ENGR 600: Alternative Energy Fundamentals

COURSE INFORMATION

Instructor:
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Email:
Use the Canvas e-mail system or e-mail me directly at meneva13@gmail.com.

Office Hours:
By appointment online. Contact me to set up the appointment.

Course Description:
Introduction to alternative energy and public policy, including policy formulation, implementa-
tion, and socioeconomic factors of energy production and consumption. Overview
of engineering principles, including fundamentals of thermodynamics. Introduction to alter-
tnative energy power systems.

This online course is designed to introduce you to a broad consideration of Alternative
Energy, by focusing on the political, economic, and social aspects of issues likely to im-
 pact the future energy mix and supply. A discussion of energy cannot be limited to one
country, state, region or locality. As much as possible, I will endeavor to take a broad
look at alternative energy policy and fundamental engineering principles. Alternative en-
ergy development requires thorough understanding of the link between policy and sci-
ence.

Course Prerequisite:
Eligibility to enroll in graduate level courses. ENGR 600 is the recommended pre- or co-
requisite for the other courses in the Graduate Renewable Energy Certificate program.

Unique class structure:
This is a Web-based, entirely online course. It is instructor led and the content and as-
signments are organized into weekly topics. Online weekly discussions are a required
part of the course. All quizzes and exams are online as well.

Course Objectives:
1. Students will gain an appreciation for the public policy process in relation to alter-
native energy development and consumption.
2. Students will learn to apply basic engineering principles to alternative energy sys-
tems.
3. Students will gain an awareness of different alternative energy systems and the political and economic factors related to energy production and consumption.

**Student Learning Outcomes:**
At the completion of this course, students will be able to:

1. Analyze how the public policy process influences the development and consumption of alternative energy.
2. Determine the appropriate engineering principles to be applied to alternative energy systems.
3. Differentiate the various political and economic factors related to alternative energy development and forecast future energy trends.

**Required Textbooks:**

**Audio/Visual Material:**
Any audio/visual material required for this course is included in individual weekly lessons.

**Student Expectations**
As a student of this course, you have certain responsibilities:

- To do the best that you can in this course.
- To turn assignments and discussions by the due dates.
- To provide a serious reason in case you are late with assignments and/or discussions.
- To let me know in a timely manner if you have any problems interfering with your progress in the course.
- To follow the honesty, etiquette, and civility principles described further in this syllabus, whenever interacting with your fellow students.
- To exercise respect and observe confidentiality in the online classroom; that is, things said by other students are to be viewed respectfully and taken in confidence.
Faculty/Instructor Expectations:
As the instructor for this course, my responsibilities include:

- To provide engaging and relevant material to discuss.
- To provide direction and feedback on ideas presented in class.
- To treat each student with fairness and respect.
- To respond to questions in a timely manner; questions sent through WebCampus or in e-mails to me will receive a response within a week (usually significantly sooner).
- To assign grades and provide feedback on assignments and discussions within two weeks of the due dates.

COURSE REQUIREMENTS

Online Discussion Forums:
You will be required to post to the discussion forum each week. You are required to submit at least one original discussion post and reply to at least one classmate’s discussion post each week. As the instructor for this course, I will occasionally intervene to answer specific questions and steer the conversation in the right direction, but as graduate students you are expected to self-learn as much as possible.

Your original discussion post is due by Wednesday, 11:59 pm PST. Your response to classmates' posts are due by Sunday, 11:59 pm PST.

Assignments:
There will be one to three questions posted at the end of each week’s lecture module related to the chapter reading, lecture notes, journal articles, and/or internet sources. Responses are limited to 500 words for each question. Assignments are due by 11:59 pm PST every Sunday.

Nuclear Energy Analysis Paper:
There are two books assigned to this course related to nuclear energy. Cravens' Power to Save the World and Martin’s Super Fuel discuss the pros and cons of traditional uranium-based nuclear power and alternative thorium-based nuclear power. The purpose of this assignment is to compare and contrast the two approaches to nuclear power. The analysis should be no more than 1,500 words in length. Most of the analysis should be devoted to comparing and contrasting the two books, including the pros and cons of traditional and alternative nuclear power. You should also discuss your reaction to the two books and choose between the two forms of nuclear power, making sure to justify your choice.
Book Review:
You will write a book review of Bakke’s *The Grid: The Fraying Wires Between Americans and Our Energy Future*. The review should discuss the major points in the book, as well as your thoughts about and reaction to the book. The review is to be submitted during the week of the course module in which the book is assigned, so we suggest that you begin reading the book as soon as you begin the course! There is a 1,500-word limit on the book review. Please thoroughly review Purdue University’s Online Writing Lab for suggestions on how to write and organize your book review at [Writing a Book Report](https://owl.english.purdue.edu/owl/resource/704/01/).

