文与答辩: 20%
Attendance (20%)+ Midterm examination (20%) + Final exam (30%) + Oral defense (20%)

11. 教材及其它参考资料 Textbook and Supplementary Readings

1. Principles of Polymerization, Fourth ed., Odian, G.
2. Organic Electronics Materials, Manufacturing and Applications, Edited by Hagen Klauk Wiley-VCH, ISBN-13978-3-527-31264-1
3. Organic Light-Emitting Devices: Synthesis, Properties, and Application, Wiley-VCH, 2006
4. 《功能高分子材料》, 赵文元主编, 化学工业出版社, 2011年
5. 《生物材料概论》, 冯庆玲, 清华大学出版社, 2009年