

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	Meteorology and climatology 气象气候学
2.	授课院系 Originating Department	School of Environmental Science and Engineering
3.	课程编号 Course Code	ESE315
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	Major Core Courses
6.	授课学期 Semester	Fall
7.	授课语言 Teaching Language	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)	
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	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	45	3	0	0	48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	Pre-requisite: Calculus, General Physics, Introduction to Earth Sciences
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	N/A
14. 其它要求修读本课程的学系 Cross-listing Dept.	N/A

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

The basic objective of this course is to introduce students to the fundamentals of meteorology and climatology. Students will be introduced to the physical laws that form the basis for our understanding of atmospheric processes. The physical processes will be integrated to explain basic atmospheric phenomena. Knowledge of the physical laws and their applications to meteorology will facilitate students' comprehension of atmospheric processes that determine the weather and climate.

16. 预达学习成果 Learning Outcomes

The increased comprehension of important physical processes in meteorology and climatology will improve students' ability to analyse and to forecast the state of the atmosphere and climate. It will enable students to understand more clearly atmospheric phenomena on many temporal and spatial scales as well as climate change.

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.)

Contents (48 class hours)

1. Overall review on meteorology and climate, 2 class hours

Major tasks in meteorology and climate; climate system summary, including atmosphere, hydrosphere, lithosphere, biosphere, cryosphere; physical properties and general gas function

2. Radiation and energy balance, 4 class hours

Basic knowledge; solar radiation; insolation; radiation and energy balance

3. Temperature, 6 class hours

Difference of temperature increase and cooling between land and ocean; temperature increase and cooling in the

atmosphere (Non-adiabatic temperature process, adiabatic temperature process); temperature increase and cooling in the atmosphere; atmosphere temperature change with time; atmosphere temperature change with time; spatial pattern of atmosphere temperature

4. Condensation, stability, & cloud process, 4 class hours

Evaporation and condensation; condensation of water vapor on land surface (dew; frost, rime ice, frost, glaze, fog); formation of clouds (condensation, collision and coalescence)

5. Precipitation, 4 class hours

Precipitation types; precipitation physical processes; rainfall and precipitation; cloud classes; cloud seeding; global distribution of precipitation

6. Air pressure & winds, 6 class hours

Air pressure change with time and altitude; air pressure field; horizontal and vertical air motion; general circulation (major factors, spatial pattern and changes)

7. Air mass & fronts, 4 class hours

Air mass classes; air mass movement; cold fronts; warm fronts;

8. Weather systems, 6 class hours

Weather systems in middle and high latitudes; weather systems in low latitudes (subtropical and tropical); convection weather systems (thunderstorm, squall line, tornado)

9. Weather forecasting, 4 class hours

Definition of weather forecasting; major methods for weather forecasting; processes for numerical weather forecasting; numerical weather forecasting accuracy

10. Climate and climatology, 4 class hours

Radiations for climate formation; circulation for climate formation; land-ocean spatial pattern for climate formation; topography and land surface impact on climate; cryosphere and climate; climate zones and climate types; climate classifications

11. Climate change and progress introduction, 4 class hours

Paleoclimate; major methods for investigating paleoclimate; climate change; human activities impact on climate change; latest studies on climate change.

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

Meteorology Today: An Introduction to Weather, Climate, and the Environment, Eighth or Ninth ed., by C. Donald Ahrens.

周淑贞主编：气象与气候学，第三版，高等教育出版社。

课程评估 ASSESSMENT

19. 评估形式 Type of	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
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Assessment

出勤 Attendance	10%		
课堂表现 Class Performance			
小测验 Quiz			
课程项目 Projects	10%		
平时作业 Assignments	20%		
期中考试 Mid-Term Test	20%		
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