

**Common Course Outline**  
**AIRC 230**  
**Alternative and Renewable Energy Sources**  
**3 Semester Hours**

**The Community College of Baltimore County**

**Description**

**AIRC 230 – 3 Credits - Alternative and Renewable Energy Sources** provides a comprehensive overview of renewable energies including solar energy, wind power, hydropower, fuel cells, biomass, and alternative transportation options. Students learn the principles of solar home design, solar hot water, heating, and cooling for new and existing construction. Students assess the viability of a wind power, hydropower or biomass system for a given site. Students also study the impact of government regulations on the use of renewable energies and investigate the potential of renewable energy technologies to help solve environmental and economic problems within society.

**3 Credits:** 2 lecture hours; 2 lab hours per week

**Prerequisites:** AIRC 210, AIRC 205, ELEI 101 or approval of program coordinator

**Overall Course Objectives**

Upon completion of this course the student will be able to:

1. classify and describe the different types of renewable energy systems, including solar energy, wind power, hydropower, renewable energy, fuel cells, and biomass;
2. assess renewable energy systems for their economic and environmental impacts;
3. explain the economics of combining energy conservation and renewable energy projects;
4. explain the effects of government regulations, politics, and corporate development on the renewable energies industry;
5. evaluate a solar energy systems for its cost effectiveness and its quality of design;
6. design a solar energy system;
7. estimate the amount of energy available from wind, water, solar, and other renewable energy systems at a site, given the appropriate data;
8. create a long-term plan to phase in renewable energies;
9. describe the steps for consumer selection of “green power”; and
10. explore the types of job opportunities available in the renewable energies industry and investigate the skills required for these jobs.

**Major Topics**

- I. Overview of the energy situation
- II. Determine energy requirements
- III. Effect of government regulation on the renewable energies industry
- IV. Solar basics and solar thermal power
- V. Wind power

- VI. Hydropower
- VII. Biomass
- VIII. Photovoltaics and fuel cells
- IX. State of the industry

### **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member and will be provided on the first day of class.

The following will be required for this course:

1. Written paper or suitable practical project
  - If a written paper is assigned, the following will apply:
    - a. Topic of the paper will be selected by the student and should relate to the subject material of the course.
    - b. The paper should be six (6) to eight (8) pages in length, typewritten, and double-spaced. It should include in addition to the six (6) to eight (8) pages of text, an author and title page and bibliography utilizing a minimum of three reference resources excluding classroom materials.
    - c. All papers are due when 80% of the class sessions are completed.
2. Midterm exam
3. Comprehensive final
4. Minimum of three (3) classroom assignments
5. Minimum of four (4) homework assignments
6. Class discussion and participation

### **Other Course Information**

This course is an Alternative Energy Certificate core course and a Heating, Ventilating, Air Conditioning and Energy program elective.

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.