

ME 493
MATERIALS in ENERGY APPLICATIONS
Spring 2014

INSTRUCTOR: Kanchan Mondal
Office: ENGR B114
Office Hours: 9:00 – 10:00 AM MWF; Other Times When Available or By Appointment

Phone: 453-7059

Text: None

Objectives: The objective is to provide the students with: (1) the knowledge on high performance materials for alternative energy technologies, (2) a fundamental understanding of their structure-property-performance relationships, (3) and rigorous training for selecting materials in commercial generation of energy.

Homework:

- ⇒ 1 individual 1 page report and 5 powerpoint slides on a specific topic assigned.
- ⇒ Report must be type written.
- ⇒ *Copying is unethical and it doesn't help you understand the topic.*
- ⇒ References for any image or data must be shown.

Grading:

Attendance	5 %
Homework	20 %
2 exams	20% (each exam 10%).
Project	55%

Emergency Procedures. Southern Illinois University, Carbondale is committed to providing a safe and health environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT's website at www.bert.siu.edu, Department of Safety's website www.dps.siu.edu (disaster drop down), and in the Emergency Response Guideline pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

TENTATIVE COURSE SCHEDULE

Class Date	Chapter/Subject
<i>Mon, Jan 13</i>	<i>Introduction to the course</i>
<i>Wed, Jan 15</i>	<i>Energy – Materials Nexus</i>
<i>Fri., Jan 17</i>	<i>Catalysis and Catalysts</i>
<i>Wed, Jan 22</i>	<i>Catalysis and Catalysts</i>
<i>Fri, Jan 24</i>	<i>Hydrogen Production and Storage</i>
<i>Mon, Jan 27</i>	<i>Hydrogen Production and Storage</i>
<i>Wed, Jan 29</i>	<i>Fuel Cells</i>
<i>Fri., Jan 31</i>	<i>Fuel Cells</i>
<i>Mon, Feb 3</i>	<i>Fuel Cells</i>
<i>Wed., Feb 5</i>	<i>High Temperature and High Pressure Applications – Supercritical Cycles</i>
<i>Fri., Feb 7</i>	<i>High Temperature and High Pressure Applications – Supercritical Cycles</i>
<i>Mon., Feb 10</i>	<i>High Temperature and High Pressure Applications – Supercritical Cycles</i>
<i>Wed. Feb 12</i>	<i>CO₂ capture and Storage</i>
<i>Fri., Feb 14</i>	<i>CO₂ capture and Storage</i>
<i>Mon., Feb 17</i>	<i>Materials for Environmental Controls</i>
<i>Wed. , Feb 19</i>	<i>Materials for Environmental Controls</i>
<i>Fri., Feb 21</i>	<i>Materials for Environmental Controls</i>
<i>Mon., Feb 24</i>	<i>Materials for Nuclear, Wind, Geothermal and other alternative sources</i>
<i>Wed., Feb 26</i>	<i>Materials for Nuclear, Wind, Geothermal and other alternative sources</i>
<i>Fri., Feb 28</i>	<i>Materials for Nuclear, Wind, Geothermal and other alternative sources</i>
<i>Mon., Mar 3</i>	Review 1
<i>Wed., Mar 5</i>	EXAM 1
<i>Fri., Mar 7</i>	<i>Renewable Energy</i>
<i>Mon., Mar 10</i>	SPRING VACATION
<i>Wed., Mar 12</i>	SPRING VACATION
<i>Fri., Mar 14</i>	SPRING VACATION
<i>Mon., Mar 17</i>	<i>Renewable Energy</i>
<i>Wed., Mar 19</i>	<i>Photovoltaics</i>
<i>Fri., Mar 21</i>	<i>Photovoltaics</i>
<i>Mon., Mar 24</i>	<i>Photovoltaics</i>
<i>Wed., Mar 26</i>	<i>Solar Thermal Energy Storage</i>

Fri., Mar 28	<i>Solar Thermal Energy Storage</i>
Mon., Mar 31	<i>Thermophotovoltaics and Thermoelectrics</i>
Wed., Apr 2	<i>Thermophotovoltaics and Thermoelectrics</i>
Fri., Apr 4	<i>Thermophotovoltaics and Thermoelectrics</i>
Mon., Apr 7	<i>Energy Harvesting Devices</i>
Wed., Apr 9	<i>Energy Harvesting Devices</i>
Fri., Apr 11	<i>Nanotechnology and Energy</i>
Mon. Apr 14	<i>Nanotechnology and Energy</i>
Wed., Apr 16	<i>Energy Storage- Batteries</i>
Fri., Apr 18	<i>Energy Storage- Batteries</i>
Mon. Apr 21	<i>Energy Storage- Batteries</i>
Wed., Apr 23	<i>Energy Storage- Supercapacitors</i>
Fri, Apr 25	<i>Energy Storage- Supercapacitors</i>
Mon., Apr 28	<i>Energy Storage- Supercapacitors</i>
Wed., Apr 30	Exam 2
Fri., May 2	<i>Challenges in Materials Research for Sustainable Energy Production</i>