Final Project: There are two options for the final project.

Option 1: A project of your choosing. This option allows you to write a final project on any renewable energy topic that may interest you; however, you must draw significantly from the course readings/materials. Some examples of acceptable project are as follows:

- For K-12 teachers/aspiring teachers: You can use this project to develop a unit plan on alternative energy for your class, including lesson plans, objectives, assessment tools, learning standards, etc.
- For business (MBA) students: Submit a business proposal for a renewable energy startup, an investment recommendation for a hypothetical client based on your understanding of the course material, or a market analysis report.
- For energy industry professionals: Submit a business proposal, energy audit, load curve analysis, energy rebate report, etc. You can use this opportunity to tie the course content into your daily job.
- For social science students (MPA, MA, or MS): Conduct a policy analysis of particular state or federal renewable energy policy, submit a research design proposal, or draft an academic paper for a peer reviewed conference or journal publication.

The above are just a few examples. Be creative in your project, but above all, it must reference/rely upon the content learned in this course. I encourage you to choose this option, as it offers the most flexibility and is the one which you will “get the most out of.”

Option 2: If the above option does not appeal to you, then you may choose to use the National Renewable Energy Laboratory’s free online solar energy analysis program PVWatts to write a final report analyzing a solar PV installation for a residential or commercial property of your choosing. You are required to complete all system info, economic, and incentive sections of the analysis and write a report detailing the system outputs. You must also submit the system output file to me alongside the written report.
Regardless of which option you choose, you MUST “clear” your project with me by Week 4, at which time you will submit a brief project proposal of about 500 words outlining what you intend to do and how you will complete the project, including any perceived challenges you think you might face. I will provide feedback on your proposal, so that you have enough time to make any changes in planning your final project. The final project should culminate in a written report, totaling 2,000 to 4,000 words.

Final Exam (Final Project Executive Summary):
In order to pass the course, you are required to write a brief executive summary of your final project during a proctored exam session administered by Examity. You may not use any notes, online references, or other resources to write the executive summary. The proctored exam session requires an Internet connection with a webcam, microphone, and speakers. The proctored session fulfills the University's requirement to verify your identity as the student registered for this course. The summary should be no more than 500 words and you will have one hour to write it. The executive summary is the only component of the final exam. Detailed instructions will be provided within the WebCampus course site.

Although the executive summary will contribute only 5% to your final grade, you are required to schedule and take this exam to pass the course.

Lecture Notes:
Lecture notes posted online are designed to supplement the assigned readings, not replace them. Assignment questions may be related to content from the lecture notes.

Grading Rubrics:
All course work will be assessed using grading rubrics. The rubrics give you objective feedback and allow you to know what is expected of you in order to earn a particular grade. Rubrics will be viewable with each course grading component.

Late Work:
Late work will not be accepted, except for very serious reasons to be explained to the instructor. This being an online class, you will have to manage your time well and inform us of any circumstances which may interfere with your progress in the course.
Course Grading:
Your final grade will be determined by the following assignments and percentages:

- Discussion Posts: 20%
- Weekly Assignments: 20%
- Nuclear Energy Analysis Paper: 20%
- Book Review (Bakke): 15%
- Final Project Executive Summary: 5%

Grade Scale:
Final course grades will be based on the following scale:
A   = 96 – 100
A-  = 90 – 95
B+  = 87 – 89
B   = 84 – 86
B-  = 80 – 83
C+  = 77 – 79
C   = 74 – 76
C-  = 70 – 73
D+  = 67 – 69
D   = 64 – 66
D-  = 60 – 63
F   = 0 - 59

UNIVERSITY POLICIES

Academic Dishonesty:
Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include: filing a final grade of "F"; reducing the student's final course grade one or two full grade points; awarding a failing mark on the coursework in question; or requiring the student to retake or resubmit the coursework. For more details, see the University of Nevada, Reno General Catalog.

