

**STATUS:**   A  

**COMMON COURSE NUMBER:**   BCN2560  

**COURSE TITLE:**   Mechanical and Electrical Systems  

**CREDIT HOURS:**           3          

**CONTACT HOURS BREAKDOWN:**

**Lecture/Discussion**           48          

**Lab**   

**Other**   

**Contact Hours/Week**           3          

**CATALOG COURSE DESCRIPTION:**

Prerequisite: None

Corequisite: None

Acquaints student with mechanical and electrical equipment commonly used in high-rise and commercial buildings. Presents fundamentals of air conditioning, heating, lighting, communicating, and wiring for electrical equipment. It includes a study of specialty equipment such as solar heating.

General Education Requirements - Associate of Arts Degree, meets Area(s):  
General Education Requirements - Associate in Science Degree, meets Area(s):

**UNIT TITLES:**

- 1. Energy and Environment**
- 2. Comfort, Heat Loss and Heat Gain**
- 3. Solar Energy and Energy Conservation**
- 4. Principles of Electricity, Electrical Systems and Materials**

**I. Course Overview:**

Upon successful completion of this course, the students should be able to demonstrate a proficiency in the basic principles of mechanical and electrical systems of buildings according to accepted professional standards.

**II. Units:**

**Unit 1. Energy and Environment**

General Outcome:

- 1.0 The students should be able to demonstrate a proficiency in the decision making process that will influence the selection of the building's mechanical and electrical equipment and its overall consumption of energy.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Describe energy sources for buildings.  
1.2 Relate the climate and the site for building orientation.  
1.3 Relate energy and architectural design.

## **Unit 2. Comfort, Heat Loss and Heat Gain**

### General Outcome:

- 2.0 The students should be able to demonstrate a proficiency in basics of thermal comfort heat flow.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Describe the thermal indoor design conditions of a building for winter and summer.
- 2.2 Describe heat loss and the thermal value of walls and roofs.
- 2.3 Define the thermal conductivity and resistance of different materials.
- 2.4 Define the heat transmission coefficient of a roof, wall or floor.
- 2.5 Calculate heat losses and heat gain for a typical South Florida home.

### **Unit 3. Solar Energy and Energy Conservation**

#### General Outcome:

- 3.0 The students should be able to demonstrate a proficiency in the fundamentals of solar technology and the basics of energy conservation principles.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Describe solar radiation.
- 3.2 Explain radiation measurements.
- 3.3 Describe flat plate and parabolic collectors.
- 3.4 Describe stratified heat storage.
- 3.5 Draw a diagram of a collector with a stratified storage tank.
- 3.6 Evaluate the economics of solar heaters as compared with conventional heating systems.

## **Unit 4. Principles of Electricity, Electrical Systems and Materials**

### General Outcome:

- 4.0 The students should be able to demonstrate a proficiency in the basic principles of electricity and the fundamental concepts of material and electrical components as outlined in the latest National Electric Code (NEC).

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Define the units of electrical current, potential, and resistance.
- 4.2 Apply Ohm's Law to series and parallel circuits.
- 4.3 Describe direct and alternating current fundamentals.
- 4.4 Define power and energy in DC and AC circuits.
- 4.5 Describe wiring, power handling, control and utilization equipment.
- 4.6 Define conductor ampacity and classify conductors according to type of insulation.
- 4.7 Draw plans of the electrical system for a small residence.