COURSE INFORMATION FORM

DISCIPLINE   HVAC
COURSE TITLE   Stationary Engineering

CR.HR        3   LECT HR.   2.5   LAB HR.   1   CLIN/INTERN HR.       CLOCK HR.       

CATALOG DESCRIPTION

Principles and safe operation of low pressure and high pressure boilers. The course will prepare students for the basic licensing examination for stationary engineering.

PREREQUISITES

HVAC 111 & 120

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

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

1. Safely operate a low pressure boiler.
2. Demonstrate the ability to cut and thread pipe.
3. Identify boiler fittings.
4. Describe the feed water system.
5. Define the fuel system.
6. Explain the draft system.
8. State boiler operation procedures.
9. Define, describe and demonstrate the ability to safely operate hydronic heating systems and low pressure boilers.
10. State and explain boiler operation safety.
11. State the requirement for boiler operator licenses.
12. Demonstrate an understanding of the business community.
GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>ESO</th>
</tr>
</thead>
</table>

PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Student will demonstrate professional oral and written communication skills.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Quizzes and written examination (1 – 11)
2. Homework and classroom exercises (1 – 11)
3. Student participation and in-class discussions (1 – 12)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Boiler operation principles
   A. Boiler Thermodynamics
   B. Combustion
   C. Boiler Types
II. Boiler Fittings
   A. Safety Valves
   B. System pressure gauge
   C. Water Column
   D. Pressure Controls
III. Feed Water System
   A. Feed water accessories
   B. Feed water valves
   C. Make up water
   D. Level control and safety
IV. Steam system
   A. Steam system accessories
   B. Valves and types
   C. Steam Headers and traps
   D. Heating Units
V. Fuel Systems
   A. Types of fuel
   B. Burners-gas and oil
   C. Combustion controls
   D. Flame guards
   E. Combustion efficiency
VI. Draft system
   A. Natural draft
   B. Mechanical Draft
VII. Boiler Water Treatment
   A. Boiler Water analysis
   B. Water treatment
VIII. Boiler Operation
   A. Shift Change
   B. Start-up procedures
   C. Boiler Maintenance
   D. Shut down procedure
   E. Boiler Troubleshooting

IX. Hot water heating systems
   A. Natural circulation systems
   B. Forced circulation
   C. Control systems

X. Boiler Safety
   A. Codes
   B. OSHA
   C. Hazardous material
   D. Personal Protection