Other acts of dishonesty include, but are not limited to the following:

a. "Copying other students’ answers on assignments, online discussions, and on quizzes and the final exam.
b. Submitting work that is not your own original work.
c. "Using unpermitted materials on quizzes and the final exam.
d. Furnishing false information to any University official, faculty member, or office.
e. "Committing forgery, alteration, misuse, theft, or using without permission, any University document, or record.
**Civility:**
Students are expected to conduct themselves in a civil manner at all times and in all forums. Students are responsible for contributing to the maintenance of a campus environment that fosters intellectual curiosity and diversity. This means respectful engagement with differing opinions and views. Harassment of one individual by another—in person, via e-mail or in electronic discussions—is uncivil behavior, which discourages the open expression of ideas on academic subjects. The University is committed to an orderly learning environment that protects the right of free speech, and do not tolerate personal intimidation of any kind.

**Class Conduct:**
With recommendation of the instructor and approval of the college dean, students may be dropped from class at any time for negligence or misconduct. Students may also be dropped for non-attendance, upon indication of the instructor. Non-attendance in an online class consists of one or more of the following: not logging into the WebCampus course at least twice a week, not submitting assignments on a weekly basis, and not participating in the discussion forum by the dates assigned.

**Disability Services:**
If you are a student who would normally seek accommodations in a traditional classroom, please contact Jill Wallace (jwallace@unr.edu), Coordinator of the GREC Program, as soon as possible. You may also contact the Disability Resource Center for services for online courses by emailing drc@unr.edu or calling (775) 784-6000.

Academic accommodations for online courses may be different than those for seated classrooms; it is important that you contact us as soon as possible to discuss services. The University of Nevada, Reno supports equal access for students with disabilities. For more information, visit the Disability Resource Center.

This course may leverage 3rd party web/multimedia content. If you experience any issues accessing this content, please notify Jill Wallace.

**Audio and Video Recording:**
Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the
University's Equal Opportunity & Title IX office at (775) 784-1547. Resources and interim measures are available to assist you. For more information, please visit the Equal Opportunity and Title IX page.

**Academic Success Services:**
Your student fees cover usage of the Math Center (775) 784-4433, Tutoring Center (775) 784-6801, and University Writing Center (775) 784-6030. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

**Course Outline: Weekly course schedule**

**Week 1:**
Topic: What is Energy?  
Reading: Simon, Ch. 1  
Assignments: Assignment 1, Discussion 1

**Week 2:**
Topic: Energy Policy, Economics, & Current Issues  
Reading: Simon, Ch. 2, 3 and 10  
Assignments: Assignment 2, Discussion 2

**Week 3:**
Topic: Reviewing the Laws of Thermodynamics  
Reading: N/A  
Assignments: Assignment 3, Discussion 3

**Week 4:**
Topic: Sustainability & Energy  
Reading: Simon, Ch. 4  
Assignments: Assignment 4 (Final Project Proposal), Discussion 4

**Week 5:**
Topic: The Power Grid  
Reading: Bakke (entire book)  
Assignments: Assignment 5 (Bakke Book Review), Discussion 5

**Week 6:**
Topic: Wind & Solar Energy  
Reading: Simon, Ch. 5 and 6  
Assignments: Assignment 6, Discussion 6
Week 7:
Topic: Geothermal Energy
Reading: Simon, Ch. 7
Assignments: Assignment 7, Discussion 7

Week 8:
Topic: Traditional Nuclear Energy
Reading: Cravens (entire book)
Assignments: Assignment 8/9 (Work on Nuclear Energy Analysis Paper), Discussion 8

Week 9:
Topic: Alternative Nuclear Energy
Reading: Martin (entire book)
Assignments: Assignment 8/9 (Nuclear Energy Analysis Paper), Discussion 9

Week 10:
Topic: Biofuels, Natural Gas, & Hydrogen
Reading: Simon, Ch. 8 and 9
Assignments: Assignment 10, Discussion 10

Week 11:
Topic: Final Project
Reading: N/A
Assignments: Work on final project due next week, Discussion 11

Week 12:
Topic: Final Project
Reading: N/A
Assignments: Assignment 12 (Final Project Report)

Week 13:
Topic: Proctored Exam
Reading: N/A
Assignments: Final Exam (Final Project Executive Summary)