



Intro to Renewable Energy - Online

20-806-291

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Required Materials: Computer with Internet Access and the following software

Adobe Acrobat Reader

Word Processor Application (e.g. MS Word*)

Spreadsheet Application (e.g. MS Excel*)

Presentation Application (e.g. MS Powerpoint*)

** MS compatible alternative software (GoogleDocs, Open Office, etc.) is also acceptable*

Prerequisites: College Algebra – math calculations will be necessary in this class. Some prior knowledge of physics, chemistry, and energy will be helpful. The online portion of the class will also make extensive use of Internet Web browsers, photo sharing, word processor, spreadsheet, and digital presentation software.

Textbook: There is no required textbook. All readings are available online, free of charge. However, a good recommended reference text is

Renewable Energy: Power for a Sustainable Future 3rded. by Godfrey Boyle

Supplies: You will need access to a computer, and a webcam or microphone for some assignments. You will also want a USB drive to save/backup your work.

Expectations: Because we will be interacting as a group online, it is important that students complete assignments in a timely fashion. Students are expected to conduct themselves and interact in a professional, positive, and respectful manner at all times.

Course Description: This course provides an introduction to renewable energy technology. The course is grounded in the fundamentals of energy, power, and the first and second laws of thermodynamics. A scientific approach is used to examine various energy sources, including fossil fuels, biomass, biogas, biofuels, solar, hydro, wind, geothermal, and ocean/tidal power. Various types of energy storage technology are also studied. Science, engineering, and policy challenges are examined for each energy technology, along with economic and environmental impacts. This course is suitable for any student with an interest in renewable energy, particularly those pursuing studies in scientific, technical, and engineering fields.

This is a 3-credit, 200-level physical science elective course. This course satisfies credit requirements for the various renewable energy certificates offered at Madison College, and serves as preparation for more advanced renewable energy coursework. Students should expect to spend roughly 4-6 hours per week on this course.

Course Outcomes: By the end of this course, students will be able to:

- Differentiate between energy and power and perform mathematical calculations using various units of measure for each quantity
- Understand the first and second laws of thermodynamics and use them to analyze various types of energy production systems
- Understand the basic principles of electricity, electrical transmission, and energy storage
- Be able to identify pros and cons of various conventional and renewable energy sources, including biomass, biogas, biofuels, hydro, wind, and solar
- Be able to apply some simple economic analyses to various renewable energy systems

Grades:	assignments	20.0%
	quizzes	20.0%
	online discussions	20.0%
	research project	20.0%
	final exam	20.0%

Homework

Homework assignments will be given throughout the course. The assignments will require the use of web-based resources along with computer spreadsheet applications for data analysis. Students are encouraged to work together on homework assignments and consult with one another to answer questions. Each student must however, submit their own set of answers/solutions to the assignments. The two lowest homework scores will be dropped from the grade calculations.

Quizzes

There will be an online quiz administered each week during the course. Late quizzes that are submitted after the due **date will be deducted 10% for each late day**. The two lowest quiz scores will be dropped from the grade calculations.

Discussions

There will be several online discussion boards during the class – roughly one discussion every other week. In order to facilitate a good dialogue in the course, it is important that you read and post comments to the discussions in a timely manner. Late contributions that are posted after the due **date will be deducted 10% for each late day**. The lowest discussion score will be dropped from the grade calculations.

Renewable Energy System Design – Research Project

You will be assigned a design project to explore one type of renewable energy application in greater detail. You will have several weeks to work on this project and your findings will be compiled into a written report submitted at the conclusion of the course. Further details will be provided later in the course

Final Exam – The final exam is cumulative, and will include content from all of the chapters.

Grading Scale:	A	93-100
	AB	88-92
	B	83-87
	BC	78-82
	C	70-77
	D	60-69
	F	< 60

COMMUNICATION POLICIES AND INFORMATION:

I make an attempt to respond to email or phone messages within 24 hours between 9am and 4pm Monday through Friday. Email is the preferred method of contact. Please note that I typically do NOT CHECK my email on the weekends.

