# 课程大纲
# COURSE SYLLABUS

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| **1.** | **课程代码/名称**<br>**Course Code/Title** | **ESE5022 环境生物技术**<br>**Environmental Biotechnology** |
| **2.** | **课程性质**<br>**Compulsory/Elective** | 专业选修课 |
| **3.** | **课程学分/学时**<br>**Course Credit/Hours** | 3/48 |
| **4.** | **授课语言**<br>**Teaching Language** | 中/英文 |
| **5.** | **授课教师 Instructor(s)** | 刘崇炫 |
| **6.** | **先修要求**<br>**Pre-requisites** | 无 |

**7. 教学目标 Course Objectives**

a. To understand fundamental principles associated with modern biotechnologies for environmental quality-control;
b. To construct quantitative models based on the fundamental principles for describing microbiological processes;
c. To apply the quantitative models for linking fundamental principles and biotechnological application cases.
a. 掌握现代环境生物技术原理；
b. 以环境生物技术原理为基础，建立描述微生物过程的定量模型；
c. 运用定量模型建立环境生物技术基本原理与环境生物技术案例间的联系。

**8. 教学方法 Teaching Methods**

Class participation, Group discussion 课堂讲授和课堂讨论

**9. 教学内容 Course Contents**

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| **Section 1** | Basics of Microbiology for Biotechnologies (6) 环境生物技术的微生物基础 |
| **Section 2** | Bacterial Energetics and Stoichiometry (8) 微生物代谢、能力转换和化学计量 |
| **Section 3** | Microbial Kinetics and Regulation Theory (4) 微生物动力学和控制理论 |
| **Section 4** | Biofilm Kinetics and Reactors (4) 生物膜动力学和反应器 |
| **Section 5** | Review and Mid-exam (2) 练习和期中考试 |
| **Section 6** | Wastewater Treatment Biotechnologies (8) 水处理生物技术 |
| **Section 7** | Emerging Biotechnologies for Resource Recovery (2) 资源回收生物技术 |
| **Section 8** | Soil and Groundwater Bioremediation (2) 土壤和地下水生物修复技术 |
| **Section 9** | Biogeochemical Cycling of Elements and Modeling (2) 元素生物地球化学循环和模拟 |
| **Section 10** | Environmental Biotechnology Application Cases (10) 环境生物技术应用实例 |

**10. 课程考核 Course Assessment**

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| | Attendance：10%<br>Homework：20%<br>Mid-exam：30%<br>Final presentation & report：40%<br>出席率和课堂讨论：10%<br>作业：20%<br>期中考：30%<br>环境生物技术应用实例报告 40% |
| **11.** | **教材及其它参考资料 Textbook and Supplementary Readings** |
| | 1、Textbook:<br>Environmental Biotechnology, Principles and Applications by Bruce Rittman and Perry McCarty; McGraw-Hill, 2001.<br>2、Supplementary Readings:<br>Biology of Microorganisms; Brook et al. |