

Alternative Energy Systems

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| Career Cluster | STEM |
| Course Code | 21057 |
| Prerequisite(s) | None |
| Credit | .5 |
| Program of Study and Sequence | Foundational Courses, Cluster Courses, Pathway Courses, Capstone Experience |
| Student Organization | None |
| Coordinating Work-Based Learning | None |
| Industry Certifications | None |
| Dual Credit or Dual Enrollment | TBD |
| Teacher Certification | Technology Education |
| Resources | Teaching Renewable Energy: http://www.ucsus.org/sites/default/files/legacy/assets/documents/clean_energy/renewablesready_fullreport.pdf National Renewable Energy Laboratory: http://www.nrel.gov/docs/gen/fy01/30927.pdf http://www.nrel.gov/education/educational_resources.html |

Course Description:

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.

Program of Study Application

This is a STEM Pathway Course for the Energy Pathway, preceded by a Foundational Course(s) and a Cluster Course(s).

Course Standards

Indicator # AES 1 Understand the historical development of alternative energy systems

| <i>Webb Level</i> | <i>Sub-indicator</i> | <i>Integrated Content</i> |
|--------------------------|---|---------------------------|
| Three Strategic thinking | <p>AES.1.1 Understand the historical background of alternative energy generation</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Define alternative, renewable, and nonrenewable energy. • 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 | |
| Three Strategic Thinking | <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 | |
| Four Extended thinking | <p>AES.1.3 Analyze the cultural, socioeconomic and political effects of alternative energy technologies</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify factors affecting the price of electricity • Analyze resource allocation, such as using renewable resources (like ethanol) for energy as compared to using these resources for other uses (like food). | |

Career Cluster: STEM

Course: Alternative Energy

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| Three Strategic thinking | AES.1.4 Understand the environmental impact of energy production and consumption. <i>Examples:</i> <ul style="list-style-type: none">• Identify the relationship between fossil fuels and greenhouse gases• Investigate extraction processes of raw materials used for fuel• Evaluate the impact individuals can have on the environment from the reduction of energy use | Algebra, geography |
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Notes:

Indicator # AES 2 Understand the types of major energy systems

| <i>Webb Level</i> | <i>Sub-indicator</i> | <i>Integrated Content</i> |
|--------------------------|--|------------------------------|
| Three Strategic Thinking | <p>AES.2.1 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 | |
| Four Extended thinking | <p>AES.2.2 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 | |
| Four Extended thinking | <p>AES.2.3 Analyze the characteristics of 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 | marine & hydrokinetic energy |
| Four Extended thinking | <p>AES.2.4 Analyze the characteristics of 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 the various processes used to convert geothermal into energy | |

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Course: Alternative Energy

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| Two Skill/Concept | AES.2.5 Analyze the characteristics of traditional energy generation systems <i>Examples:</i> <ul style="list-style-type: none">• Identify the processes involved when using nuclear energy to generate electricity• Identify the processes involved when using hydroelectric approaches to generate electricity• State the environmental benefits for using traditional energy systems | |
| Four Extended thinking | AES 2.6 Model an alternative energy system. <i>Examples:</i> <ul style="list-style-type: none">• Build a device to lift a weight with the most appropriate alternative power supply.• Create a functioning scale model of an alternative energy system | |

Notes:

Career Cluster: STEM

Course: Alternative Energy

Indicator # AES 3 Research alternative energy careers and trends in energy development

| <i>Webb Level</i> | <i>Sub-indicator</i> | <i>Integrated Content</i> |
|--------------------------------|--|---------------------------|
| Three Strategic thinking | AES3.1 Identify careers in alternative energy. <i>Example:</i> <ul style="list-style-type: none">• Investigate jobs in each of the alternative energy fields.• Research, create a report, and present your findings on a career of interest in alternative energy. | |
| One Recall | AES3.2 Identify future energy resources. <i>Example:</i> <ul style="list-style-type: none">• Identify new fields of study, such as Marine Hydrokinetic Energy. | |

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