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**	流体力学实验 Fluid Mechanics Lab
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**	MAE302-16
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业核心课 Major Core Course
6.	**授课学期 Semester**	春季 Spring
7.	**授课语言 Teaching Language**	中英双语 Chinese-English Bilingual
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）**	刘晓宇 (实验员)，力学与航空航天工程系，liuxy7@sustech.edu.cn LIU Xiaoyu (Tutor), Department of Mechanics and Aerospace Engineering， 赵晓争 (实验员)，力学与航空航天工程系，zhaoxz@sustech.edu.cn ZHAO Xiaozheng (Tutor), Department of Mechanics and Aerospace Engineering
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	30

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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	16		80		96
12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MAE303 流体力学 或 MAE207 工程流体力学 MAE303 Fluid Mechanics / MAE207 Engineering Fluid Mechanics				
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite					
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

- 帮助学生熟悉流体力学实验的基本知识与操作；
- 通过实际的实验操作增强学生对流体力学知识的理解；
- 训练学生掌握基本水力学实验操作，以及如何处理与分析实验数据；
- 学习如何在合作团队里面设计创新型流体力学实验装置。

- To familiarize students with fundamentals of fluid mechanics experiments;
- To improve the understanding of fluid mechanics knowledge through practical lab experiments;
- To train students to practice hands-on fundamental hydraulic experiments, and process and analyze experimental data obtained;
- To provide students with experience of designing innovative experimental rigs of fluid mechanics as a collaborative group.

16. 预达学习成果 Learning Outcomes

顺利完成本课程学习后，学生们将会：

- 认识到实验研究对流体力学的重要性；
- 理解并有能力独立操作基本水力学实验，处理和分析实验数据、以及撰写实验报告；
- 运用流体力学理论与实验知识设计实际的实验装置；
- 通过团队协作认识到项目管理、团队意识与沟通等技能的重要性。

Upon successful completion of the course, students will be able to:

- Appreciate the importance of lab experiments to fluid mechanics;
- Demonstrate the understanding and ability to operate fundamental hydraulic experiments, process and analyze experimental data, and write up lab reports independently;
- Design practical experimental rigs by using knowledge of fluid mechanics theories and labs;
- Appreciate the importance of project management, teamwork, communication, etc. through working as a collaborative group.

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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. 流体力学实验课程介绍（6 课时）
   1.1 课程概述、实验操作、团队设计项目介绍（2 课时）
   1.2 流体力学实验简介（概述、研究领域、发展历史、研究目标）（2 课时）
   1.3 相似性理论、流体力学实验设备与技术（2 课时）

2. 流体力学实验原理（10 课时）
   2.1 流体力学实验室介绍、水力学演示实验（1 课时）
   2.2 水力学操作实验原理（5 课时）
   2.3 教学风洞介绍与演示（1 课时）
   2.4 风洞操作实验原理（3 课时）

3. 流体力学实验操作（25 课时）
   3.1 水力学实验，共 10 项（15 课时）
   3.2 空气动力学实验，共 5 项（10 课时）

4. 团队设计项目（55 课时）
   4.1 每周组会（5 课时）
   4.2 项目工作（50 课时）

Part 1: Course Introduction (6 credit hours）
   1.1 Course overview, lab experiments, group design project (2 credit hours）
   1.2 Introduction to fluid mechanics experiments
   (overview, research areas, history, and research objectives) (2 credit hours)
   1.3 Similarity theory, fluid mechanics experiment facilities and techniques (2 credit hours)

Part 2: Theory of lab experiments (10 credit hours)
   2.1 Introduction of fluid mechanics laboratory, demonstration of hydraulic experiments (1 credit hour)
   2.2 Lab experiment theory: hydraulic experiments (5 credit hours)
   2.3 Introduction and demonstration of the wind tunnel for teaching (1 credit hour)
   2.4 Lab experiment theory: wind tunnel experiments (3 credit hours)

Part 3: Hands-on practice of lab experiments (25 credit hours)
   3.1 Lab experiment practice: hydraulic experiments, 10 in total (15 credit hours)
   3.2 Lab experiment practice: aerodynamic experiments, 5 in total (10 credit hours)

Part 4: Group design project (55 credit hours)
   4.1 Weekly group meetings (5 credit hours)
   4.2 Project work (50 credit hours)

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

1. 毛根海，章军军，陈少庆，胡卫红，《应用流体力学实验》，高等教育出版社，2008；
2. 毛根海团队，《工程流体力学实验指导书与报告》，杭州源流科技有限公司，2015；
3. Wind Tunnel Instruction Manual, Armfield Ltd, 2015.

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		项目表现 Project performance
小测验 Quiz				
课程项目 Projects		30		项目开题 Project proposal 5% （小组分数 Group mark） 项目报告 Project report 25%
平时作业 Assignments		50	抄袭实验报告记 0 分 Cheating: 0	实验报告 Lab reports 3% x 10 + 4% x 5
期中考试 Mid-Term Test				
期末考试 Final Exam	1 小时 1 hour	5		口试 Oral exam
期末报告 Final Presentation	2 小时 2 hours	10		（小组分数 Group mark）
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)		±5		组内互评 Peer assessment

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 Committee for Teaching Affairs in Department of Mechanics and Aerospace Engineering