

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	航空航天与力学概论 Introduction to Aerospace Engineering & Mechanics				
2.	授课院系 Originating Department	力学与航空航天工程系 Department of Mechanics and Aerospace Engineering				
3.	课程编号 Course Code	MAE205				
4.	课程学分 Credit Value	2				
5.	课程类别 Course Type	专业选修课 Major Elective Courses				
6.	授课学期 Semester	秋季 Fall				
7.	授课语言 Teaching Language	中文 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)	团队授课: 许振宇 (力学与航空航天工程系, xuzy@sustech.edu.cn) 邓巍巍, 韩品连, 万敏平, 余鹏, 王敏, 王建春, 黄仕迪, 刘宇				
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	32	0	0	0	32

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	飞行器动力学，飞行器设计，飞行器原理
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 NA

教学大纲及教学日历 SYLLABUS

15. **教学目标 Course Objectives**

本课程是航空航天工程学科的入门课，目的是让学生掌握飞行与飞行器相关的基础知识，了解飞行器的发展历史，航空航天相关产业的现状，各种飞行器的飞行环境、飞行原理、操控方法、推进器、结构、系统、仪表等。与此同时还让学生对航空航天工程和力学的相关学科有所了解，增加他们今后学习过程中的方向感。

This is an introductory course of aerospace engineering, the objective is to let students master the fundamental concepts of flight and flight vehicles, to know about the flight environment, flight principles, control methods, propulsion, structure and avionics. In the meantime, students are also given information about aerospace engineering, the subject itself, increasing the sense of direction in future studies.

16. **预达学习成果 Learning Outcomes**

本课程所涉及的面较为广泛，所以教学中选取所有飞行器所共有的原理和系统等核心知识重点解释；而对其它知识广泛介绍。目的是让学生对飞行和飞行器的基本原理和发展有相当的了解；懂得在今后的学习中有的放矢；能够更专业的与同行交流等。八个力学系列讲座，涵盖面较广，目的是让学生清楚力学的作用和发展方向。

The contents covered in this course is abroad, the core knowledge about shared principles and systems of all flight vehicles will be emphasized, while others will be broadly introduced. The objective is to let students know about flight, flight vehicle, their principles and development history; and to have a full overview of the subject and to have the ability to communicate with professionals. The eight mechanics serial lectures cover abroad range of topics, which intends to make clear the applications and development trend of mechanics.

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.)

Section 1: (2 学时/2 credit hours)

飞行发展简史，飞行器术语；标准大气与气象

Flight History, Terminology, Flight Environment

Section 2: (2 学时/2 credit hours)

力学系列讲座，由八位老师之一授课；Mechanics Lecture Series, by one of eight Lecturers

Section 3: (2 学时/2 credit hours)

空气动力学：无粘不可压流，无粘可压流；音速与激波，粘流；翼型

Aerodynamics: Fluid Flow, Speed of Sound, Airfoil

Section 4: (2 学时/2 credit hours)

力学系列讲座，由八位老师之一授课；Mechanics Lecture Series, by one of eight Lecturers

Section 5: (2 学时/2 credit hours)

飞行原理：有限机翼，后掠翼；升力，阻力；固定翼、旋翼飞行原理；无人机

Flight Principles: Wing, Design Analysis, Fixed-Wing Airplane, Rotary-Wing Aircraft

Section 6: (2 学时/2 credit hours)

力学系列讲座，由八位老师之一授课；Mechanics Lecture Series, by one of eight Lecturers

Section 7: (2 学时/2 credit hours)

飞行力学：飞行器性能，稳定性与操控；操控系统

Flight Mechanics: Performance, Stability & Control

Section 8: (2 学时/2 credit hours)

力学系列讲座，由八位老师之一授课；Mechanics Lecture Series, by one of eight Lecturers

Section 9: (2 学时/2 credit hours)

空间飞行：开普勒定律；姿态控制；火箭，导弹，再入；地月往返，星际航行

Space Flight: Kepler Principles, attitude control, Rocket, Missile, re-entry

Section 10: (2 学时/2 credit hours)

力学系列讲座，由八位老师之一授课；Mechanics Lecture Series, by one of eight Lecturers

Section 11: (2 学时/2 credit hours)

飞行器结构与系统：应力，应变，疲劳；飞行器结构；维护；防冰

Structures & Systems: Stress, Strain, Fatigue, Structure, Maintenance, de-icing

Section 12: (2 学时/2 credit hours)

力学系列讲座, 由八位老师之一授课; Mechanics Lecture Series, by one of eight Lecturers

Section 13: (2 学时/2 credit hours)

推进系统: 螺旋桨, 活塞式、燃气涡轮、冲压发动机; 燃油系统: 火箭发动机; 电子推进

Propulsion: Propeller, Piston Engine, Turbine Engine, Ramjet, Fuel Oil System, Rocket Engine

Section 14: (2 学时/2 credit hours)

力学系列讲座, 由八位老师之一授课; Mechanics Lecture Series, by one of eight Lecturers

Section 15: (2 学时/2 credit hours)

机载设备: 航空仪表, 导航系统; 地面设备

Avionics: On-board Instrument, Navigation, Ground Facility

Section 16: (2 学时/2 credit hours)

力学系列讲座, 由八位老师之一授课; Mechanics Lecture Series, by one of eight Lecturers

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

教材:

贾玉红, 黄俊, 吴永康, 航空航天概论, 北京航空航天大学出版社, 第三版, 2013

参考书目:

- [1] 王云, 航空航天概论, 北京航空航天大学出版社, 2009
- [2] 昂海松, 童明波, 余雄庆, 航空航天概论, 科学出版社, 2015
- [3] John D Anderson, Introduction to Flight, McGraw-Hill, 6ed, 2008
- [4] M Kroes, J Rardon, Aircraft basic science, 8ed, 2013

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		30		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				

平时作业 Assignments	30	抄袭记零分 Cheating: 0	
期中考试 Mid-Term Test			
期末考试 Final Exam	40	抄袭记零分 Cheating: 0	
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

力学与航空航天工程系教学指导委员会
 The commission of teaching instruction in department of mechanics and aerospace engineering

