

# Renewable Energy (RE)

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## Courses

### **RE A100 Introduction to Sustainable Energy 3 Credits**

Introduces students to the field of sustainable energy. Topics include current energy use, principles of energy conservation and efficiency, renewable energy resources, technologies, storage and hardware options, regulations, applicable codes, and career pathways.

### **RE A102 Applied Physics for Sustainable Energy 3 Credits**

Introductory course for students considering a career in sustainable energy. Includes the physical principles for energy efficiency and various renewable energy technologies, including solar, wind, hydropower and geothermal. Demonstrates how the principles of physics relate to the design, basic operation, advantages and limitations of sustainable energy projects.

**Registration Restrictions:** Placement into MATH A055 or higher

**Prerequisites:** RE A100 with a minimum grade of D or concurrent enrollment.

### **RE A110 Introduction to Solar Photovoltaic Systems 1 Credit**

Presents basics of design and installation of solar photovoltaic (PV) systems with an emphasis on residential-scale systems. Introduces physics related to solar energy, ways of harvesting solar energy, sizing a PV system, energy storage vs. grid-tie, system components, installation options, cost/benefit considerations, and safety.

### **RE A120 Introduction to Solar Hot Water Systems 1 Credit**

Presents basics of design and installation of solar thermal hot water systems with emphasis on residential-scale systems. Introduces physics related to solar thermal energy, ways of harvesting solar energy, sizing solar thermal systems, and uses in domestic hot water and space heat applications. Includes energy storage, system components, installation techniques, cost/benefit considerations, and safety.

### **RE A130 Introduction to Small Wind Systems 1 Credit**

Presents basics of the design, installation and operation of small wind systems with an emphasis on residential-scale systems. Introduces physics related to wind energy, ways of harvesting and using wind energy, turbine and site selection, energy storage vs. grid-tie considerations, system components, installation techniques, cost/benefit considerations, and safety.

### **RE A140 Home Energy Basics 1 Credit**

Introduces the fundamental principles and skills to complete a home energy audit.

### **RE A150 Basics of Ground-Source Heat Pump Systems 1 Credit**

Presents basics of ground-source heat pump geoexchange systems and their use for space heating and cooling and domestic hot water production. Introduces physical concepts related to harvesting shallow geothermal energy, system components, common installation configurations, cost/benefit considerations and safety.

### **RE A160 Basics of Biodiesel and Vegetable Oil Fuel Systems 1 Credit**

Presents biodiesel processing techniques and straight vegetable oil (SVO) fuel systems and their use in Alaska. Introduces the science of biodiesel and SVO systems, including use of fish oil. Examines safe production techniques, different types of processors and SVO systems, and issues with emissions, collection, and storage.

**Special Note:** Students will make their own small batches of biodiesel.

### **RE A203 Sustainable Energy Project Development 3 Credits**

Synthesizes facets of project development and management within the context of sustainable energy projects.

**Prerequisites:** RE A100 with a minimum grade of D.

### **RE A210 Cold Climate Construction 3 Credits**

Covers design, construction and basic building science related to understanding, planning, and constructing or retrofitting a durable home in a difficult climate.

**Special Note:** Upon satisfactory completion, this course meets the prerequisite for the State of Alaska Contractor Residential Endorsement and provides 16 continuing education credits by the State of Alaska Division of Occupational Licensing for General Contractors with Residential Endorsements.

### **RE A290 Selected Topics in Sustainable Energy 1-4 Credits**

Various topics of interest related to sustainable energy systems and development, including energy conservation, energy efficiency and renewable energy production.

**Special Note:** May be repeated for a maximum of 9 credits with a change in subtitle.