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**	蓝色宜居星球 The Blue Habitable Planet
2.	**授课院系 Originating Department**	地球与空间科学系、海洋科学与工程系、环境科学与工程学院 Departments of Earth and Space Sciences, Ocean Science and Engineering and Environmental Science and Engineering
3.	**课程编号 Course Code**	EOE101
4.	**课程学分 Credit Value**	2
5.	**课程类别 Course Type**	通识选修课程 General Education (GE) Elective Courses
6.	**授课学期 Semester**	春季 Spring /秋季 Fall
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）**	杨英杰，地球与空间科学系， yangyj@sustech.edu.cn； 张伟，地球与空间科学系，zhangwei@sustech.edu.cn； 包雪阳，地球与空间科学系，baoxy@sustech.edu.cn； 叶玲玲，地球与空间科学系，yell@sustech.edu.cn； 冉将军，地球与空间科学系，ranjj@sustech.edu.cn； 王蕊嘉，地球与空间科学系，wangrj@sustech.edu.cn； 郭震， 海洋科学与工程系， guoz3@sustech.edu.cn； 张传伦， 海洋科学与工程系，zhangcl@sustech.edu.cn； 徐景平， 海洋科学与工程系，xujp@sustech.edu.cn； 杨挺， 海洋科学与工程系，yangt@sustech.edu.cn； 周祐民， 海洋科学与工程系，chouym@sustech.edu.cn； 刘志强， 海洋科学与工程系，liuzq@sustech.edu.cn； 王辰， 环境科学与工程学院，wangc@sustech.edu.cn； 雷洋，环境科学与工程学院，leiy3@sustech.edu.cn； 张斌田，环境科学与工程学院，zhangbintian@sustech.edu.cn； 郑国贸，环境科学与工程学院，zhenggm@sustech.edu.cn。 Yingjie Yang, Department of Earth and Space Sciences, yangyj@sustech.edu.cn; Wei Zhang, Department of Earth and Space Sciences, zhangwei@sustech.edu.cn; Xueyang Bao, Department of Earth and Space Sciences, baoxy@sustech.edu.cn; Lingling Ye, Department of Earth and Space Sciences, yell@sustech.edu.cn; Jiangjun Ran, Department of Earth and Space Sciences, ranjj@sustech.edu.cn; Ruijia Wang, Department of Earth and Space Sciences, wangrj@sustech.edu.cn;

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Guomao Zheng, Department of Engineering and Environmental Science and Engineering, wangc@sustech.edu.cn, zhenggm@sustech.edu.cn.

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）	

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	30		2		32

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

地球是人类的家园，是人类赖以生存的唯一星球。人类生存与可持续发展所涉及的一系列重要问题，如全球气候变化的应对（国际碳中和宣言），自然灾害的防御，深地、深空和海洋资源的勘探与开发，环境污染的治理等等，都与现代地球科学有关，了解和保护我们的蓝色宜居星球是全世界每个国家、每个人应有的意识和责任。本课程主要介绍宇宙、银河系以及行星系统的起源与演化，生命的起源与演化， 地球内部圈层、地表环境、大气和海洋各个圈层之间的相互联系和相互作用，全球气候变化起因与现状，以及人类社会发展对地球系统的影响。通过本课程的学习，大学生将对与地球科学相关的基础前沿问题以及人类社会可持续发展所面临的问题有一个基本的了解和认识。

The earth is the homeland of human beings and the only planet on which human beings live. Global major issues relevant to human survival and sustainable development, such as the mitigation of global climate change (International carbon neutrality declaration), defence against natural disasters, exploration and development of deep-earth, deep ocean, and deep-space resources, environmental pollution control and etc., are all the research topics of Earth science. Understanding and protecting our blue habitable planet is every nation's and every citizen's responsibility. This course mainly introduces the origin and evolution of our universe,

our galaxy and our planetary systems, the origin and evolution of life on the Earth, the interaction between the solid Earth, surface environment, atmosphere, and oceans, the origin and current status of global climate change, and the impact of human social development on the Earth system. After taking this course, students will have a basic understanding of frontier topics in earth science and the problems faced by the sustainable development of human society.

