

课程大纲 COURSE SYLLABUS

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| 1. | 课程代码/名称 Course Code/Title | 持久性有机污染物的环境健康效应 Environmental health effects of persistent organic pollutants | | | | |
| 2. | 课程性质 Compulsory/Elective | 专业选修课 Professional Elective Courses | | | | |
| 3. | 开课单位 Offering Dept. | 环境科学与工程学院 School of environmental science and Engineering | | | | |
| 4. | 课程学分/学时 Course Credit/Hours | 2/32 | | | | |
| 5. | 授课语言 Teaching Language | 中英双语 English & Chinese | | | | |
| 6. | 授课教师 Instructor(s) | 裘文慧 | | | | |
| 7. | 开课学期 Semester | 秋季 Fall | | | | |
| 8. | 是否面向本科生开放 Open to undergraduates or not | 否 No | | | | |
| 9. | 先修要求 Pre-requisites | 无 None | | | | |
| 10. | 教学目标 Course Objectives | <p>本课程的目标是使学生熟悉持久性有机污染物与环境健康之间的相互联系，增强学生保护环境意识。通过本课程的学习，使学生了解持久性有机污染物的环境行为特征，以及持久性有机污染物从环境介质进入生物体的方式和途径；熟悉持久性有机污染物对生物体包括人体健康的影响及其影响机理，从个体到细胞和分子水平解释持久性有机污染物与健康的响应关系。本课程力图通过系统性和生动性的知识讲授，使学生掌握基本的环境和健康的科学知识，培养基本的环境科学素养和环境保护意识。</p> <p>The goal of the course of “Environmental health effects of persistent organic pollutants” is to make students familiar with the relationship between persistent organic pollutants and environmental health, and enhance students' awareness of environmental protection. Through the study of this course, students can understand the environmental behaviour characteristics of persistent organic pollutants and the ways and means of persistent organic pollutants entering organisms from environmental media; Be familiar with the impact of persistent organic pollutants on organisms including human health and its impact mechanism, and explain the response relationship between persistent organic pollutants and health from individual to cellular and molecular level. Through systematic and vivid knowledge teaching, this course aims to enable students to master basic environmental and health scientific knowledge and cultivate basic environmental scientific literacy and environmental protection awareness.</p> | | | | |
| 11. | 教学方法 Teaching Methods | | | | | |
| | 授课方式 Teaching 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 |

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|-------------------------------------|--|----|---|---|----|
| <p>学时数 Credit Hours</p> | 22 | 10 | 0 | 0 | 32 |
| <p>12. 教学内容 Course Contents</p> | | | | | |
| <p>Section 1</p> | <p>持久性有机污染物（POPs）的生态毒理学研究历程与进展 Research process and progress of ecotoxicology of persistent organic pollutants (POPs) 简述 POPs 生态毒理学的研究历程和研究进展，展望 POPs 生态毒理与健康效应研究的发展趋势 This chapter briefly describes the research process and progress of POPs ecotoxicology, and looks forward to the development trend of POPs ecotoxicology and health effects</p> | | | | |
| <p>Section 2</p> | <p>化学物质剂量效应关系 Dose effect relationship of chemical substances 概述化学物质的剂量-效应关系，剂量-效应曲线模型，剂量-效应的置信区间 This chapter summarizes the dose-effect relationship of chemicals, dose-effect curve model and dose-effect confidence interval</p> | | | | |
| <p>Section 3</p> | <p>联合毒性效应 Combined toxic effect 概述混合物的加和参考模型，重点评估混合物的毒性 This chapter summarizes the addition and reference model of the mixture, focusing on the evaluation of the toxicity of the mixture</p> | | | | |
| <p>Section 4</p> | <p>POPs 的生物吸收和转化 Bioabsorption and transformation of POPs 概述 POPs 的生物吸收和转运，生物转化和代谢，生物富集过程，POPs 的生物有效性，沿食物链的迁移 This chapter summarizes the bioabsorption and transport of POPs, biotransformation and metabolism, bioconcentration process, bioavailability of POPs, and migration along the food chain</p> | | | | |
| <p>Section 5</p> | <p>POPs 的遗传毒性 Genotoxicity of POPs 概述 POPs 的遗传毒性，POPs 导致的遗传物质损伤，氯酚类污染物诱发基因点突变的效应研究，多世代毒性效应 This chapter summarizes the genotoxicity of POPs, genetic material damage caused by POPs, the effect of chlorophenols on gene point mutation, and multi generation toxicity</p> | | | | |
| <p>Section 6</p> | <p>基于课程主题“POPs 遗传毒性”的小组汇报讨论 Group report and discussion based on the subject of the genotoxicity of POPs 学生关于“POPs 遗传毒性”进行案例讨论 An independent case discussion on "the genotoxicity of POPs " between students</p> | | | | |

