

University of Nevada Las Vegas  
Howard R. Hughes College of Engineering

## ME 648: Nanomaterials for Energy Applications

[Semester/Year]

[Class location]

**Instructor:** Jaeyun Moon, Ph.D.

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**Office Hours:** [Days and hours, or by appointments]

**Grading:** Letter grade, 3.0 credits

**Course Objectives:** 'Nanomaterials for Energy Applications' is a course to introduce various energy technologies and nanomaterials for the technologies. The objectives are as follows:

- (1) Understand the issues related to climate change and energy usage
- (2) Understand the fundamentals on renewable energy technologies
- (3) Learn relationships between material properties/structures and specific performance in those technologies
- (4) Learn knowledge from technical journal papers

**Course Outcomes:** After completing this course, the students will:

- (1) Be aware of the energy issues
- (2) Know the fundamental operating mechanisms of the major renewable energy technologies
- (3) Know how the nanomaterials are used to solve facing challenges of the technologies
- (4) Know how to search and utilize the journal papers to solve technical problems

### References

- Fundamentals of Renewable Energy Processes (3rd Edition) by Aldo Vieira, Publisher: Academic Press
- Lecture Notes, Journal papers, Web Links provided in the class and the class website

### Grading Criteria:

- ME648 is a cross-listed course with ME448. Undergraduate students (ME448) and graduate students (ME648) will be evaluated separately with different grading criteria and scales. Here are the grading criteria for ME 448 and ME 648.

- **Grading for ME 448**

Midterm	30%
Final	30 %
Class Presentation 1	10 %
Class Presentation 2	10 %
Project Presentation	10 %
Assignments	10 %

- **Grading for ME 648**

Midterm	20%
Final	25 %
Class Presentation 1	10 %
Class Presentation 2	10 %
Project Presentation	20 %
Assignments	15 %

### A. Class Presentations:

- At the 1<sup>st</sup> class, the instructor and the students will discuss to make six presentation groups.

- The groups will conduct three presentations during the course.
- For the 1<sup>st</sup> and 2<sup>nd</sup> “**Class Presentations**”, journal papers will be assigned to each group by the instructor.
- At the last “**Project Presentation**”, the groups will need to present their own ideas about the energy technologies discussed in the classes. Depending on the proposal topics, the groups should emphasize the followings:
  - Brief overview of the technology you choose. Why is the technology you choose important for us?
  - What is the technical problem that your group wants to address?
  - What is your proposed idea and/or method for addressing this problem?
  - Why can the idea solve the problem?
  - What will be the benefits, if your idea solves the problem?
- Presentation time 20 mins and Q&A 5mins (total 25 mins)

**B. Course Assignments**

- Two course assignments will be given during the course.
- All assignments must be turned in on the due date. Late assignments will not be accepted.

**Tentative Course Schedule:**

<b>Lecture</b>	<b>Coverage</b>	<b>Assignment or Class Presentation</b>
1	Topic 1: Energy (1)	
2	Topic 1: Energy (2)	
3	Topic 2: Photovoltaic (1)	
4	Topic 2: Photovoltaic (2)	
5	Topic 2: Photovoltaic (3)	
6	Topic 2: Photovoltaic (4)	1st paper assignment
7	Topic 3: Solar thermal power (1)	
8	Topic 3: Solar thermal power (2)	
9	<b>Class presentation 1</b>	
10	<b>Class presentation 1</b>	
11	Topic 4: Electrical Energy Storage (1)	Homework assignment #1
12	Topic 4: Electrical Energy Storage (2)	
13	Topic 4: Electrical Energy Storage (3)	Homework assignment #1 submitted
14	Topic 5: Thermoelectrics (1)	
15	Topic 5: Thermoelectrics (2)	
	<b>Midterm (Topic 1 - Topic 4)</b>	2nd paper assignment
16	Topic 5: Thermoelectrics (3)	
17	Topic 6: Wind Energy	
18	<b>Class presentation 2</b>	
19	<b>Class presentation 2</b>	
20	Topic 7: Fuel cell (1)	
21	Topic 7: Fuel cell (2)	
22	Topic 8: Hydrogen Production/storage (1)	
23	Topic 8: Hydrogen Production/storage (2)	
24	Topic 9: Superconductor	Homework assignment #2
25	Topic 10: Combustion & thermal barrier coatings (1)	
26	Topic 10: Combustion & thermal barrier coatings (2)	Homework assignment #2 submitted
27	<b>Project presentation</b>	
28	<b>Project presentation</b>	
	<b>Final exam (Topic 1-10)</b>	

**Academic Misconduct** – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: [http://www.unlv.edu/sites/default/files/page\\_files/27/UNLVStudentConductCode1212016.pdf](http://www.unlv.edu/sites/default/files/page_files/27/UNLVStudentConductCode1212016.pdf).

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**Religious Holidays Policy** – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, January 29, 2016, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Incomplete Grades** - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring** – The Academic Success Center (ASC) provides tutoring and academic assistance for all UNLV students taking UNLV courses. Students are encouraged to stop by the ASC to learn more about subjects offered, tutoring times and other academic resources. The ASC is located across from the Student Services

Complex (SSC). Students may learn more about tutoring services by calling 702-895-3177 or visiting the tutoring web site at: <http://academicsuccess.unlv.edu/tutoring/>.

**UNLV Writing Center** – UNLV Writing Center – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

**Rebelmail** – By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.