

SUSTAINABLE ENERGY (NRGY)

NRGY 101N - Intro to Sustainable Energy. 3 Credits.

Offered autumn. Offered at Missoula College. A survey of traditional energy systems and technologies. Introduces conventional primary energy sources—coal, oil, gas, nuclear—and examines the technologies used to capture, convert, distribute, store, and utilize these energy sources. Consideration is given to physical and engineering aspects, as well as economic, social environmental, and political factors that determine the sustainability of these sources.

NRGY 102 - Intro to Sustainable Energy II. 3 Credits.

Offered autumn and spring. Offered at Missoula College. Prereq., NRGY 101 or consent of instructor. Same as CCS 102. A survey of renewable energy systems and technologies. Addresses physical and technical aspects of wind, solar, geothermal, hydro, tidal, biological, and wave energy systems. Consideration is given to engineering, economic, social, environmental, and political factors that determine implementation and sustainability. Credit not allowed for both NRG 102 and CCS 102.

NRGY 120 - Industrial Safety and Rigging. 3 Credits.

Offered autumn. Offered at Missoula College. This course provides an overview of safe industrial practices and provides students with hands-on experiences in rigging for a variety of industries. Students will complete the requirements for an OSHA 30 certification, construct a scaffold system, identify equipment for shifting heavy loads such as may be used in the wind and solar industries. Load security, fall gear, arrest equipment, confined spaces, safety data sheets will be covered. Students will also learn elements of first aid, cardio-pulmonary resuscitation (CPR), and proper use of Automated External Defibrillators (AED's).

NRGY 191 - Special Topics. 1-3 Credits.

(R-6) Offered intermittently. Offered at Missoula College. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

NRGY 192 - Independent Study. 1-6 Credits.

(R-6) Offered intermittently. Offered at Missoula College. Course material appropriate to the needs and objectives of the individual student.

NRGY 195 - Practicum. 2 Credits.

Offered summer. Offered at Missoula College. Prereq., NRGY 101, M 121 or consent of instructor. Same as CCS 191. The practicum provides students with a supervised field experience. Students will gain hands-on experience with energy specific technologies in a fast-paced creative environment. This course increases students' occupational awareness and professionalism.

NRGY 196 - Independent Study. 1-6 Credits.

(R-6) Offered intermittently. Offered at Missoula College. Course material appropriate to the needs and objectives of the individual student.

NRGY 235 - Building Energy Efficiency. 4 Credits.

Offered spring. Offered at Missoula College. Prereq., NRGY 101. Provides an overview of energy efficiency opportunities in residential buildings with an emphasis on the Passivhaus standard. Prepares the student to take the National RESNET Home Energy Rater Exam, which is a required final exam. Local home and industry tours, and hands-on exposure to HVAC controls and maintenance are also offered. Study of the analysis techniques used for reduction of energy consumption and energy management, including energy accounting and energy auditing. Residential and commercial building energy efficiency opportunities will be covered. Other topics addressed include motors, pumps, green building, and purchasing energy supplies. Career opportunities in energy efficiency will be discussed. Several local tours of energy-efficient homes will occur throughout the semester.

NRGY 241 - Alternative Fuels. 3 Credits.

Offered autumn. Offered at Missoula College. Prereq., NRGY 101, M 121. Identifies alternative fuel sources; explores fuel characteristics; identifies and evaluates the infrastructure required to produce, store, distribute, and use them; discusses emission and conversion efficiencies; assesses social, environmental, and economic impacts.

NRGY 242 - Solar Thermal & Wind Systems. 3 Credits.

Offered autumn. Offered at Missoula College. Prereq., NRGY 101, M 121, Prereq., or Co-req., M 122. Same as CCS 242. Introduction to the fundamentals of solar and wind energy for the design and installation of solar thermal and wind systems. Includes an overview of the physics and chemistry of the resource and the technology, and will prepare students for a career in renewable energy or for installing a renewable energy system on their own home. Credit given for NRG 242 or CCS 242, not both.

NRGY 243 - Fundmtl PV Design & Install. 3 Credits.

Offered spring. Offered at Missoula College. Prereq., M 121, Prereq./Co-req., ETEC 105. An introduction to the fundamental principles and technologies of solar photovoltaic energy systems. Emphasis on system design and installation, including site and resource assessment, load analysis, troubleshooting, and cost analysis. The material covered prepares students for a career in renewable energy or for installing a renewable energy system on their own home.

NRGY 244 - Bioenergy. 3 Credits.

