

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	智能海洋探测 Intelligent Ocean Exploration
2.	授课院系 Originating Department	海洋科学与工程系 Department of Ocean Science and Engineering
3.	课程编号 Course Code	OCE 210
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业选修课 Major Elective Course
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)	林间 讲席教授 海洋科学与工程系 创园 9 栋 511 Chair Prof. Jian LIN, Department of Ocean Science and Engineering, Innovation Park 9-511
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	林施榕 海洋科学与工程系 Shirong Lin, Department of Ocean Science and Engineering.
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	选课学生人数不限 No limitation on student enrolment numbers.

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
	48	0	0	0	48
学时数 Credit Hours					
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements					
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite					
14. 其它要求修读本课程的学系 Cross-listing Dept.					

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

<p>(1) 本新课程将由国际著名海洋学家主讲，采用多角度、跨学科的方式首次系统性地介绍最先进的海洋智能探测方法，讲述现代海洋智能观测中的基础原理与关键手段、创新思想，重大技术突破的过程以及未来海洋智能尖端技术的发展趋势。</p> <p>(2) 本课程将深入介绍 (a) 无人机、无人船和无人潜器等三位一体的新型智能化海洋探测的基本原理与方法；(b) 智能科考平台、海底观测网、大洋钻探等大型海洋观测系统；(c) 物理-化学-生物基因原位分析原理以及大数据与深度学习等先进方法在海洋探测与资源开发中的应用。</p> <p>(3) 本课程适合全校学生修读，包括海洋科学、地球科学、环境科学、计算机、材料、电子、机械与生物科学等专业。学生有机会直接接触高智能海洋探测技术与实体设施。</p> <p>(1) Taught by internationally renowned ocean scientists, this course will introduce the basic principles and advanced methods in intelligent ocean exploration from interdisciplinary perspectives. The course will systematically present innovative ideas, major technological breakthroughs, and the future of intelligent ocean exploration and technologies.</p> <p>(2) This course will provide an in-depth systematic illustration of the cutting-edge technologies in ocean exploration, including (a) drones, unmanned surface vessels, underwater vehicles, and bio-robots; (b) ocean observation systems, such as intelligent moving research platforms, seafloor observatory networks, and ocean drilling; (c) advanced methods of physical-chemical-biological-genomic in-situ analysis; and (d) big data analysis and deep machine learning, and their applications in ocean resource exploration.</p> <p>(3) This course is suitable for all students at SUSTech, including those with interests in ocean science, Earth science, environmental science, computer science, materials, electronics, mechanical, and biological science, etc.</p>

16. 预达学习成果 Learning Outcomes

<p>(1) 本课程将阐述目前国际上最先进的海洋智能技术，通过具体实例显示智能技术在海洋科学中的巨大应用前景，开阔南科大学学生们的跨学科视野，帮助学生们了解智慧海洋的发展趋势。</p> <p>(2) 通过当前热门的人工智能和海洋科学的结合，激发学生对海洋科学和技术的兴趣，吸引更多的优秀学子投身海洋事业，发展智能海洋，为全球海洋可持续性开发与建设海洋中心城市作贡献。</p> <p>(1) This course illustrates the most advanced intelligent ocean technologies in the world, illuminate their broad applicability, and illustrate the leading role of intelligent technology in future ocean sciences. The course will expand the interdisciplinary vision of SUSTech students.</p>
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(2) Through introducing the state-of-the-art artificial intelligence and ocean technologies, this course will help to stimulate students' interest in ocean science and technology.

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.)

本课程《智能海洋探测》，共 48 学时，每周安排一次（3 学时），一共 16 周。

1. 海洋大数据和深度学习（6 学时）

Ocean big data and deep learning (6 units)

2. 无人机的海洋应用（6 学时）

Drones and ocean application (6 units)

3. 水下机器人（6 学时）

Underwater robots (6 units)

4. 仿生机器人（3 学时）

Bio-robots (3 units)

5. 智能型海洋物理-化学-生物采样技术与原位分析（6 学时）

Intelligent physical-chemical-biological oceanographic sampling and in-situ analysis (6 units)

6. 载人潜水器（3 学时）

Development of manned submersibles (3 units)

7. 智能型海洋科学考察平台（3 学时）

Intelligent ocean research platforms (3 units)

8. 海底观测网（3 学时）

Seafloor observatory network (3 units)

9. 大洋钻探技术（3 学时）

Ocean drilling technology (3 units)

10. 海洋卫星遥感（3 学时）

Marine satellite remote sensing (3 units)

11. 智能探测海洋生物资源（3 学时）

Intelligent exploration of marine biological resources (3 units)

12. 智能探测海底资源 (3 学时)
Intelligent exploration of seafloor resources (3 units)

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

相关阅读材料。

(1) Understanding the Oceans: A Century of Ocean Exploration, by Margaret Deacon, Tony Rice, Colin Summerhayes, Publisher: Routledge; 1st edition, 2013.

(2) 中国海洋工程与科技发展战略研究: 海洋探测与装备卷, 著者 金翔龙, 2014

(3) 《海底构造与地球物理学》, 科学出版社, 吴时国、张健编著, 2014

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		30%		
小测验 Quiz				
课程项目 Projects		30%		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		30%		
其它 (可根据需要 改写以上评估方式) Others (The above may be modified as necessary)				

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

海洋科学与工程系本科教学委员会

Department of Ocean Science and Engineering Undergraduate Committee