课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	ESE**** 大气气溶胶/Atmospheric Aerosols
2.	**课程性质** **Compulsory/Elective**	专业选修课 **Elective**
3.	**课程学分/学时** **Course Credit/Hours**	3/48
4.	**授课语言** **Teaching Language**	英文 English
5.	**授课教师** **Instructor(s)**	傅宗玫 Tzung-May Fu
6.	**先修要求** **Pre-requisites**	无 No

7. 教学目标
Course Objectives

The objective of this course is to provide graduate-level students with a comprehensive understanding of atmospheric aerosols, as well as to equip them with the skills necessary to conduct scientific research in this field. Topics covered include the basic properties of atmospheric aerosols, aerosol microphysics and optics, aerosol chemistry, aerosol modeling, aerosol measurements, and the climate and health impacts of atmospheric aerosols. Course materials are based on both fundamental theories and cutting-edge research in the relevant areas. Tutorials and assignments are designed to provide students with hands-on experience using some of the most commonly used tools in aerosol research. Finally, students are expected to complete a research-level term project on a topic related to atmospheric aerosols of their choice.

8. 教学方法
Teaching Methods

Lectures: 44 h; tutorials: 4 h

9. 教学内容
Course Contents

Topic 1 (4 h)	Introduction to atmospheric aerosols: size distributions, compositions, mixing states, spatiotemporal distributions, life cycles, climate and health effects
Topic 2 (8 h)	Physical processes of aerosols: collision/coalescence, dry and wet deposition, hygroscopic growth, Kohler curve, kappa theory, optical properties, Mie scattering
Topic 3 (14 h)	Chemical processes of aerosols: gas-particle mass transfer (nucleation, diffusion/condensational growth, aqueous phase chemistry, heterogeneous chemistry), chemistry of secondary inorganic aerosols, organic aerosols

	Topic 4 (8 h)	Modelling atmospheric aerosols: thermodynamic models (E-AIM, ISORROPIA), VBS model, MOSAIC model, receptor models (CMB, PMF), other models (back trajectory, PSCF, MCM)
	Term project literature review (2 h)	Literature review presentation on topic of choice
	Topic 5 (6 h)	Aerosol measurements: size distribution measurements, off-line composition measurements, online composition measurements (AMS), satellite measurements
	Topic 6 (4 h)	Environmental impacts of aerosols: aerosol-radiation interactions, aerosol-cloud-precipitation interactions, aerosol toxicology and epidemiology
	Term project presentation (2 h)	Term project presentation
10.	**课程考核** **Course Assessment**	
	Attendance (10%); assignments (40%); literature review (15%); term project and presentation (35%)	
11.	**教材及其它参考资料**	
	Textbooks and Supplementary Readings 1. Seinfeld, J. H., and Pandis, S. N., Atmospheric Chemistry and Physics: from Air Pollution to Climate Change, 3rd edition, Wiley, 2016. 2. Jacob, D., Introduction to Atmospheric Chemistry, Princeton University Press, 1999. 9780691001852. 3. IPCC Sixth Assessment Report, Working Group 1: The Physical Science Basis, 2021.	