Catalog Description
This course presents an introduction to the fundamentals and applications of fuel cell and hydrogen technology. It includes thermodynamics, electrochemical kinetics, fuel cell electrode catalysts, fuel cell systems, fuel reforming and hydrogen production, hydrogen storage, hydrogen safety. The applications of fuel cells in power generation, portable power, and automotives will also be covered. Students will also have a chance to work on a term project, write a term paper and present the term project.

Pre-requisites
PHYS215 and CHEM111, or with Instructor’s approval.

Textbook

Course Objectives
By the end of the course, students will have gained the skills and knowledge to demonstrate the following objectives:
• Be familiar with the energy conversion techniques including conventional power generation and fuel cells.
• Understand the principle of different types of fuel cells and be able to perform basic design calculations on proton exchange membrane fuel cells.
• Be familiar with different fuel reforming processes for hydrogen production.
• Recognize the sources of alternative energy for future economy.
• Realize the impact of energy production and consumption to the environment.

Topics Covered
• Introduction of energy conversion processes
• Electrochemistry basics
• Fuel cell thermodynamics
• Fuel cell kinetics
• Transport processes in fuel cell
• Fuel cell systems
• Fuel cell applications
• Fuel cell experiments
• Hydrogen economy concept
• Hydrogen production
• Hydrogen storage
• Hydrogen safety
• Life Cycle Analysis & Economic Impact
Class/Laboratory Schedule
Lecture Meeting Time: Monday, Wednesday, Friday, 3:30AM- 11:35AM
Lecture Meeting Location: Jett Hall 283

Instructor
Dr. Shuguang Deng, Tel: 575-646-4346, e-mail: sdeng@nmsu.edu

Grading Scheme
There will be two exams and one term paper and presentation. The guidelines for term paper and presentation will be provided.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Quiz/Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Exam-1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam-2</td>
<td>40%</td>
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<tr>
<td>Term Paper</td>
<td>15%</td>
</tr>
<tr>
<td>Presentation</td>
<td>10%</td>
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A: 85-100; B: 75-84; C: 65-74; D: 60-64; F: <60

Re-grades
Re-grades can be done at the request of student within one week of the return date of the graded assignments. A memo explaining why a re-grade is necessary must be attached to the front page of the assignment. The score on the assignment may increase or decrease after re-grade.

The NMSU Department of Chemical Engineering maintains a syllabus addendum containing course requirements common to all courses with the CH E prefix online. This document is accessible from the URL: http://chemeng.nmsu.edu/che_courses.htm