Introduction to Renewable Technologies

COURSE DESCRIPTION

Introduction to Renewable Technologies

Interested in transforming energy? With concerns about climate change and growing populations' effects on traditional energy supplies, scientists, governments, and societies are increasingly turning to renewable and innovative energy sources. In the Introduction to Renewable Technologies course, you'll learn all about the cutting-edge field of renewable energy and the exciting new technologies that are making it possible. You'll explore new ways of generating energy and storing that energy, from biofuels to high-capacity batteries and smart electrical grids. You'll also learn more about the environmental and social effects of renewable technologies and examine how people's energy decisions impact policies.

COURSE METHODOLOGY

- This is an inquiry-based course. Students will generate knowledge through online readings, asynchronous discussions with students and their instructor, interactions with online tutorials, and online and hands-on simulations.
- The instructor will act as a guide, a facilitator, an events planner, and a resource advisor. He/she will always be available through course message.
- The student must actively construct and acquire knowledge by being intrinsically motivated to succeed. To succeed, students must participate and complete all readings and activities. This course requires the student's active participation.
- Both formal and informal assessment methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal assessment may include multiple-choice quizzes, tests, discussion board participation, and written assignments. A final exam will be given at the end of the course.

COURSE PARTICIPATION OBJECTIVES

This course for which you are registered is a college preparatory, academically rigorous course that covers an entire semester's worth of material. As such, it is important that you adhere to the following guidelines as you manage your time and commit to successfully completing all required coursework:

1. The requirements for this course are equivalent to completion of minimum of 90+ hours of class instruction at a traditional on-site high school
2. Assignments must be submitted for each unit as they are completed so that the teacher may review and assess your performance. Do not hold your work, you must submit each unit's homework as it is completed, demonstrating weekly assignment completions
3. You must log in regularly to your course to demonstrate continued participation, and completion of all course requirements, including assignments, assessments and discussion forums
4. You must complete your individual work and any incident of suspected cheating, plagiarism or collaboration on assignments violates the academic integrity expectations outlined at the time of your enrollment and can result in failure of the course or further action as deemed appropriate

Citizenship

Students are expected to conduct themselves in a responsible manner that reflects sound ethics, honor, and good citizenship. It is the student's responsibility to maintain academic honesty and integrity and to manifest their commitment to the goals of NUVHS through their conduct and behavior. Students are expected to abide by all NUVHS policies and regulations. Any form of academic dishonesty, or inappropriate conduct by students or applicants may result in penalties ranging from warning to dismissal, as deemed appropriate by NUVHS.

Communication

Throughout this course students will need to be in close contact with their instructor and fellow students. Students are expected to communicate via course message and electronic discussion boards. Therefore, students should plan on checking their course messages at least three times a week and participate in the discussion boards during the weeks they are live.

Instructors strongly encourage and welcome open communication. Clear, consistent, and proactive communication will ensure a successful experience in this course. It is the student's responsibility to notify the instructor immediately if and when a personal situation occurs that affects his/her performance in this class. Being proactive with communication will result in a quick solution to any problems that may occur.

COURSE OUTLINE

Unit 1 – Introduction to Renewable Technologies

How are your lights, cell phones, and water heaters powered? Every time you turn on a light or make a call, you may be using power from a limited source that emits pollutants. Or perhaps the power comes from a clean, replenishable source. In the United States, there is a 93 percent chance you are using energy from a nonrenewable energy source. Nonrenewable energy sources include coal, oil, and natural gas. Eventually they run out. Renewable energy sources come from sources that will not run out. They either replenish through a natural process or come from a source with an infinite supply. These might be sunlight, wind, rain, tides, waves, and the earth's natural heat. In this unit, you'll learn about renewable energy technologies and why they are important. You'll also learn about the history of renewable energy technologies. Finally, you'll look at some of the countries making a difference by using renewable energy.

Learning Objectives

- Define renewable energy technologies.
- Identify different kinds of renewable energy technologies.
- Defend reasons for developing and using renewable technologies.
- Recount the history of renewable energy technologies.
- Describe where and how renewable energy is currently used globally.

Activities

Unit 1 Text Questions	Homework	10 points
Unit 1 Online Lab Questions	Homework	10 points
Unit 1 Activity	Homework	15 points
Unit 1 Discussion 1	Discussion	5 points
Unit 1 Discussion 2	Discussion	5 points
Unit 1 Quiz	Quiz	15 points

Unit 2: Climate Change and Energy Policies

You've probably heard of global warming. You might understand that it is a slow temperature increase all over the world. You might also know that this temperature increase somehow harms the environment. But how? In this unit, you'll learn about global warming and how it causes climate change. You'll also learn how climate change harms wildlife, natural resources, and humans. Consumers' use of electricity and cars are the main causes. But changing consumer habits is not as easy as it seems. Several countries have implemented successful policies to stop global warming. By examining these success stories, we'll look at how we can use these examples to build a framework for future climate change policies.