Netiquette: If you are unfamiliar with online culture or are unfamiliar with "netiquette," you may appreciate a review of some guidelines covering email, discussion boards, etc. Please **do not** forward any emails or documents from your **classmates** in this course without their knowledge and/or permission. You may forward **my** emails or documents to anyone you think might find them helpful; however, please do not forward anything that violates your own or others' privacy rights.

Required email: I will communicate with you using your official Madison College email address, that ends in @madisoncollege.edu. Please email me from your official email account OR through Blackboard; I may not open emails from unknown domains for security reasons. **You are responsible for monitoring your Madison College e-mail account at least twice a week for the duration of this course, and more frequent use is strongly encouraged.**

Student Responsibilities: Students are expected to be familiar with Madison College policies and procedures. Many of the important [policies and procedures are on the Madison College website](#). Because this class is online, you should also be aware of [the computer use guidelines](#), which govern acceptable computer interaction at Madison College.

Class Deadlines: This course is being offered in a 100% online format. Assignments will be issued on Monday each week, and will be due by midnight the following Monday. You may work on assignments whenever you like throughout the week, but be careful about leaving too much work until the last night. Please note that this course requires online discussion, which works best if you log in at a minimum of twice during the week. If you are having difficulty meeting these deadlines for any reason, it is your responsibility to contact the instructor ASAP to discuss your situation.

Special Needs

If there are unique circumstances that could affect your performance in this class, please contact me at the earliest convenience to make necessary accommodations that will enable you to fully participate. Information of this nature will remain confidential.

TECHNICAL POLICES RELATED TO THE ONLINE FORMAT:

File Format Requirements: All text documents must be submitted as directed in Microsoft Word, Microsoft Excel or Adobe format, (.doc, .xls or .pdf files). If you create files using other platforms (e.g. Open office or Google Docs) be sure to save or export them in a compatible format. Some assignments may require other specialized formats; look for details in the guidelines for each assignment.

Technical Assistance: Computer difficulties are not an excuse for non-participation. If you experience problems with Blackboard or your computer, call (608) 246-6666, or toll-free at (866) 277-4445. They can talk you through fixing many, many problems. Their hours are 7:00 a.m. to 10:00 p.m., Monday-Friday and 7:30 a.m. to 3:00 p.m. on Saturdays.

Problems with your personal computer (or help with software and apps) may be fixed if you take your computer to [Wolfpack Techies](#), a FREE computer repair service at Madison College for students and faculty. Fall semester hours are Mondays and Wednesdays 12:30-5pm, Fridays 8am-5pm, and Saturdays 8am-3pm in Truax 358.

Keep in mind that your instructor can be of only limited help in computer troubles. Your best bet is to phone the professionals above.

Blackboard Outages: Madison College does its best to keep our Blackboard classroom up and running. However, despite our best efforts, our virtual classroom may go down unexpectedly. It's also possible your computer will contract a virus or worm that will make you wail and gnash your teeth. Should this happen to you, *do not panic!* Phone the computer help desk at (608)246-6666, or toll-free at (866) 277-4445. If an assignment is due, please attach it to an email to your instructor.

Course Topics and Timeline

Week 0	Introduction, Getting Online, Pre-test
Week 1	Energy and Laws of Thermodynamics
Week 2	Fossil Fuels
Week 3	Biomass and Biogas
Week 4	Biofuels
Week 5	Solar Thermal
Week 6	Electricity and Electromagnetism
Week 7	Hydropower
Week 8	Wind Power
Week 9	Solar Photovoltaics
Week 10	Concentrated Solar Power
Week 11	Geothermal Energy
Week 12	Energy Storage
Week 13	Energy Water Nexus
Week 14	Energy Economics and Policy
Week 15	Project & Final Exam