

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	质谱技术在环境领域的应用 Application of Mass Spectrometry in Environmental Field
2.	课程性质 Compulsory/Elective	专业选修课
3.	课程学分/学时 Course Credit/Hours	3/48
4.	授课语言 Teaching Language	中文/英文
5.	授课教师 Instructor(s)	郑国贸
6.	先修要求 Pre-requisites	无
7.	教学目标 Course Objectives	
	<p>Application of Mass Spectrometry in Environmental Field is set for the graduates who major in Environmental Science and Engineering. It is an optional course and the total hour is 48. The objectives of this course are to help students (1) master basic knowledge of mass spectrometry, such as GC/LC-MS, GC/LC-MS/MS, high-resolution mass spectrometry, imaging mass spectrometry; and (2) learn how to apply basic theories and methods of mass spectrometry to analyze environmental problems related to xenobiotics and endogenous chemicals and to develop solutions incorporated with exposome and metabolomics for addressing the problems.</p> <p>质谱技术在环境领域的应用是为环境科学与工程专业的研究生课程设定的。专业选修课程，总时间是 48 小时。本课程的目标是（1）帮助学生掌握质谱技术的基本原理，如气相/液相色谱质谱联用，串联质谱，高分辨质谱，成像质谱等；（2）学习如何应用质谱技术来分析环境中的外源污染物以及与生命健康相关的内源小分子，结合暴露组学和代谢组学制定解决问题的方案。</p>	
8.	教学方法 Teaching Methods	
	<p>课堂教学与科研探讨，科技论文写作的形式相结合，注重培养学生综合应用知识的能力。</p> <p>Combination of classroom teaching and scientific research, study of scientific and technical papers, pay attention to cultivate students' comprehensive application of knowledge.</p>	
9.	教学内容 Course Contents	
	Section 1	<p>General introduction to mass spectrometry (小计: 1 学时)</p> <p>质谱技术介绍</p> <p>(1) The development of mass spectrometry globally (0.5 学时)</p> <p>质谱技术的发展</p> <p>(2) The objective, content and requirements of this course (0.5 学时)</p> <p>课程目标、内容和要求</p>

Section 2	Principles of mass spectrometry (小计: 10 学时) 质谱分析技术基本原理 (1) Ionization (1 学时) 离子化方法 (2) Mass analyzer (2 学时) 质量分析器 (3) Tandem mass spectrum (2 学时) 串联质谱分析 (4) Mass spectrometry coupled with separation techniques (3 学时) 质谱与分离技术的结合 (5) Detector and instrumental control system (2 学时) 检测与仪器控制系统
Section 3	Application of mass spectrometry in determining pollutants (小计 12 学时) 质谱技术在污染物监测的应用 (1) Organic pollutants (1 学时) 有机污染物的种类 (2) Pre-treatment methods of environmental samples and biological samples (2 学时) 环境样品以及生物样品的前处理流程 (3) Application of GC-MS (3 学时) 气相色谱质谱的应用 (4) Application of LC-MS (3 学时) 液相色谱质谱的应用 (5) Quantification (3 学时) 定量分析方法
Section 4	Application of mass spectrometry in exposome (小计 10 学时) 质谱技术在暴露组学的应用 (1) The development of exposome (1 学时) 暴露组学的发展 (2) Application of GC-QTOF/Orbitrap (3 学时) 气相高分辨质谱的应用 (3) Application of LC-QTOF/Orbitrap (3 学时) 液相高分辨质谱的应用 (4) Data analysis (3 学时) 数据解析
Section 5	Application of mass spectrometry in metabolomics (小计 10 学时) 质谱技术在代谢组学的应用 (1) The development of metabolomics (1 学时) 代谢组学的发展 (2) Application of GC-QTOF/Orbitrap (3 学时) 气相高分辨质谱的应用 (3) Application of LC-QTOF/Orbitrap (3 学时) 液相高分辨质谱的应用 (4) Data analysis (3 学时) 数据解析
Section 6	Presentation and Discussion (小计 5 学时) 做演讲与报告
10. 课程考核 Course Assessment	
演讲 50%+期末报告 50%, Course presentation: 50%, final report: 50%.	
11. 教材及其它参考资料 Textbook and Supplementary Readings	
1、《质谱分析技术原理与应用》，台湾质谱学会，2018，科学出版社，ISBN: 9787030592040。	