New Energy Technology(新能源技术)

（1900025）

I. Course Code: 1900025

Class Hour: 32　Credit: 2

II. Suitable specialty：

Chemistry majored graduates

III. Prerequisites:

Courses for chemistry majored undergraduates

IV. Course Description and course target

This course is designed for chemistry majored graduates. As people face both energy resources shortage and low carbon release requirement. Chemistry needs to find more roles to play in energy industry. This course will cover both conventional resources like wind power, hydropower, biomass power, nuclear power etc, and some unconventional techniques, for example dye-sensitized solar cells etc.. Smaller and smaller devices demand molecules and supermolecules used as materials, especially photo electronic materials. In this course the photoelectric and electroluminescence properties of molecular and supramolecular devices will be discussed.

The understanding of new aspects of molecules will help students developing their ability to join this interdisciplinary field easily. Hopefully, after learning device fabrication methods and characterization techniques, students may feel more confident about contributing to the energy industry and developments.

V. Teaching method:

Lectures, discussion and team work.

VI. **Course content**

Chapter 1 energy crisis? 2 hrs
1.1 Introduction
1.2 Energy crisis
1.3 Energy resource calcifications
Chapter 2 Solar energy 6 hrs
2.1 Brief history of utilization of solar energy
2.2 Silicon based solar cells
2.3 Dye sensitized solar cells
Chapter 3 Nuclear energy 6 hrs
3.1 Nuclear reactions
3.2 Nuclear reactors
Chapter 4 wind energy 2 hrs
4.1 Wind resources
4.2 Driving forces for the wind power commercialization
Chapter 5 Geothermal Energy 2 hrs
5.1 History of geothermal application
5.2 Classification of geothermal resources
5.3 Geothermal power stations
Chapter 6 Hydropower 2 hrs
6.1 Hydropower resources
6.2 Hydropower applications
6.3 Status quo and perspective
6.3 Pump water storage power stations spring up
Chapter 7 Biomass energy 2 hrs
7.1 Biomass resource classification
7.2 Biomass utilizations
Chapter 8 hydrogen energy 2 hrs
8.1 Hydrogen resource
8.2 Preparation methods
8.3 Hydrogen storage and transportation
Chapter 9 electric energy 6 hrs
9.1 Fuel Cells
9.2 New electricity generators
Chapter 10 saving energy 2 hrs
10.1 Heat-electricity joint supply
10.2 Hydro-coal liquid fuel
10.3 Remain heat utilization

VII. **Evaluation and exams**

Class performance (20%), attendance (10%) and final exam performance (70%).

VIII. **References**

1. 新能源技术，翟秀静，刘奎仁，韩庆编著，化学工业出版社，2005 年。
2. 新能源技术，杨立忠；杨钧锡；别义勋编著，中国科学技术出版社，1994 年。
3. 新能源技术，马经国主编，江苏科学出版社，1992 年。
4. 新能源材料，雷永泉主编，天津大学出版社，2000 年。
5. *New Technologies for Energy Efficiency*, Michael F. Hordeski.
6. *New and Renewable Energy Technologies for Sustainable Development*, N. H. Afgan, Balkema Publishers, 2004.

IX. **Program Editor：Tianxin WEI**