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**	**氢能 Hydrogen Energy**
2.	**授课院系 Originating Department**	机械与能源工程系 Department of Mechanical and Energy Engineering
3.	**课程编号 Course Code**	ME487
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业选修课 Major Elective Courses
6.	**授课学期 Semester**	春季 Spring
7.	**授课语言 Teaching Language**	中英双语 English & 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）**	王海江 机械与能源工程系 Haijiang Wang, Department of Mechanical and Energy Engineering
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	48				48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	
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

通过该课程，使学生掌握氢能产业链上包括氢气制取、氢气储存、氢气运输、氢气加注及氢气应用的相关知识及技术，了解氢能相关技术及市场的发展方向。

Students will, through this course, learn hydrogen energy related knowledge and technologies including hydrogen production, hydrogen storage, hydrogen transportation, hydrogen re-fueling and applications of hydrogen, and meanwhile learn the market and technology development trend.

16. 预达学习成果 Learning Outcomes

学生将掌握氢能相关知识，熟悉氢气制取、氢气储存、氢气运输、氢气加注及氢气应用的相关技术，了解各项技术的现状及发展方向。

Students will gain the knowledge of hydrogen energy, get familiar with the related technologies of hydrogen production, hydrogen storage, hydrogen transportation, hydrogen re-fueling and applications of hydrogen, and learn the state-of-the-art technology and technology development trend.

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.)

第一章 氢能简介 (2 hrs)

第二章 氢气生产 (16 hrs)

1. 由化石燃料生产氢气 (4 hrs)
2. 氢气纯化技术 (2 hrs)
3. 电解水生产氢气 (8 hrs)
4. 热化学生产氢气 (1)
5. 天然氢气 (1hr)

第三章 氢气储存 (10 hrs)

1. 高压气体氢气储存 (2 hrs)
2. 氢气液化 (2 hrs)
3. 固态储氢 (4 hrs)
4. 化学储氢 (2 hrs)
5. 规模储氢 (2 hrs)

第四章 氢气运输 (6 hrs)

1. 管式车运输 (2 hrs)
2. 液氢运输 (2 hrs)
3. 管道运输 (2 hrs)

第五章 氢气加注 (4 hrs)

1. 氢气压缩技术 (2 hrs)
2. 加氢站建设 (2 hrs)

第六章 氢气应用 (10 hrs)

1. 燃料电池技术 (6 hrs)
2. 氢内燃机 (1 hr)
3. 氢在化工上的应用 (2 hrs)
4. 氢在冶金上的应用 （1 hr）

Chapter 1. Introduction to hydrogen energy (2 hrs)

Chapter 2. Hydrogen production (16 hrs)

6. Hydrogen production from fossil fuel (4 hrs)
7. Hydrogen purification techniques (2 hrs)
8. Hydrogen production by water electrolysis (8 hrs)
9. Hydrogen production by thermochemical cycles (1)
10. Hydrogen from natural sources (1hr)

Chapter 3. Hydrogen storage (10 hrs)

6. Hydrogen storage as pressurized gas (2 hrs)
7. Hydrogen liquefaction (2 hrs)
8. Solid state hydrogen storage (4 hrs)
9. Hydrogen storage by chemicals (2 hrs)
10. Large-scale hydrogen storage (2 hrs)

Chapter 4. Hydrogen Transportation (6 hrs)

4. Hydrogen transport tube-trailer (2 hrs)
5. Liquid hydrogen transport (2 hrs)
6. Hydrogen pipeline (2 hrs)

Chapter 5. Hydrogen Re-fueling (4 hrs)

3. Hydrogen compression techniques (2 hrs)
4. Construction of hydrogen re-fueling stations (2 hrs)

Chapter 6. Applications of hydrogen (10 hrs)

5. Fuel cell technology (6 hrs)
6. Hydrogen internal combustion engine (1 hr)
7. Application of hydrogen in chemical industries (2 hrs)
8. Application of hydrogen in metallurgy (1 hr)

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

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	期终	10		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test	第九周	30		
期末考试 Final Exam	第十七周	60		
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