

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

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| 1. | 课程名称 Course Title | 生物医学工程（二）Biomedical Engineering II |
| 2. | 授课院系 Originating Department | 生物医学工程系 Department of Biomedical Engineering |
| 3. | 课程编号 Course Code | BMEB314 |
| 4. | 课程学分 Credit Value | 3 |
| 5. | 课程类别 Course Type | 专业核心课 Major Core Courses |
| 6. | 授课学期 Semester | 春季 Spring |
| 7. | 授课语言 Teaching Language | 英文 English |
| 8. | 授课教师、所属学系、联系方式 Instructor(s), Affiliation & Contact (For team teaching, please list all instructors) | 李凯，生物医学工程系，副教授 Kai Li, Biomedical Engineering, Associate Professor, lik@sustech.edu.cn |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 待公布 To be announced |
| 10. | 选课人数限额(可不填) Maximum Enrolment (Optional) | |

| 11. 授课方式 Delivery Method | 讲授 Lectures | 习题/辅导/讨论 Tutorials | 实验/实习 Lab/Practical | 其它(请具体注明) Other (Please specify) | 总学时 Total |
|-----------------------------|----------------|-----------------------|------------------------|-------------------------------------|--------------|
| 学时数 Credit Hours | 48 | | | | 48 |

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| 12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | 生物医学工程（一）Biomedical Engineering I |
| 13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite | 无 None |
| 14. 其它要求修读本课程的学系 Cross-listing Dept. | |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

To introduce students to classical and modern biomaterials as well as their applications in functional tissue engineering. To attain a holistic appreciation of the various disciplines within biomaterials and tissue engineering and to develop the ability to apply concepts to various problems.

本课程将为学生介绍经典和现代生物材料在功能性组织工程领域中的应用研究，并为学生介绍该涵盖了多学科交叉的研究领域，以培养其解决实践问题的能力。

16. 预达学习成果 Learning Outcomes

Through this course, the students should be able to understand the biological requirement for designed tissue engineering systems (e.g., scaffold); fabricate multicomponent biomaterials using advanced manufacturing technologies; design diagnostic and therapeutic materials systems.

通过本课程的学习，学生可以得到多方面能力的锻炼，包括理解如何设计具有良好生物兼容性的材料体系，如植入支架等；利用现代加工技术制备多功能的生物材料；设计用于疾病诊断与治疗的体系。

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

- Lecture 1: 现代生物材料导论 Introduction to Modern Biomaterials (3 学时)
- Lecture 2: 生物材料表面修饰 Biomaterials Surface (3 学时)
- Lecture 3: 聚合物生物材料 Polymeric Biomaterials (3 学时)
- Lecture 4: 可生物降解聚合物: 化学、降解和应用 Biodegradable Polymers: Chemistry, Degradation and Applications (3 学时)
- Lecture 5: 合成橡胶在心病学中的应用 Elastomers and Applications in Cardiology (3 学时)
- Lecture 6: 中空纤维、水凝胶及其应用 Hollow Fibers, Hydrogels, and their Applications (3 学时)
- Lecture 7: 金属材料与骨移植 Metal Materials and Bone Grafting (3 学时)
- Lecture 8: 玻璃、陶瓷、医用粘合剂和密封剂 Glasses, Ceramics, Medical Adhesives and Sealants (3 学时)
- Lecture 9: 从生物材料到医疗器械 From Biomaterials to Medical Devices (3 学时)
- Lecture 10: 药物供给 Drug Delivery (3 学时)
- Lecture 11: 组织工程导论 Introduction to Tissue Engineering (3 学时)
- Lecture 12: 细胞结构 Cell Culture (3 学时)
- Lecture 13: 冷冻保存 Cryopreservation (3 学时)
- Lecture 14: 骨组织工程 Tissue Engineering for Orthopaedics (3 学时)
- Lecture 15: 皮肤和血管组织工程 Tissue Engineering for Skin and Blood Vessels (3 学时)
- Lecture 16: 功能化组织工程在生物医学工程学科的应用 Functional Tissue Engineering for Biomedical Applications (3 学时)

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

- Introduction to Biomedical Engineering (3rd Ed.), Enderle JD, Bronzino J (eds.), Academic Press, 2011.
- Biomaterials for Tissue Engineering: Methods and Protocols (Methods in Molecular Biology), (1st Ed.), Humana Press 2018.
- Introduction to Biomaterials: Basic Theory with Engineering Applications (1st Ed.), 2013, Cambridge University Press 2013.

课程评估 ASSESSMENT

| 19. 评估形式 Type of Assessment | 评估时间 Time | 占考试总成绩百分比 % of final score | 违纪处罚 Penalty | 备注 Notes |
|--------------------------------|--------------|-------------------------------|-----------------|-------------|
| 出勤 Attendance | | 10 | | |
| 课堂表现 | | 10 | | |

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| Class Performance | | | | |
| 小测验 Quiz | | | | |
| 课程项目 Projects | | | | |
| 平时作业 Assignments | | 10 | | |
| 期中考试 Mid-Term Test | | | | |
| 期末考试 Final Exam | | 70 | | |
| 期末报告 Final Presentation | | | | |
| 其它（可根据需要 改写以上评估方式） Others (The above may be modified as necessary) | | | | |

20. 记分方式 **GRADING SYSTEM**

A. 十三级等级制 **Letter Grading**
 B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 **REVIEW AND APPROVAL**

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority

