

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	实验 DIY：发现力学之美 Experimental DIY: Discover the Beauty of 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	MAE101
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)	Yu Peng Department of Mechanics and Aerospace Engineering 余鹏， 力学与航空航天工程系， yup6@sustech.edu.cn 88018911
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	肖思 教学实验员 xiaos@sustech.edu.cn Si Xiao Tutor 刘晓宇 教学实验员 liuxy7@sustech.edu.cn Xiaoyu Liu Tutor 赵晓争 教学实验员 zhaoxz@sustech.edu.cn Xiaozheng Zhao Tutor 力学与航空航天工程系 Department of Mechanics and Aerospace Engineering
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	20

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	0	0	64	0	64

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.	无 NA

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

课程要求学生动手制作无人机、水火箭、平衡车、爬墙汽车等常见设备的基本模型；在训练实践能力的同时，加深学生对力学理解以建立深入学习航空航天、海洋、水利、机械、土木、化学、交通运输、生物医药工程类科学知识的力学基础。

The course requires students to make basic models of common equipment, such as drones, water rockets, balance cars, and wall-climbing cars. While training and improving students' practical ability and capacity, this course will not only help them in developing their understanding of mechanics, but also lay the roots for future study in engineering subjects, such as aerospace, ocean, civil, chemistry, transportation, and biomedical.

16. 预达学习成果 Learning Outcomes

- 完成无人机、水火箭、平衡车、爬墙汽车等常见设备的简单模型的制作，从而具备较强的动手能力；
 - 理解实验涉及的动量矩平衡、动量守恒、伯努利方程等基本力学知识；
 - 建立基本的力学概念体系，为深入学习航空航天、海洋、水利、机械、土木、化学、交通运输、生物医药等工程类科学知识奠定基础。
- Train and improve students' practical ability and capacity by making basic models of common equipment, such as drones, water rockets, balance cars, and wall-climbing cars. to ;
 - Understand the basic mechanics knowledge such as momentum moment balance, momentum conservation, and Bernoulli equation involved in the experiments;
 - Establish a basic mechanical concept system, to lay the roots for future study in engineering subjects, such as aerospace, ocean, civil, chemistry, transportation, and biomedical.

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.)

序号 NUM.	学时 Hours	实验项目 Course Contents
1	4	生活力学：自制吸尘器和简易吹风机； Daily Mechanics: make a simple vacuum cleaner and a hair dryer;
2	4	能量平衡：牛顿摆及重力车； Energy Balance: Newton pendulum and gravity car;
3	4	奋力前行：爬虫机器人及电平衡车； Move Forward: reptile robot and electric balance car;
4	4	结构力学：简易桥梁制作； Structural Mechanics: simple bridge making;
5	4	逆风飞翔：逆风无动力行驶小车和动力航模飞机； Fly Upwind: headwind and powerless model airplanes;
6	4	有点浪漫：自制小喷泉； Something Romantic: homemade small fountain;
7	4	自由飞行：无动力飞机制作； Free Flight: unpowered aircraft production;
8	4	生活实用：自制抽水器； Practical Life: homemade water pump;
9	4	纵横驰骋：简易爬墙汽车； Gallop Around: simple climbing car;
10	4	感受战争：投石车； Feel the War: catapult;
11	4	力学魔术：铁环与铁链套结过程、骰子点数控制； Magic Mechanics : iron ring and iron chain tying process, scorpion point control;
12	4	压强测试：可口可乐的摇摆； Pressure Test: swing of Coca-Cola ;
13	4	断裂破坏：典型金属材料的拉伸； Fracture Failure: stretching of typical metal materials;
14	4	飞行传说：竹蜻蜓与四旋翼无人机； Flight Legend: bamboo rafts and quadrotor drones;
15	4	自激振动：一只欢快的啄木鸟； Self-excited Vibration: a cheerful woodpecker
16	4	梦想升空：水火箭制作与放飞 Dearm Lift-Off: make and release a water rocket

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

1. 庄表中. 工程力学的应用、演示和实验[M]. 高等教育出版社, 2015.
2. 刘延柱等. 趣味刚体动力学(第二版)[M]. 高等教育出版社, 2018.
3. 武际可. 伟大的实验与观察-力学发展的基础[M]. 高等教学出版社, 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		20		
课堂表现 Class Performance		20		
小测验 Quiz		50		
课程项目 Projects				
平时作业 Assignments		10		

期中考试 Mid-Term Test				
期末考试 Final Exam				
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**

<input type="checkbox"/> A. 十三级等级制 Letter Grading <input checked="" type="checkbox"/> 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
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