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| Section 7 | <p>POPs 的生殖发育毒性 Reproductive and developmental toxicity of POPs POPs 对生殖能力的影响, POPs 的致畸性, POPs 对生物发育进程的影响 This chapter summarizes the impact of POPs on reproductive ability, teratogenicity of POPs and the impact of POPs on biological development process</p> |
| Section 8 | <p>基于课程主题“POPs 生殖发育毒性”的小组汇报讨论 Group report and discussion based on the subject of the reproductive and developmental toxicity of POPs 学生关于“POPs 的生殖发育毒性”进行案例讨论 An independent case discussion on "the reproductive and developmental toxicity of POPs" between students</p> |
| Section 9 | <p>POPs 的神经发育毒性 Neurodevelopmental toxicity of POPs 概述 POPs 的神经毒性, 体外研究中 POPs 的神经细胞毒性, POPs 的神经行为毒理学效应, POPs 的神经发育毒性 This chapter summarizes the neurotoxicity of POPs, the neurocytotoxicity of POPs in vitro, the neurobehavioral toxicological effects of POPs, and the neurodevelopmental toxicity of POPs</p> |
| Section 10 | <p>基于课程主题“POPs 神经发育毒性”的小组汇报讨论 Group report and discussion based on the subject of the neurodevelopmental toxicity of POPs 学生关于“POPs 的神经发育毒性”进行案例讨论 An independent case discussion on "the neurodevelopmental toxicity of POPs" between students</p> |
| Section 11 | <p>POPs 的免疫毒性 Immunotoxicity of POPs 综述免疫毒理学的定义和发展, 免疫毒性的评价和作用机制, 典型 POPs 的免疫毒性研究进展 This chapter summarizes the definition and development of immunotoxicology, the evaluation and mechanism of immunotoxicity, and the research progress of immunotoxicity of Typical POPs</p> |
| Section 12 | <p>基于课程主题“POPs 免疫毒性”的小组汇报讨论 Group report and discussion based on the subject of the immunotoxicity of POPs 学生关于“POPs 的免疫毒性”进行案例讨论 An independent case discussion on "the immunotoxicity of POPs" between students</p> |
| Section 13 | <p>POPs 的内分泌干扰效应 Endocrine disrupting effects of POPs 概述内分泌系统, 内分泌干扰效应的作用机制, POPs 的内分泌效应 This chapter summarizes the endocrine system, the mechanism of endocrine interference effect and the endocrine effect of POPs</p> |
| Section 14 | <p>基于课程主题“POPs 内分泌干扰效应”的小组汇报讨论 Group report and discussion based on the subject of the endocrine disrupting effects of POPs 学生关于“POPs 的内分泌干扰效应”进行案例讨论</p> |

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| | An independent case discussion on "the endocrine disrupting effects of POPs" between students |
| Section 15 | 免疫-神经-内分泌交互作用 Immune neuroendocrine interaction 概述神经系统与免疫系统的相互作用，内分泌系统与免疫系统的相互作用，神经系统与内分泌系统的相互作用 This chapter summarizes the interaction between nervous system and immune system, the interaction between endocrine system and immune system, and the interaction between nervous system and endocrine system |
| Section 16 | 高通量测试技术与有害结局路径 High throughput testing technology and harmful outcome path 概述高通量测试技术，有害结局路径的构建，集成测试技术 This chapter summarizes high-throughput testing technology, the construction of harmful outcome path, and integrated testing technology |

13. 课程考核
Course Assessment

| 课程评估 ASSESSMENT | | | | | |
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| 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 | 每周 Every Week | 10% | | |
| √ | 课堂表现 Class Performance | 每周 Every Week | 40% | | |
| | 小测验 Quiz | | | | |
| | 课程项目 Projects | | | | |
| √ | 平时作业 Assignments | 16 周 Week 16 | 20% | | |
| | 期中考试 Mid-Term Test | | | | |
| | 期末考试 Final Exam | | | | |
| √ | 期末报告 Final Presentation | 16 周 Week 16 | 30% | | |
| | 其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary) | | | | |

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

教材 Textbook

[1] 《持久性有机污染物的生态毒理学》，尹大强，科学出版社，2019
《Environmental Health Effects of Persistent Organic Pollutants》，Yin, D.Q, Science Publishing House, 2019

参考资料 Supplementary Readings

- [2] 《持久性有机污染物的分析方法和检测技术》，张庆华，科学出版社，2021
《Analytical Methods and Detection Techniques of Persistent Organic Pollutants》，Zhang, Q.H, Science Publishing House, 2021
- [3] 《持久性有机污染物内分泌干扰效应》，周炳升，科学出版社，2018
《Endocrine Disrupting Effects Of Persistent Organic Pollutants》，Zhou, B.S, Science Publishing House, 2018
- [4] 《Persistent Organic Pollutants》，Lynch, Kaleb, Larsen and Keller Education, 2017