



COMMON COURSE OUTLINE: Course discipline/number/title: GEM 1110: Commercial Green Energy Management Lab

A. CATALOG DESCRIPTION

1. **Credits: 4 (Lab)**
2. **Hours/Week: 8**
3. **Prerequisites (Course discipline/number):** Concurrent or successful completion BUM III and IV courses or a similar HVAC program or background in a commercial HVAC system operation with instructors permission.
4. **Co-requisites (Course discipline/number):** Enrollment in GEM 1100
5. **MnTC Goals (if any):** NA

This course provides lab work and applications related to the latest theories' and principles of green energy savings in commercial HVAC systems. Lab components include commercial Green Energy, HVAC automated control systems, commercial lighting for energy savings, commercial heat loss analysis, and commercial alternative energy sources, hybrid control systems conversions to electronic control, commercial solar and wind technology applications.

B. DATE LAST REVISED (Month, year): February, 2009

C. OUTLINE OF MAJOR CONTENT AREAS:

1. Diagnose and operate commercial Green Energy systems
2. Diagnose and operate Green Energy automated control systems
3. Diagnose and operate commercial Green Energy pneumatic systems
4. Diagnose and operate commercial Green Energy hybrid control systems
5. Diagnose and operate commercial Green Energy air handling units
6. Diagnose and operate the total commercial Green Energy HVAC automated control circuit
7. Diagnose and operate commercial Green Energy heat loss analysis equipment
8. Demonstrate commercial Green Energy comfort and psychometrics principles
9. Identify commercial Green Energy high efficiency hot water boiler components
10. Identify commercial Green Energy high efficiency forced air furnace components
11. Identify commercial Green Energy heat pump components
12. Identify commercial Green Energy solar energy components
13. Identify commercial Green Energy wind technology components

D. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Observe commercial Green Energy heating cycle.
2. Analyze Green Energy electrical efficiencies in commercial lighting.
3. Install commercial Green Energy automated controllers.
4. Commission a commercial Green Energy automated controller.
5. Create a program for Green Energy savings for a commercial automated system.
6. Evaluate commercial Green energy electrical energy usage.

E. LEARNING OUTCOMES (MNTC): NA

F. METHODS FOR EVALUATION OF STUDENT LEARNING:

1. Fully Operational Lab Tests
2. Workbook and Lab assignments
3. A-F grading scale

G. SPECIAL INFORMATION (if any): None