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**	**河流及海岸动力学 Mechanics of River and Coast**
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**	
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**	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）**	刘延、环境科学与工程学院、15101146228 Yan Liu, School of Environmental Science and Engineering, 15101146228
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	无 NA
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

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	42	6	0	0	48

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	水力学 Hydraulics
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 N/A
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

本课程的教学目标是使学生：

1） 认识和理解天然河流、海岸带泥沙输移的基本规律

2） 认识和理解因泥沙运动引起的河流、河口海岸带演变规律

3） 熟悉和掌握泥沙输移和河床演变的计算方法

4） 了解河流及海岸动力学的实际应用及其对社会发展的重要作用

The teaching objectives of this course are to enable students to:

1) Know and understand the basic laws of sediment transport in natural rivers and coastal zones

2) Recognize and understand the evolution of rivers, estuaries and coastal zones caused by sediment movement

3) Familiar with and master the calculation methods of sediment transport and river bed evolution

4) Understand the practical application of river and coastal dynamics and its important role in social development

16. 预达学习成果 Learning Outcomes

通过本课程的学习，学生能够：1）认识天然河流和海岸带紊流运动基本规律，理解由此引起的泥沙输移，包括河道和海岸带水流特征、泥沙起动输移沉降基本规律等。2）认识和理解河流演变和河口海岸带演变的基本规律，包括沙波演化、河道演变、河口三角洲形成等。3）熟悉和掌握泥沙输移和河床演变的计算方法，包括河床阻力计算方法、泥沙输移计算公式、河床变形计算的基本方程等。4）了解河流及海岸动力学的实际应用及其对社会发展的重要作用，包括水库冲淤、河流改道、三角洲演化等。

Through the study of this course, students will be able to: 1) Understand the basic laws of turbulent flow in natural rivers and coastal zones, and understand the resulting sediment transport, including the characteristics of river and coastal water flow, the basic laws of sediment start-up transport and settlement, etc. . 2) Recognize and understand the basic laws of river evolution and estuary coastal zone evolution, including sand wave evolution, channel evolution, estuary delta formation, etc. 3) Familiar with and master the calculation methods of sediment transport and riverbed evolution, including the calculation method of riverbed resistance, the calculation formula of sediment transport, the basic equations of riverbed deformation calculation, etc. 4) Understand the practical application of river and coastal dynamics and its important role in social development, including reservoir erosion, river diversion, delta evolution, etc.

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.)

绪论 （2 学时）/ Introduction (2 class hours)

第一部分 河道水流基本特性 （10 学时）/ Part 1: Principles of river flows

第 1 讲、明渠紊流（4 学时）/ Lecture 1: Turbulent flow in open channels

第 2 讲、波浪运动理论（2 学时）/ Lecture 2: Theory of wave motion

第 3 讲、床面形态 （2 学时）/ Lecture 3: Characteristics of sediment beds

第 4 讲、河床阻力（2 学时）/ Lecture 4: Resistance of sediment beds

第二部分 泥沙运动特性 （20 学时）/ Part 2: Principles of sediment transport

第 5 讲、泥沙颗粒基本性质（4 学时）/ Lecture 5: Basic properties of sediments

第 6 讲、泥沙的起动 （4 学时）/ Lecture 6: Incipient motion of sediments

第 7 讲、推移质运动 （4 学时）/ Lecture 7: Bed load transport

第 8 讲、悬移质运动 （4 学时）/ Lecture 8: Suspended load transport

第 9 讲、波浪作用下的泥沙运动（4 学时）/ Lecture 9: Sediment motion under the influence of wave

第三部分 河流及海岸带演变规律（12 学时）/ Part 3: Principles of fluvial and coastal evolution

第 10 讲、河流形态划分（2 学时）/ Lecture 10: River morphology

第 11 讲、河床演变（4 学时）/ Lecture 11: Fluvial evolution

第 12 讲、河口海岸带演变（4 学时）/ Lecture 12: Evolution of estuaries and coasts

第 13 讲、人类活动对于河流演变的影响（2 学时）/ Lecture 13: Impact of human activities on fluvial evolution

另有 4 学时用于学生演讲、讨论和现场参观，总计 48 学时。

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

教材 Textbooks:

1) 《河流动力学概论 （第二版）》， 邵学军 王兴奎著，清华大学出版社，2005

Introduction to River mechanics, Xuejun Shao Xingkui Wang, Tsinghua University Press, 2005

2) Erosion and sedimentation (second edition), Pierre Y. Julien, Cambridge University Press, 2010

教参 Reference:

泥沙运动力学，钱宁、万兆惠， 科学出版社，1983

River Mechanics (second edition), Pierre Y. Julien, Cambridge University Press, 2018

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	The entire semester	10%		
课堂表现 Class Performance	The entire semester	10%		
小测验 Quiz		10%		
课程项目 Projects				
平时作业 Assignments	The entire semester	20%		
期中考试 Mid-Term Test				
期末考试 Final Exam	Final Week	50%		
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)				

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