Learning Objectives

- Discuss global climate change issues.
- Describe how consumer habits influence climate change and energy policies.
- Evaluate climate change policies globally.
- Create frameworks for energy evaluation, including economic, sustainability, and tradeoffs.

Activities

Unit 2 Text Questions	Homework	10 points
Unit 2 Online Lab Questions	Homework	10 points
Unit 2 Activity	Homework	15 points
Unit 2 Discussion 1	Discussion	5 points
Unit 2 Discussion 2	Discussion	5 points
Unit 2 Quiz	Quiz	15 points

Unit 3: The Electric Power System and Fossil Fuels

Why do we continue to use nonrenewable energy sources? We answer the question by looking at how electricity gets from Point A to Point B. The history of electricity explains how we built this system. In this unit, you'll explore the infrastructure and history of electricity. You'll learn about the tradeoffs in using nonrenewable sources, specifically fossil fuels, for generating power. You'll also look at the new technologies we could use.

Learning Objectives

- Discuss the history of the electric power system and the use of fossil fuels.
- Evaluate the current electric power system and use of fossil fuels.
- Investigate the advantages and disadvantages of the electric power system and use of fossil fuels.
- Examine new technologies and changes in the use of fossil fuels and the electric power system.

Activities

Unit 3 Text Questions	Homework	10 points
Unit 3 Online Lab Questions	Homework	10 points
Unit 3 Activity	Homework	15 points
Unit 3 Discussion 1	Discussion	5 points
Unit 3 Discussion 2	Discussion	5 points
Unit 3 Quiz	Quiz	15 points

Unit 4: Nuclear Power

If all you know about nuclear power comes from The Simpsons, you're about to find out that there's a whole lot more to nuclear power than what happens at the fictional Springfield nuclear power plant. Nuclear power is a chemical process of splitting atoms. It is very efficient and has the potential to power the entire world. However, it does have some disadvantages. Nuclear meltdowns can be devastating to the surrounding environment and can even cause widespread death if not managed responsibly.

Learning Objectives

- Define nuclear energy and discuss how it is harnessed.
- Describe nuclear fission.
- Discuss the advantages and disadvantages of nuclear power.
- Explain the societal debate over nuclear power.

Activities

Unit 4 Text Questions	Homework	10 points
Unit 4 Online Lab Questions	Homework	10 points
Unit 4 Activity	Homework	15 points
Unit 4 Discussion 1	Discussion	5 points
Unit 4 Discussion 2	Discussion	5 points
Unit 4 Quiz	Quiz	15 points

Unit 4: Nuclear Power (Continued)

Midterm Exam Objectives

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the first four units in this course (Note: You will be able to open this exam only one time.)

Midterm Exam Activities

Midterm Discussion	Discussion	5 points
Midterm Exam	Exam	50 points

Unit 5: Solar Energy

Solar energy is getting a lot of attention. The sun provides lots and lots of energy, and we can use it in our homes and offices without having to use the local power company. Technologies that harness solar energy are varied and sophisticated. The sun's heat can be used in many ways, including providing steam for traditional power plants. However, these technologies are still immature. So large-scale solar power continues to be expensive. It can also be unreliable when the sun is not shining. In this unit, you'll learn about solar energy and the exciting ways we can use it to power our lives.

Learning Objectives

- Define solar energy and discuss how it is harnessed.
- Compare passive solar and active solar energy.
- Examine photovoltaic cells and solar thermal systems.
- Outline the advantages and disadvantages of solar energy.

Activities

Unit 5 Text Questions	Homework	10 points
Unit 5 Online Lab Questions	Homework	10 points
Unit 5 Activity	Homework	15 points
Unit 5 Discussion 1	Discussion	5 points
Unit 5 Discussion 2	Discussion	5 points
Unit 5 Quiz	Quiz	15 points

Unit 6: Wind Energy

Wind energy has been around for centuries, as early as 5000 BCE. But it's been getting a lot of attention lately as a renewable energy technology. It's clean and sustainable, but wind turbines take up a lot of land and make a lot of noise. In addition, harnessing wind energy requires an area where the climate is optimal, and the land is preferably flat and rural. In areas with a lot of wind, this renewable technology is inexpensive and ideal, especially for homeowners who want to power their own homes. In this unit, you'll learn more about how wind energy is created and the advantages and disadvantages of using it as an energy source.

Learning Objectives

- Describe wind energy and how it has been used historically.
- Consider environmental factors that affect harnessing wind energy.
- Discuss kinetic energy.
- Evaluate the advantages and disadvantages of wind energy.

Activities

Unit 6 Text Questions	Homework	10 points
Unit 6 Online Lab Questions	Homework	10 points
Unit 6 Activity	Homework	15 points
Unit 6 Discussion 1	Discussion	5 points
Unit 6 Discussion 2	Discussion	5 points
Unit 6 Quiz	Quiz	15 points

Unit 7: Biomass and Biofuels

Amongst sources of energy, biomass is the oldest. When humans first set a fire using wood, biomass energy was born. In this unit, you'll learn about how we get electricity from biomass and biofuel. You'll also learn about the process of converting biomass to biofuels. Finally, you'll look at the different options for using biofuels and the pros and cons of both biomass and biofuels.

