

# 课程大纲

## COURSE SYLLABUS

1.	<b>课程代码/名称</b> <b>Course Code/Title</b>	环境生物分析化学/ <b>Environmental Bioanalytical Chemistry</b>
2.	<b>课程性质</b> <b>Compulsory/Elective</b>	专业核心课/Compulsory
3.	<b>开课单位</b> <b>Offering Dept.</b>	环境科学与工程学院/School of Environmental Science and Engineering
4.	<b>课程学分/学时</b> <b>Course Credit/Hours</b>	3 学分/3 Credits
5.	<b>授课语言</b> <b>Teaching Language</b>	中英双语/English&Chinese
6.	<b>授课教师</b> <b>Instructor(s)</b>	张斌田/Bintian Zhang
7.	<b>开课学期</b> <b>Semester</b>	秋季学期/Autumn Semester
8.	<b>是否面向本科生开放</b> <b>Open to undergraduates or not</b>	否/No
9.	<b>先修要求</b> <b>Pre-requisites</b>	无/None
10.	<b>教学目标</b> <b>Course Objectives</b>	
	<ol style="list-style-type: none"> <li>1. 了解生物分析化学的基本概念和原理 (Understand the basic concepts and principles of bioanalytical chemistry)</li> <li>2. 掌握最前沿的生物分析技术 (Learn the cutting-edge bioanalytical technologies)</li> <li>3. 学会用生物分析化学的工具去解决一些环境科学的问题 (Know how to use bioanalytical chemistry tools to solve environmental problems)</li> </ol>	
11.	<b>教学方法</b> <b>Teaching Methods</b>	
	课堂讲授及讨论/案例学习及讨论 Lecture and Discussion/Cases Study and Discussion (Student Presentations)	
12.	<b>教学内容</b> <b>Course Contents</b> (如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)	
	<b>Section 1</b>	生物分子与生物分析 (Biomolecules and bioanalysis) <ul style="list-style-type: none"> <li>• 教学大纲 (Syllabus)</li> <li>• 生物分子及生物分析化学的基本概念 (Basic concepts of biomolecules and bioanalytical chemistry)</li> </ul>
	<b>Section 2</b>	生物样品的制备 (Preparation of biological sample) <ul style="list-style-type: none"> <li>• 介绍常用的生物样品制备技术 (Introduction of the commonly used technologies for the preparation of biological samples)</li> </ul>
	<b>Section 3</b>	用于生物分析的色谱技术 (Chromatography for bioanalysis) <ul style="list-style-type: none"> <li>• 色谱技术的原理 (Principle of chromatography)</li> </ul>

	<ul style="list-style-type: none"> <li>• 色谱技术的生物分析应用 (Application of chromatography for bioanalysis)</li> </ul>
<b>Section 4</b>	生物质谱 (Mass spectrometry for bioanalysis) <ul style="list-style-type: none"> <li>• 质谱技术的原理 (Principle of mass spectrometry)</li> <li>• 生物质谱的应用 (Application of Bio-MS)</li> </ul>
<b>Section 5</b>	电泳技术 (Electrophoresis) <ul style="list-style-type: none"> <li>• 电泳的基本原理和理论 (Principle and theory of electrophoresis)</li> <li>• 凝胶电泳 (Gel electrophoresis)</li> <li>• 毛细管电泳 (Capillary electrophoresis)</li> </ul>
<b>Section 6</b>	微流控和芯片实验室 (Microfluidic and Lab on a chip) <ul style="list-style-type: none"> <li>• 微流控芯片原理 (Principle of microfluidic device)</li> <li>• 芯片实验室的概念 (Concept of lab on a chip)</li> <li>• 微流控芯片的应用 (Application of microfluidic for bioanalysis)</li> </ul>
<b>Section 7</b>	免疫分析与分子印迹技术 (Immunoassay and molecular imprinting technologies) <ul style="list-style-type: none"> <li>• 免疫分析技术的原理 (Principle of immunoassay)</li> <li>• 分子印迹技术的原理 (Principle of molecular imprinting technology)</li> <li>• 免疫分析及分子印迹技术的应用 (Application of immunoassay and imprinting technology)</li> </ul>
<b>Section 8</b>	生物传感器 (Biosensors) <ul style="list-style-type: none"> <li>• 生物传感器的概念和原理 (Concept and principle of biosensors)</li> <li>• 生物传感器的应用 (Application of biosensors)</li> </ul>
<b>Section 9</b>	DNA 分析及测序技术 (DNA analysis and sequencing technology) <ul style="list-style-type: none"> <li>• 核酸的提取和分离 (Extraction and isolation of Nucleic Acids)</li> <li>• 核酸的扩增 (Nucleic Acid amplification)</li> <li>• DNA 测序技术 (DNA sequencing technology)</li> </ul>
<b>Section 10</b>	蛋白质分析及测序技术 (Protein analysis and sequencing technology) <ul style="list-style-type: none"> <li>• 蛋白质分析技术 (Technologies for protein analysis)</li> <li>• 蛋白质测序技术 (Protein sequencing technology)</li> </ul>
<b>Section 11</b>	蛋白质组分析与环境科学 (Proteomic analysis and environmental science) <ul style="list-style-type: none"> <li>• 蛋白质组分析的策略 (Strategy of proteomic analysis)</li> <li>• 蛋白质组分析的环境科学应用 (Application of proteomics in environmental science)</li> </ul>
<b>Section 12</b>	代谢组学与环境科学 (Metabolomics and environmental science) <ul style="list-style-type: none"> <li>• 代谢组学的概念 (Concept of metabolomics)</li> <li>• 代谢组学的环境科学应用 (Application of metabolomics in environmental science)</li> </ul>
<b>Section 13</b>	生物信息学与计算毒理学 (Bioinformatics and computational toxicology) <ul style="list-style-type: none"> <li>• 生物信息学的概念和应用 (Concept and application of bioinformatics)</li> <li>• 计算毒理学的概念和应用 (Concept and application of computational toxicology)</li> </ul>
<b>Section 14</b>	细胞分析化学 (Cell analysis) <ul style="list-style-type: none"> <li>• 细胞分析技术 (Technologies for cell analysis)</li> <li>• 细胞分析的环境科学应用 (Application of cell analysis in environmental science)</li> </ul>
<b>Section 15</b>	案例和讨论 (Case study and discussion) <ul style="list-style-type: none"> <li>• 学生报告 (Student Presentation)</li> </ul>
<b>Section 16</b>	案例和讨论 (Case study and discussion) <ul style="list-style-type: none"> <li>• 学生报告 (Student Presentation)</li> </ul>

<b>13.</b>	<b>课程考核</b> <b>Course Assessment</b>
	<b>Course Grading</b> <ol style="list-style-type: none"> <li>1. Participation : 20% (不定期点名四次)</li> <li>2. Homework : 20% (平时作业四次)</li> <li>3. Project (项目) : 40% (主题 Presentation 一次)</li> <li>4. Final exam: 20% (开卷考试)</li> </ol>
<b>14.</b>	<b>教材及其它参考资料</b> <b>Textbook and Supplementary Readings</b>
	<ol style="list-style-type: none"> <li>1. Bioanalytical Chemistry, Susan R. Mikkelsen, Eduardo Cort ón, Wiley (2nd edition), 2016</li> <li>2. 生物分析化学, 鞠焜先等, 科学出版社, 2007</li> </ol>