16. 预达学习成果 Learning Outcomes

完成本课程学习后，学生将会掌握以下知识和能力：

1. 宇宙、银河系以及行星系统的起源与演化过程；
2. 地球内部基本结构和动力学过程；
3. 地球各个圈层之间的相互关系；
4. 生命起源与演化；
5. 全球气候变化起因与现状；
6. 人类社会发展对地球系统影响的基本现状；
7. 理解世界各国对人类可持续发展所做出的各种应对措施。

Upon completion of this course, students will have the following knowledge and abilities:

1. The origin and evolution of the universe, the Milky Way and planetary systems;
2. The basic structure and dynamic process of the Earth's interior;
3. The interactions between the various spheres of the Earth;
4. The origin and evolution of life on the Earth;
5. The causes and current status of global climate change;
6. The impact of human social development on the earth system;
7. Understanding various policies adopted by countries around the world to maintain sustainable human development.

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.)

1. Introduction, Class overview **(Week 1)**

2. Big Bang, the birth of the universe **(Week 2)**

How do we know the Big Bang is true?

3. Origin of the Elements, Molecules and their physical properties **(Week 3)**

4. Formation of the Solar System **(Week 4)**

Other planets and moons

5. The age of the universe and the earth **(Week 5)**

All you need to know about radioactive dating-- essential for the universal time scale

6. Interior Modifications **(Week 6)**

How planets become layered, leading to a surface hospitable for life

7. Plate Tectonics and Geochem Cycle **(Week 7)**

Our planetary surface is in continual movement. How the external and internal cycles of Earth are related, connections between mantle, crust, ocean, atmosphere

8. Natural disaster **(Week 8)**

Earthquake, Volcano, Tsunami, landslide

MIDTERM

9. Origin of Life and Life Evolution **(Week 9)**

What do we understand about life so far? Evolution as a planetary process. How do we know evolution is real?

10. Oxygen production and consumption **(Week 10)**

How oxygen is produced and consumed? Exterior Modifications：The Record of Oxidation of the Planetary Surface

11. Climate System and Global Warming **(Week 11)**

How and when a stable climate was established on Earth's surface. Climate system, climate change, green-house gas, radiative forcing, global warming

12. Atmosphere and Ocean **(Week 12)**

Interactions of the atmosphere and ocean

13. Earth Resources and Cycles **(Week 13)**

Carbon and Water cycle

14. Fossil Fuels, Soils and Ecosystems **(Week 14)**

Fossil fuel, soil, ecosystem

15. Human Impacts, Pollutants and Global Change **(Week 15)**

Global change, human impact, pollutants

16. Earth Future and Possible Solutions **(Week 16)**

Earth future and possible solutions

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

本课程使用教材及参考书为：

1. How to Build a habitable Planet, Charles H. Langmuir and Wally Broecker, Princeton University Press, 2012.
2. 构建生命宜居的类地行星——从宇宙大爆炸到人类文明的地球演化史，查尔斯•朗穆尔、华莱士•布勒克著，厉子龙译，浙江大学出版社，2020.
3. 《地球系统与演变》，作者汪品先,田军,黄恩清,马文涛， 科学出版社，2018 年 6 月。

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				
课堂表现 Class Performance		5%		
小测验 Quiz		15%		
课程项目 Projects				
平时作业 Assignments		15%		

期中考试 Mid-Term Test		25%		
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)				

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

地球与空间科学系、海洋科学与工程系、环境科学与工程学院本科教学指导委员。
Undergraduate Teaching Steering Committee of Department of Earth and Space Sciences, Ocean Science and Engineering and Environmental Science and Engineering.