Offered spring. Offered at Missoula College. Prereqs., SCN 175N, M 121 and NRGY 102, or consent of instructor. Investigates the physical nature of various biorenewable resources and the technologies currently employed to produce, harvest, refine and convert these into useable energy, feedstocks and products.

NRGY 245 - Fuel Cells. 3 Credits.

Offered spring. Offered at Missoula College. Prereq., NRGY 101, M 121. An introduction to the different types of fuel cells (hydrogen, biological, metal/air, proton exchange membrane, etc.) accompanied by a critical examination of their applications, operation, efficiencies, advantages and disadvantages. Students must purchase a fuel cell kit for a laboratory component.

NRGY 246 - Geothermal Energy Technology. 3 Credits.

Offered autumn. Offered at Missoula College. Prereqs., NRGY 101 and 102 and M 121. An introduction to the physical and technical aspects of geothermal energy systems. Topics covered include the fundamental principles of geology and hydrology, heat flow mechanisms, and a consideration of heat exchange systems including: dry steam, flash, binary systems, heat pumps, passive systems. The course also surveys political, economic, ecological, and social aspects of geothermal energy development.

NRGY 250 - Energy Finance. 3 Credits.

Offered summer. Offered at Missoula College. An introduction to the terminology, policies, and mathematical models for financing energy technology projects. Concepts covered include time value of money, tax code, triple bottom line, and cost-benefit analysis. Microsoft Excel will be used.

NRGY 260 - Smart Grid Technology. 3 Credits.

Offered at Missoula College. Prereq., ETEC 105 or equivalent. Provides an overview of smart grid technician opportunities at both the residential and industrial scale. Prepares the student to work in a variety of settings including programming a thermostat, monitoring a grid simulation system, building a simple timer to schedule when major appliances run, familiarity with Energy STAR appliances, and integration with both renewable and non-renewable primary energy sources. Local home and industry tours, and hands-on exposure to programmable logic circuits will be part of the course. Study of efficiency techniques used for reduction of energy consumption at the residential and industrial scale will be included. Career opportunities in a variety of industries related to grid-scale power management will be discussed. Possible projects include the building of a small circuit to coordinate the operation of a suite of appliances.

NRGY 270 - Recycling Technology. 4 Credits.

Offered at Missoula College. Familiarity with general materials and their properties is assumed. Students must possess basic word processing skills, be able to download and open relatively large PDF files, and perform functions such as loading software and navigating between folders and files. Familiarity with basic computing skills is a must for online courses and will significantly influence your course experience. Provides an overview of recycling opportunities at both the residential and industrial scale. Prepares the student to work with a variety of materials including cellulosic, plastic, metal, glass and electronics waste. Students will be exposed to ANSI-IREC standards as well as LEED standards for repurposing and ?upcycling? materials. Local home and industry tours, and hands-on exposure to materials processors such as glass pulverizer, cardboard grinders and plastics extruders will be part of the course. Study of efficiency techniques used for reduction of virgin material consumption and waste management, including materials auditing and accessing international materials reclamation will be included. Career opportunities in a variety of industries related to materials reclamation will be discussed. Possible projects include the building of a solar thermal forge.

NRGY 290 - Undergraduate Research. 1-10 Credits.

Offered every term. Offered at Missoula College. Prereq., consent of instr. Independent research under the direction of a faculty member.

NRGY 291 - Special Topics. 1-4 Credits.

(R-6) Offered intermittently. Offered at Missoula College. Experimental offerings of Energy Technology faculty and visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

NRGY 292 - Independent Study. 1-9 Credits.

(R-6) Offered intermittently. Offered at Missoula College. Course material appropriate to the needs and objectives of the individual student.

NRGY 295 - Practicum. 2 Credits.

Offered at Missoula College. The practicum provides students with a supervised field experience. Students will gain hands-on experience with energy specific technologies in a fast-paced creative environment. This course increases students' occupational awareness and professionalism.

NRGY 298 - Internship. 2 Credits.

Offered every term. Prereq., M 121 and consent of instructor. Same as CCS 298. Extended classroom experience providing practical application of classroom learning through on the job training in a student's field of study. This experience increases student skills, prepares them for initial employment, and increases occupational awareness and professionalism.

NRGY 299 - Energy Technology Capstone. 3 Credits.

(R-9) Offered spring and autumn. Offered at Missoula College. Students participate in an energy technology design, building, testing, and competition. Previous examples include participation in the Shell EcoMarathon and the American Society of Mechanical Engineering Human Powered Vehicle Challenge. This course is very time intensive and will require meetings outside of regularly scheduled class times. Travel to competition is strongly encouraged, but not required.