

## 环境工程原理 (ESE204) 课程大纲

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- 2、2019 秋季学期——2023 秋季学期 5-8 页

## 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.

1.	<b>课程名称</b> <b>Course Title</b>	环境工程原理 <b>Principles of Environmental Engineering</b>
2.	<b>授课院系</b> <b>Originating Department</b>	环境科学与工程学院 School of Environmental Science and Engineering
3.	<b>课程编号</b> <b>Course Code</b>	ESE204
4.	<b>课程学分</b> <b>Credit Value</b>	2
5.	<b>课程类别</b> <b>Course Type</b>	专业基础课 Major Fundamental Courses
6.	<b>授课学期</b> <b>Semester</b>	秋季 Fall
7.	<b>授课语言</b> <b>Teaching Language</b>	中文 Chinese
8.	<b>授课教师、所属学系、联系方式</b> (如属团队授课, 请列明其他授课教师) <b>Instructor(s), Affiliation &amp; Contact (For team teaching, please list all instructors)</b>	授课教师: 裘文慧, 环境科学与工程学院, 13534188125, qiuwh@sustech.edu.cn Instructor: Wenhui Qiu, School of Environmental Science and Engineering; Tel: 13534188125; Email: qiuwh@sustech.edu.cn
9.	<b>实验员/助教、所属学系、联系方式</b> <b>Tutor/TA(s), Contact</b>	
10.	<b>选课人数限额(可不填)</b> <b>Maximum Enrolment (Optional)</b>	

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
	28		4	0	32
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	先修课 Pre-requisites: 大学物理 General Physics, 化学原理 General Chemistry				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	水处理工程 Water Treatment Engineering, 大气污染与防治 Atmospheric Pollution Prevention and Control, 固体废物处理处置与资源化 Solid Waste Treatment, Disposal and Recycling				
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 N/A				

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

《环境工程原理》是环境工程、环境科学、给水排水工程等相关专业的主干专业基础课，主要讲述水处理工程、大气污染控制工程、固体废弃物处理处置工程等环境污染控制以及生态修复工程中涉及的具有共性的基本现象和基本过程的基本原理。主要内容包括物理的分离过程原理、生物化学反应工程原理、环境工程前沿技术四部分。分离过程原理部分主要讲述沉淀、过滤、吸收、吸附的基本原理。反应工程原理部分讲述化学和生物修复的概念、先进技术、工程技术的应用等。环境工程前沿技术部分讲述了水处理前沿工艺、环境污染物在生态系统的行为、全球变化及其对生物影响、可持续发展前沿。其中，环境工程原理基础部分的热量和质量传递、流体流动、分离过程原理部分的离子交换、萃取和膜分离、以及反应工程原理部分因为课时限制，作为自学内容。

"Principles of environmental engineering" is the main basic course for environmental engineering, environmental science, and water supply and drainage engineering. This course focuses on the basic principles of basic phenomena and basic process, which are the commonness principles involved in water treatment engineering, air pollution control engineering, solid waste disposal engineering, and ecological restoration engineering. The main content includes three parts: principle basis of environmental engineering, principle of separation process and principle of reaction engineering. The basic part of environmental engineering principle mainly describes the principle of material and energy conservation, transfer process, etc. The principle part of separation process mainly describes the basic principles of precipitation, filtration, absorption and adsorption. Reaction engineering principles section describes chemistry and microbial reaction metrology, kinetics, process analysis of various reactors, etc.

#### 16. 预达学习成果 Learning Outcomes

《环境工程原理》从理论上系统、深入地阐述了水处理工程、大气污染控制工程、固体废弃物处理处置工程及生态修复工程等的原理、解决问题的思路和方法，为后续的专业课程学习打下良好的理论基础。

"Principles of environmental engineering" systematically and deeply expounds the basic principles, problem solving ideas and methods of water treatment engineering, air pollution control engineering, solid waste treatment and disposal engineering and ecological restoration engineering, from the perspectives of theory and application, aiming at laying a good theoretical foundation for the subsequent major courses of environmental engineering.

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.)**

序号 NO.	内容 Content	学时安排 Hours				学时汇总 Sub- total
		理论 Theoretic Teaching	实验 Experiment	实践 Exercise	上机操作 Computer Operation	
1	绪论 Introduction	2				2
2	物理分离过程 Physical Separation Engineering	2				2
3	化学反应工程 Chemical Reaction Engineering	2				2
4	生物反应工程 Biological Reaction Engineering	2				2
5	环境的生物修复 Bioremediation of the environment	4				4
6	水处理前沿 Water Treatment Technology	4				4
7	环境污染物在生态系统中的行为 The behavior of environmental pollutants in ecosystems	4				4
8	环境变化及其对生物的影响 Environmental changes and their impact on organisms	4				4
9	可持续发展 Sustainable development	4				4
10	实际工程案例参观 Actual project visit case			4		4
Total		28		4		32

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

1. 课程教材/Teaching Materials or Textbooks

环境工程原理（第3版），胡洪营、张旭、黄霞、王伟、席劲瑛 编著，高等教育出版社，2015年08月。

Environment, Organic Chemistry, Sornd Editwn, Schwarzenbach, R. P., Gschwend, P. M., Imboden, D.M., 2004年01月。

2. 主要参考书目/ References for Further Reading

环境工程原理习题集，胡洪营、张旭、黄霞 编著，高等教育出版社，2006年12月。

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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 Class Performance		10%		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		20%		
期中考试 Mid-Term Test		20%		
期末考试 Final Exam		40%		
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)				

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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

## 课程详述

### COURSE SPECIFICATION

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7.	授课语言 <b>Teaching Language</b>	中文 Chinese
8.	授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） <b>Instructor(s), Affiliation &amp; Contact (For team teaching, please list all instructors)</b>	授课教师：颜枫，环境科学与工程学院，15210586824，yanf@sustech.edu.cn Instructor: Feng YAN, School of Environmental Science and Engineering; Tel: 15210586824; Email: yanf@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 <b>Tutor/TA(s), Contact</b>	助教：李春艳，环境科学与工程学院，18290212176，11930293@mail.sustech.edu.cn TA: Chunyan LI, School of Environmental Science and Engineering; Tel: 18290212176; Email: 11930293@mail.sustech.edu.cn
10.	选课人数限额(可不填) <b>Maximum Enrolment (Optional)</b>	

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	32	2	0	0	32
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	先修课 Pre-requisites: 大学物理 General Physics, 化学原理 General Chemistry				
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14. 其它要求修读本课程的学系 Cross-listing Dept.	无 N/A				

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1	绪论 Introduction	2				2
2	质量衡算与能量衡算 Mass and Energy Balance	4				4
3	热量传递 Heat Transfer	4				4
4	质量传递 Mass Transfer	4				4
5	流体流动 Fluid Flow	2				2
6	沉降 Precipitation	4				4
7	过滤 Filtration	4				4
8	吸收 Absorption	4				4
9	吸附 Adsorption	4				4
10	复习答疑 Review and Answer Questions	0		0		0
Total		32				32

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课堂表现 Class Performance				
小测验 Quiz		10%		
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