# Energy, Power & Society Course No. 41150 Credit: 1.0

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| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Energy (17.2071)

Course Description: A **technical level** course in which students will compare various energy sources, analyze the modern demands of power usage, and evaluate the economic, environmental, and social impacts of renewable and nonrenewable energy sources.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: General Knowledge

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Define and analyze different forms of energy, differentiate between potential and kinetic energy, and give examples of how each form of energy is used. |  |
| 1.2 | Analyze past and present energy conversion systems and conversion efficiencies. |  |
| 1.3 | List major energy resources, their past and present contributions, and projected supplies. |  |
| 1.4 | Describe the energy forms, quantities, and end uses in the residential, commercial, industrial, and transportation sectors. |  |
| 1.5 | List the factors that could lead to energy crises events, their potential impacts on society, and implications for future energy consumption. Detail what individuals, organizations, and governments can do to prevent or plan for possible energy crises. |  |
| 1.6 | Understand the differences between renewable and nonrenewable energy sources and how each affects the world. |  |
| 1.7 | Differentiate between the positive and negative impacts of renewable and nonrenewable energy sources on global economic, environmental, and societal systems as well as on individuals. |  |
| 1.8 | State how renewable energy sources that utilize solar, wind, earth, oceans, biomass and waste can be used to supply energy and discuss how they were developed. |  |
| 1.9 | Compare and contrast various locations throughout the world which would be best suited for utilization of renewable energies. |  |

## Benchmark 2: power generation

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Define work and power. Illustrate an understanding of historic human use of power; demonstrate by making and using simple machines. |  |
| 2.2 | Describe the basic principles of power generation, transmission, distribution and usage with fossil fuels, wind, solar, biomass, hydroelectric, geothermal, and nuclear power sources. |  |
| 2.3 | Compare the benefits and potential harmful effects on the economy, environment, society, and individuals from fossil fuels, wind, solar, biomass, hydroelectric, geothermal, and nuclear power sources. |  |

## Benchmark 3: Transportation Energy & Alternative Transportation Energy

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Analyze the function of reciprocating engine design and construction. |  |
| 3.2 | Analyze the similarities and differences between 2- and 4-stroke cycle engine designs. |  |
| 3.3 | Differentiate between compression ignition engines and other types, and explain why they are currently the most common engines. |  |
| 3.4 | Analyze the similarities and differences in the designs and functions of gas turbine engines, ram powered engines, and rocket engines. |  |
| 3.5 | Describe how the steam turbine functions to transmit energy. |  |
| 3.6 | Describe how external combustion devices produce, transmit, and use power for useful purposes. |  |
| 3.7 | Describe several innovative or uncommon engine designs such as the Stirling engine, how they differ from other engines, and how they may be used in the future. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

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