**上海交通大学硕士研究生课程教学大纲**

|  |
| --- |
| 课程基本信息（Course Information） |
| 课程代码（Course Code） | PO6020 | \*学时（Credit Hours） | 48 | \*学分（Credits） | 3 |
| \*课程名称（Course Name） | （中文）新能源系统 |
| （英文）New Energy System |
| 课程性质(Course Type) | 专业基础课Discipline Fundamental Course |
| 授课语言(Language of Instruction) | 英文English |
| \*开课院系（School） | 中英国际低碳学院China-UK Low Carbon College |
| 先修课程（Prerequisite） | Fundamentals of Thermodynamics (热力学基础)Heat Transfer (传热学) |
| 授课教师（Teacher） | 张振东/薛渊 | 课程网址(Course Webpage) |  |
| \*课程简介（Description） | 新能源系统课程将根据所依赖的各项技术来介绍各种能源系统。基于热力学及经济性的原则，对各类能源系统进行分析。同时，对新能源系统使用的背景，包括气候变化、能源可再生等议题，也会有相应的介绍。 |
| \*课程简介（Description） | *Advanced Energy Systems and Analysis*. (Credits: 3) Typical Energy Systems will be introduced with economic and thermodynamic principles. Various production systems will be analyzed. Sustainability, climate change, and other current energy system topics will also be addressed. The technologies of clean renewable energy such as nuclear power, hydropower, solar energy and wind energy are discussed, followed by a review of the state-of-the-art processes to produce alternative fuels such as biodiesel, bioethanol and biogases. Mobile power packs such as battery technology, hydrogen energy and fuel cells are discussed and the prospects of application in the transportation sector are examined. Lastly, energy sources from the Mother Nature such as geothermal energy, ocean thermal energy, tidal and wave energy for power generation are discussed |
| 课程教学大纲（course syllabus） |
| \*学习目标(Learning Outcomes) | Upon completion of course study, students should:1. Understand the complexities associated with various energy systems:
2. Appreciate the “big picture” related to different energy systems;
3. Have quantitative and qualitative tools to evaluate energy systems or sub-systems;
4. Appreciate the global energy picture
 |
| \*教学内容、进度安排及要求(Class Schedule& Requirements) |

|  |  |  |  |
| --- | --- | --- | --- |
| Week 1 | Overview + Energy System Analysis Tool + Economic Analysis Tool | Week 9 | Bio-fuel, bio-diesel, bio-ethanol |
| Week 2 | Thermodynamic Review + Climate Change | Week 10 | Battery + Transportation System |
| Week 3 | Fossil Fuel + Combustion System + Carbon Sequestration | Week 11 | Hydrogen + Fuel Cell |
| Week 4 | Nuclear Energy | Week 12 | Geothermal |
| Week 5 | Solar Energy + Heat Storage | Week 13 | Hydropower + Tidal + Wave Energy |
| Week 6 | Solar PV | Week 14 | Sustainability/TEA/LCA |
| Week 7 | Wind Energy | Week 15 | Presentation |
| Week 8 | Biomass Conversion Technology | Week 16 | Case Study+ Final Exam |

 |
| \*考核方式(Grading) | Your final grade will be calculated based on your performance in the following areas: Homework+Quiz (25%), Midterm Test (15%), Final Exam (20%), Project+Presentation (40%).  |
| \*教材或参考资料(Textbooks & Other Materials) | English Textbook: 1. Vanek, F.M., Albright, L.D., and Angenent, L.T., *Energy Systems Engineering: Evaluation and Implementation*, 2nd Edition, McGraw-Hill, New York, 2012
2. Boyle, Godfrey. *Renewable Energy: Power for a Sustainable Future*, Third Edition. Oxford University Press, 2012.
3. Bent Sørensen, *Renewable Energy-Its physics*, engineering, use, 3rd ed, Elsevier Science, 2004
4. Aldo Vieira da Rosa, *Fundamentals of Renewable Energy Processes*, 2nd ed. Academic Press, 2009
5. 左然，施明恒，王希麟，可再生能源概论，机械工业出版社，2007

Other Supplemental Materials may also be provided. |
| 其它（More） |  |
| 备注（Notes） |  |

**Course Arrangement**

|  |  |  |
| --- | --- | --- |
| **Week** | **Course Content** | **Teacher** |
| Week 1 | Overview + Energy System Analysis Tool + Economic Analysis Tool |  | XY |
| Week 2 | Thermodynamic Review + Climate Change | CT |  |
| Week 3 | Fossil Fuel + Combustion System + Carbon Sequestration |  | XY |
| Week 4 | Nuclear Energy | CT |  |
| Week 5 | Solar Energy + Heat Storage | CT |  |
| Week 6 | Solar PV | CT |  |
| Week 7 | Wind Energy | CT | XY |
| Week 8 | Biomass |  | XY |
| Week 9 | Bio-fuel, bio-diesel, bio-ethanol | CT |  |
| Week 10 | Battery + Transportation System |  | XY |
| Week 11 | Hydrogen + Fuel Cell | CT |  |
| Week 12 | Geothermal |  | XY |
| Week 13 | Hydropower + Tidal + Wave Energy |  |  |
| Week 14 | Work on Project | CT/XY |  |
| Week 15 | Sustainability/TEA/LCA |  | XY |
| Week 16 | Presentation | CT/XY |  |

备注说明：

1.课程大纲一般为教师网上填写，填写要求会自动提示；对于新开课程，需要填着纸质大纲，并经院系教学委员会或专业委员会通过。

2．带\*内容为必填项。

3．课程简介字数为300-500字；课程大纲以表述清楚教学安排为宜，字数不限。