COMMON COURSE OUTLINE: Course discipline/number/title: BU 2612: Refrigeration Systems Lab

A. CATALOG DESCRIPTION
   1. Credits: 2
   2. Hours/Week: 4
   3. Prerequisites (if any): BUM II courses or background in Electricity and concurrent or successfully completed BU 2602.
   4. Co-requisites (if any): None
   5. MnTC Goals (if any): NA

This course covers principles of HVAC and air conditioning systems. Furnaces, boiler, air conditioners, heat pumps, economizers, heating & cooling decks, and zones are analyzed and operated. Recommended Entry Skills Knowledge: Electrical and/or Mechanical Ability.

B. DATE LAST REVISED (use current date): April, 2004

C. OUTLINE OF MAJOR CONTENT AREAS:
   1. Demonstrate accuracy.
   2. Diagnose and operate hot water boilers.
   3. Diagnose and operate forced air furnaces.
   4. Diagnose and operate electric furnaces.
   5. Diagnose and operate alternate heating systems.
   6. Diagnose and operate air conditioning systems.
   7. Diagnose and operate air handling.
   8. Diagnose and operate economizer/dampers.
   9. Diagnose and operate air to air heat pumps.
   10. Diagnose and operate geothermal heat pumps.
   11. Diagnose and operate gas fired furnaces.
   12. Diagnose and operate oil fired furnaces.
   13. Diagnose and operate the total HVAC control circuit.
   14. Diagnose and operate an Andover energy managing system.
   15. Program an Andover energy managing system.
   16. Measure indoor air quality.
   17. Diagnose and operate temperature graphing techniques.
   18. Demonstrate comfort and psychrometrics principles.
   19. Isolate hot water boiler components.
   21. Isolate forced air furnace components.
   22. Isolate air conditioning components.
   23. Isolate heat pump components.
   24. Isolate alternate heating components.
   25. Isolate air handling components.
   26. Observe firing and heating cycle.
   27. Switch pump motors.
   28. Start/Stop firing system.
   29. Drain expansion tanks.
   30. Add cold water.
   31. Test heat units temperature differences.
   32. Check electrical circuit.
   33. Print graphs/temps.
   34. Check air filters.
   35. Check drive belts.
   36. Check damper linkage.
   37. Start supply fan.
   38. Record motor amps.
   39. Start air conditioner.
   40. Measure temperature difference.
C. OUTLINE OF MAJOR CONTENT AREAS: Continued... 
41. Start heating systems. 
42. Adjust heating controls. 
43. Check forced draft fan. 
44. Operate heating system in unoccupied mode. 
45. Test damper/economizer. 
46. Adjust economizer controls. 
47. Measure operation temperature. 
48. Override automatic controls. 

D. LEARNING OUTCOMES (GENERAL): The student will be able to: 
   1. Test. 
   2. Analyze. 
   3. Repair. 
   4. Install. 

E. LEARNING OUTCOMES (MNTC): NA 

F. METHODS FOR EVALUATION OF STUDENT LEARNING: 
   1. Proficiency at operating lab equipment 
   2. Fully Operational Lab Tests 
   3. Lab Assignments 

G. SPECIAL INFORMATION (if any): None