Learning Objectives

- Describe the major sources of biomass.
- Create a life cycle analysis for biomass conversion.
- Examine different biofuel options.
- Outline the advantages and disadvantages for biomass and biofuel energy.

Activities

Unit 7 Text Questions	Homework	10 points
Unit 7 Online Lab Questions	Homework	10 points
Unit 7 Activity	Homework	15 points
Unit 7 Discussion 1	Discussion	5 points
Unit 7 Discussion 2	Discussion	5 points
Unit 7 Quiz	Quiz	15 points

Unit 8: Geothermal and Hydroelectric Energy

By now you know that energy is everywhere. And we could get it from anywhere. It's just a matter of finding out how to convert it so we can use it for electricity. In this last unit, you'll learn about geothermal and hydroelectric energy. Both of these renewable energy technologies use the earth's natural energy. One uses the heat deep in the earth's crust; the other uses the power of water.

Learning Objectives

- Describe types of geothermal energy.
- Discuss how hydroelectric energy is created.
- Examine environmental factors that influence these energy types.
- Evaluate the advantages and disadvantages of geothermal and hydroelectric energy.

Activities

Unit 8 Text Questions	Homework	10 points
Unit 8 Online Lab Questions	Homework	10 points
Unit 8 Activity	Homework	15 points
Unit 8 Discussion 1	Discussion	5 points
Unit 8 Discussion 2	Discussion	5 points
Unit 8 Quiz	Quiz	15 points

Unit 8: Geothermal and Hydroelectric Energy (Continued)

Final Exam Objectives

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from units five to eight in this course – the last four units. (Note: You will be able to open this exam only one time.)

Final Exam Activities

Class Reflection Discussion	Discussion	10 points
Final Exam	Exam	50 points

HOW YOU WILL BE GRADED

For critical thinking questions, there are no right or wrong answers. For example, a question on your thoughts on why you think people are shy is a pretty open-ended type of question. Grades will be based on the depth of personal insight you present. **Do not simply agree or disagree** with an insight question. We are looking for critical thinking and possibly a related personal experience with the question.

It is important to provide detailed answers for insight/opinion questions.

For review questions, you should be produce a more academic answer. For example, "What two categories are norms divided into?" This type of direct question requires a specific answer. Please use full sentences and proper grammar.

When submitting paragraphs, use these guidelines.

1. The first, second or last sentence contains the main idea and key words from the question or assigned topic.
2. Paragraph contains one to three explanatory sentences.
3. Paragraph contains two to four sentences about specific details related to question.
4. Details are colorful, interesting and appropriate.
5. Paragraph ends with a good closing sentence that refers to the main idea without repeating it.
6. Free of spelling and grammatical errors.

GRADE SCALE

The following grading scale will be used to determine your final letter grade.

Letter Grade	Percentage Earned
A	95%+
A-	90% - 94.9%
B+	87% - 89.9%
B	84% - 86.9%
B-	80% - 83.9%
C+	77% - 79.9%
C	74% - 76.9%
C-	70% - 73.9%
D+	67% - 69.9%
D	64% - 66.9%
D -	60% - 63.9%
F	59% and lower

SUPPORT

At NUVHS you will have access to multiple support teams. Who you contact will depend on the questions you have. Always start by contacting your teacher through the Message Center in the course. Your teacher should be able to answer your question, but if they can't, then they will direct you to another support team. If you have questions about any of the course content, your grades, or course policies, you should contact your instructor.

For questions about your enrollment, transcripts, or general school-wide policies, you can contact **NUVHS Student Services** at info@nuvhs.org or by phone at 866.366.8847. For example, if you would like to withdraw from your course, you should contact Student Services. Please note that a refund for your course can only be obtained if you drop within the first seven days of enrolling in the course.

For help with login/password issues, or other technical issues specific to the Blackboard website, you can contact the team at National University Blackboard Learn. They can also be reached by phone at (888) 892-9095.

EXPECTED SCHOOL-WIDE LEARNING RESULTS (ESLRs)

Engaged Learners

- Demonstrate self-directed learning skills such as time management, and personal responsibility through the completion of course requirements
- Develop an understanding of their own preferred learning styles to enhance their overall academic potential
- Incorporate effective and relevant internet and multimedia resources in their learning process to broaden their knowledge base

Critical Thinkers

- Effectively analyze and articulate sound opinions on a variety of complex concepts
- Illustrate a variety of problem-solving strategies that strengthen college preparation and workforce readiness
- Formulate a framework for applying a variety of technology and internet-based research to enhance information literacy and collaborative thinking

Effective Communicators

- Demonstrate awareness and sensitivity to tone and voice in multiple forms of communication
- Express concepts and ideas in a variety of forms
- Enhance communication skills through the use of media rich or other technology resources

Global Citizens

- Appreciate the value of diversity
- Understand the range of local and international issues facing today's global community
- Demonstrate awareness of the importance of cultural sensitivity and social responsibility in the 21st century