

Alternate Energy Systems

Course Code: 21057

Rationale Statement:

Alternate Energy systems play a critical role in everyday life, and as such are an important part of engineering. This course serves as an introductory course in alternative energy. This is a survey of wind, biomass, solar, geothermal, and other non-traditional energy sources, characteristics, and application by means of projects and hands-on activity, and other experimental activities. This course also provides a close look at the “Green Automobiles” of the future.

Suggested Grade Level: 10 - 12

Topics Covered:

- Historical and social development of alternative energy generation systems
- Key concepts of alternative energy systems
- Types of major energy generation systems
- Environmental impact of using alternate energy technologies

Core Technical Standards & Examples

Indicator #1: Understand the historical development of alternative energy generation systems	
Bloom’s Taxonomy Level	Standard and Examples
Understanding	<p>AES.1.1 Understand the historical background of alternative energy generation</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify various energy generation technologies throughout history • Analyze the significance of energy generation and the growth of society • Explain the relationship between energy production and public demand

Evaluating	<p>AES.1.2 Analyze the role of society in the use of energy generation methods</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Evaluate the demand levels for energy usage for industrialized nations • Summarize the influence energy has had on developing nations • Summarize the influence energy systems had on technological advancements
Evaluating	<p>AES.1.3 Analyze the cultural, socioeconomic and political effects of alternate energy technologies</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Build a motor support structure and powers it to lift a weight with the most appropriate power supply • Identify factors affecting the price of electricity • Analyze data to select the most appropriate technology for the given problem
<p>Indicator #2: Investigate a basic understanding of alternative energy</p>	
<p>Bloom's Taxonomy Level</p>	<p>Standard and Examples</p>
Understanding	<p>AES.2.1 Understand the key terms of technology</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Define alternative energy • Define renewable energy • Define non-renewable energy
Understanding	<p>AES.2.2 Understand the key concepts of technology</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • State some of the energy theory behind the 'greenhouse effect' • Analyze data to select the most appropriate technology for the given problem • Make precise calculations and check the validity of the results from the context of the problem

Indicator #3: Understand the types of major energy systems	
Bloom's Taxonomy Level	Standard and Examples
Analyzing	<p>AES.3.1 Analyze the characteristics of wind energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify various types of wind energy systems • Analyze structures in wind energy systems • State that wind energy can be used to generate electricity
Analyzing	<p>AES.3.2 Analyze the characteristics biomass energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify the various types of biomass systems • Identify the types of biomass • Analyze the various processes used to convert biomass into energy
Analyzing	<p>AES.3.3 Analyze the characteristics solar energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • State that solar energy can be used to generate electricity • State the energy conversion-taking place in solar panels • Analyze the environmental benefits for using solar energy systems
Analyzing	<p>AES.3.4 Analyze the characteristics geothermal energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify the various types of geothermal systems • Compare the advantages and disadvantages of using geothermal energy • Analyze he various processes used to convert geothermal into energy
Analyzing	<p>AES.3.5 Analyze the characteristics traditional energy generation systems</p> <p><i>Examples:</i></p>

	<ul style="list-style-type: none"> • Identify the correct energy flow in a nuclear power plant • Identify the processes involved when using nuclear energy to generate electricity • State the environmental benefits for using traditional energy systems
<p>Indicator #4: Understand the environmental impact of using alternate energy generation technologies</p>	
<p>Bloom's Taxonomy Level</p>	<p>Standard and Examples</p>
<p>Understanding</p>	<p>AES.4.1 Understand the environmental effects of alternate energy technologies</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify how water can be used to generate electricity • Identify the purpose of the sub-systems within a hydroelectric Power plant • State that wind energy can be used to generate electricity