南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

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.	**课程名称 Course Title**	工业水回用 Industrial Water Reuse
2.	**授课院系 Originating Department**	环境科学与工程学院 School of Environmental Science and Engineering
3.	**课程编号 Course Code**	ESE417
4.	**课程学分 Credit Value**	3 Credits
5.	**课程类别 Course Type**	专业选修课 Major Elective Courses
6.	**授课学期 Semester**	春季 Spring
7.	**授课语言 Teaching Language**	中英双语 English & 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） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	雷洋，环境科学与工程学院， leiy3@sustech.edu.cn, 15856558168
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

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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
	学时数 Credit Hours	40	4	0	4 企业走访参观学习	48

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	None
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	None
14.	其它要求修读本课程的学系 Cross-listing Dept.	None

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

1. 掌握工业水回用的基本知识、概念。

   Master the basic knowledge and concepts of industrial water reuse.

2. 了解不同的工业水处理应用领域，以及许多行业在其工业流程中采用水资源再利用的原因。

   Understand the different application areas of industrial water treatment and the reasons why many industries adopt water reuse in their industrial processes.

3. 使学生掌握工业水处理及回用技术的原理和分类，能够根据工业废水的特点合理选择水处理及回用技术方法。

   To enable students to master the principles and classification of industrial water treatment and reuse technology and reasonably choose water treatment and reuse technology methods according to the characteristics of industrial wastewater.

4. 使学生具备查阅和分析工业水处理及回用相关学术文献的能力。

   To enable students to have the ability to consult and analyze the academic literature related to industrial water treatment and reuse.

16. 预期学习成果 Learning Outcomes

课程结束后，预计学生会理解工业水回用的重要意义，熟知工业水回用的相关概念、原理和知识，掌握前沿的高级工业水处理及回用技术，能为不同工业客户提供工业水回用方案。

After the course, students are expected to understand the significance of water reuse in industry, master the basic concepts and principles, be familiar with various advanced industrial water treatment and reuse technologies, and provide water reuse solutions for multiple industries.

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.)

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第一章：工业废水污染概述 （2 课时）Chapter 1: Introduction to industrial water treatment and reuse (2 hours)

- 工业废水主要污染物及其排放标准（1 课时）Typical pollutants in industrial wastewater and the discharge standard (1 hour)
- 工业废水污染防治及回用的策略、进展（1 课时）Progress and strategy in industrial water treatment and reuse (1 hour)

第二章：清洁生产概述 （2 课时）Chapter 2: Overview of cleaner production: concept and methods (2 hours)

第三章：工业废水的处理和处置 （2 课时）Chapter 3: Industrial wastewater treatment and disposal (2 hours)

- 工业废水的净化再生与回用 （1 课时）Purification, regeneration and reuse of industrial wastewater (1 hour)
- 工业废水的处理和处置方式 （1 课时）Industrial wastewater treatment and disposal methods (1 hour)

第四章：工业废水处理技术及原理 (10 课时) Chapter 4: Industrial wastewater treatment technologies and their principles (10 hours)

- 工业废水水质和水量（2 课时）Quality and quantity of industrial wastewater (2 hours)
- 物理化学法（2 课时）Physicochemical methods (2 hours)
- 生物法（2 课时）Biological process (2 hours)
- 膜科学与技术（4 课时）Membrane science and technology (4 hours)

第五章：企业走访参观学习 （4 课时）Chapter 5: Visiting industries (4 hours)

第六章：电镀行业废水处理及回用（6 课时）Chapter 6: Water treatment and reuse in electroplating industry (6 hours)

- 电镀行业废水概述 （2 课时）Overview of wastewater production in electroplating industry (2 hours)
- 电镀行业清洁生产 （2 课时）Clean production in electroplating industry (2 hours)
- 电镀行业废水处理及回用技术 （2 课时）Water treatment and reuse technologies in the electroplating industry (2 hours)

第七章：纺织印染行业废水处理及回用（6 课时）Chapter 7: Wastewater treatment and reuse in textile printing and dyeing industry (6 hours)

- 纺织印染行行业废水概述 Overview of wastewater production in textile printing and dyeing industry (2 hours)
- 纺织印染行行业清洁生产 Clean production in textile printing and dyeing industry (2 hours)
- 纺织印染行业废水处理及回用技术 Water treatment and reuse technologies in textile printing and dyeing industry

第八章：养殖废水处理及资源回收（6 课时）Chapter 8: Livestock wastewater treatment and resource recovery (6 hours)

- 养殖行业废水概述（2 课时）Overview of livestock wastewater production (2 hours)
- 养殖行业清洁生产（2 课时）Clean production in livestock industry (2 hours)

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- 养殖行业废水处理及资源回收（2 课时）Livestock wastewater treatment and resources recovery (2 hours)

第九章：工业废水处理厂的设计 （4 课时）Chapter 9: Design of industrial wastewater treatment plant (4 hours)

- 工业废水处理厂的设计一 （2 课时）Design of industrial wastewater treatment plant: Part 1 (2 hours)
- 工业废水处理厂的设计二 （2 课时）Design of industrial wastewater treatment plant: Part 2 (2 hours)

第十章：学生海报展示及 PPT 汇报 （4 课时）Chapter 10: Poster and PPT presentations (4 hours)

第十一章：总结（2 课时） Chapter 11: Summary (2 hours)

序号 NO.	内容 Content	学时 Hours				汇总 Sub-total
		理论 Theoretic Teaching	实验 Experiment	实践 Exercise	上机操作 Computer Operation	
1	工业废水污染概述 Introduction to industrial water treatment and reuse	2				2
2	清洁生产概述 Overview of cleaner production: concept and methods	2				2
3	工业废水的处理和处置 Industrial wastewater treatment and disposal	2				2
4	工业废水处理技术及原理 Industrial wastewater treatment technologies and their principles	10				10
5	企业走访参观学习 Visiting industries			4		4
6	电镀行业废水处理及回用 Water treatment and reuse in electroplating industry	6				6
7	纺织印染行业废水处理及回用 Wastewater treatment and reuse in textile printing and dyeing industry	6				6
8	养殖废水处理及资源回收 Livestock wastewater treatment and resource recovery (6 hours)	6				6
9	工业废水处理厂的设	4				4

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	Design of industrial wastewater treatment plant					
10	学生海报展示及 PPT 汇报 Poster and PPT presentations	4				4
11	总结 Summary	2				2
总学时 Total		48				48

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

Edwards, Joseph D. *Industrial Wastewater Treatment*. CRC Press, 2019.

Ranade, Vivek V., and Vinay M. Bhandari. *Industrial wastewater treatment, recycling and reuse*. Butterworth-Heinemann, 2014.

Ng, Wun Jern. *Industrial wastewater treatment*. World Scientific, 2006.

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		0		
课程项目 Projects		30		
平时作业 Assignments		0		
期中考试 Mid-Term Test		0		
期末考试 Final Exam		0		
期末报告 Final Presentation		50		
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

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