

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.

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|-----|---|--|------------------------------|-------------------------------|--|---------------------|
| 1. | 课程名称 Course Title | 地下水模拟与应用 Applied Groundwater Modeling | | | | |
| 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 | ESE418 | | | | |
| 4. | 课程学分 Credit Value | 3 | | | | |
| 5. | 课程类别 Course Type | 专业选修课 Major Elective Courses | | | | |
| 6. | 授课学期 Semester | 秋季 Fall | | | | |
| 7. | 授课语言 Teaching Language | 英文 English | | | | |
| 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) | 张幼宽, 环境科学与工程学院 Zhang, You-Kuan School of Environmental Science & Engineering Email: zhangyk@sustech.edu.cn Office: 台州楼 415 Phone: 88018082 Cell & WeChat: 13851763866 | | | | |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 待公布 To be announced | | | | |
| 10. | 选课人数限额(可不填) Maximum Enrolment (Optional) | 25 | | | | |
| 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 | 48 | 0 | 0 | 0 | 48 |

Credit Hours

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| 12. | 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | Groundwater Hydrology |
| 13. | 后续课程、其它学习规划 Courses for which this course is a pre-requisite | NA |
| 14. | 其它要求修读本课程的学系 Cross-listing Dept. | NA |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

To learn the science and art of modeling water flow and solute transport in subsurface environment;

To have the ability of solving groundwater-related environmental problems with commonly-used groundwater modeling software, i.e., GMS (which includes MODFLOW, MODPATH, MT3DMS, RT3D, etc.).

16. 预达学习成果 Learning Outcomes

After taking this course, students should have basic knowledge about groundwater modelling and unique ability to quantitatively evaluate various groundwater-related environmental problems., e.g., groundwater over-pumping, groundwater contamination by leaky underground storage tanks, landfills, and groundwater remediation design, with available modelling software.

**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.)**

Introduction (2 hours)

Part I: Groundwater Flow Modeling

- Review of Groundwater Flow Theories (2 hours)
- Modeling Purpose and Conceptual Model (2 hours)
- Basic Mathematics (2 hours)
- Introduction to GMS, MODFLOW, and MODPATH (4 hours)
- Modeling Domain, Boundaries, Sources, and Sinks (2 hours)
- Numerical Model Design (2 hours)
- Parameter Estimation and Assignment (2 hours)
- Model Calibration and Validation (4 hours)
- Forecasting and Uncertainty Analysis (2 hours)
- Modeling Report (2 hours)

Part II: Solute Transport Modeling

- Review of Solute Transport Theories (2 hours)
- Modeling Purpose and Conceptual Model (2 hours)
- Basic Mathematics (2 hours)
- Introduction to MT3DMS, RT3D (4 hours)
- Modeling Domain, Boundaries, Sources, and Sinks (2 hours)
- Numerical Model Design (2 hours)
- Parameter Estimation and Assignment (2 hours)
- Model Calibration and Validation (2 hours)
- Forecasting and Uncertainty Analysis (2 hours)
- Modeling Report (2 hours)

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

Textbook:

Applied Groundwater Modeling, 2nd ed. by M. Anderson, W. Woessner, and R. Junt, Elsevier, 2015.

References:

Applied Contaminant Transport Modeling, 2nd ed. By C. Zheng and G.D. Bennett, 2002.

Introduction to Groundwater Modeling by Wang and Anderson, 1982.

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 | In each lecture | 5% | | |
| 课堂表现 Class Performance | In each lecture | 5% | | |
| 小测验 Quiz | | | | |

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| 课程项目 Projects | | | | |
| 平时作业 Assignments | Every week | 55% | | |
| 期中考试 Mid-Term Test | | | | |
| 期末考试 Final Exam | | | | |
| 期末报告 Final Presentation | During the exam week | 30% | | WRITING AND ORAL PRESENTATION |
| 其它（可根据需要 改写以上评估方 式） Others (The above may be modified as necessary) | During the semester | 5% | | FIELD TRIP |

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

