# 课程大纲
# COURSE SYLLABUS

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| **1.** | **课程名称(中英文)<br>Course Title(Chinese and English)** | **MEE5401 电化学能源系统工程技术研究<br>Studies on Engineering and Technologies of Electrochemical Energy Systems** |
| **2.** | **课程类别<br>Course Type** | 专业课<br>Specialized Course |
| **3.** | **授课院系<br>Originating Department** | 机械与能源工程系<br>The Department of Mechanical and Energy Engineering |
| **4.** | **可选课学生所属院系<br>Open to Which Majors** | 机械与能源工程系、材料科学与工程系<br>The Department of Mechanical and Energy Engineering, The Department of Material Science and Engineering |
| **5.** | **课程学时、学分<br>Credit Hours** | 48/3 |
| **6.** | **授课语言<br>Teaching Language** | 双语<br>Chinese and English |
| **7.** | **授课教师 Instructor(s)** | 王海江讲席教授<br>Chair Professor Haijiang Wang |
| **8.** | **是否开给本科生** | 否 |
| **9.** | **先修课程、其它学习要求<br>Pre-requisites or Other Academic Requirements** | 王海江教授的“新能源技术：氢能与燃料电池技术”或李辉教授的“电化学能量储存与转化”<br>“New Energy Technology: Hydrogen and Fuel Cell Technology” by Professor Haijiang Wang, or, “Electrochemical Energy Storage and Conversion” by Professor Hui Li |

**10. 教学目标 Course Objectives**

教学目标为通过该课程使学生获得如下知识和技能：
1. 电化学能量系统的材料、部件与系统构成
2. 电化学能量系统的过程机理
3. 电化学能量系统的部件与系统的设计与制作方法
4. 电化学能量系统集成与测试方法
5. 电化学能量系统性能与寿命的研究方法
6. 独立选题的技能
7. 独立开展研究的技能
8. 书写研究报告的技能

The objective of this course is to teach and train the students the following knowledge and capabilities.
1. Materials, components and systems of electrochemical energy systems
2. Processes in electrochemical energy systems
3. Components and system design and fabrication methods
4. Integration and measurement methods
5. Performance and durability research methods
6. Capabilities to identify research project independently
7. Capabilities to carry out scientific research independently
8. Capabilities to write research reports or publications

**11. 教学方法及授课创新点 Teaching Methods and Innovations**

1. 教授讲座

2．实验课
3．教授指导下的科学研究
4．教授与学生小组讨论
5．教授指导下的研究报告书写
6．学生练习如何宣讲研究成果

1. Lectures
2. Laboratory practice
3. Scientific research under the supervision of professors
4. Group discussion on research results and progress
5. Research report writing under the supervision of professors
6. Student's practice on presentation skills

**12. 教学内容及学时分配 Course Contents and Course Schedule**

1．讲座：电化学能量系统概述 （4 学时）
2．讲座：优秀研究论文解析 （2 学时）
3．讲座：科学选题和研究方法（2 学时）
4．教授指导下的学生选题及开题报告书写（8 学时）
5．教授指导下的学生研究及论文撰写（28 学时）
6．学术讲座训练：学生练习宣讲能力（4 学时）

1. Lecture: Overview on electrochemical energy systems (4 hours)
2. Lecture: Analysis of selected research papers (2 hours)
3. Lecture: Selection of research topic and research method (2 hours)
4. Research proposal drafting under professor's supervision (8 hours)
5. Research and paper drafting under professor's supervision (28 hours)
6. Presentation: students presentation skill training (4 hours)

**13. 课程考核 Course Assessment**

开题报告 30%
研究成果及论文 60%
讲座 10%

Research proposal: 30%
Research results and papers: 60%
Presentation: 10%

**14. 教材及其他参考资料 Textbook and Supplementary Readings**


1. Bessarabov D, Wang H, Zhao N, et al. *PEM Electrolysis for Hydrogen Production*, CRC Press, 2015.
2. James Larminie, Andrew Dicks. *Fuel Cell Systems Explained, Second Edition* 2013.
3. Wang Q, Eikerling M H, Malek K. *PEM fuel cell electrocatalysts and catalyst layers : fundamentals and applications*. Springer, 2008.
4. Ru-Shi Liu, Lei Zhang, et al. *Electrochemical technologies for energy storage and conversion.* Wiley-VCH 2012