

STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE

ACHP171 – HEATING AND PLUMBING PRINCIPLES AND PRACTICES 1

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SCHOOL OF ENGINEERING TECHNOLOGY

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- A. TITLE: Heating and Plumbing Principles and Practices 1
- B. COURSE NUMBER: ACHP171
SHORT TITLE Heating and Plumbing
- C. CREDIT HOURS: 7
- D. WRITING INTENSIVE COURSE: (OPTIONAL) No
- E. LENGTH OF COURSE: 15 weeks (including final)
- F. SEMESTER(S) OFFERED: Fall
- G. HOURS OF LECTURE: 4 hrs. of lecture per week.
9 hrs. of lab per week.
- H. CATALOGUE DESCRIPTION: The fundamentals of heating equipment and practices; selection, use and care of hand and power tools; piping fabrication of copper, steel, cast iron and plastic pipe; oil burner installation and service; drainage, waste and vent plumbing; basic sheet metal practice; well pumps and accessories.
- I. PRE-REQUISITES: None
CO-COURSES: MATH 101 or 106, ENGL 101, and CONS 151
- J. GOALS (STUDENT LEARNING OUTCOMES):
By the end of the course, the student should be able to:

Course Objective	Institutional SLO
Install a half bathroom using proper practices in a group setting	3. Professional competence 4. Inter/Intra personal skills
Install a functional single zone oil boiler in a group setting	3. Professional competence 4. Inter/Intra personal skills
Show proper usage of hand and power threading tools	3. Professional competence
Flare and solder copper pipe and tubing	3. Professional competence
Create basic sheet metal objects	3. Professional competence
Design proper DWV and supply water systems	2. Critical thinking 3. Professional competence

- K. TEXTBOOK: Residential Construction Academy: Plumbing
Residential Construction Academy: Heating
Sheet Metal
ACHP171 Lab and Reference Manual
- L. REFERENCES: Manufacturer installation and service manuals, ASHRAE Fundamentals.
- M. EQUIPMENT: Various heating and plumbing equipment, combustion analyzer, velometer, multimeter, ammeter and monometer.
- N. GRADING METHOD: (P/F, A-F, etc.): A-F.
- O. MEASUREMENT CRITERIA/METHODS: One half of grade will come from completed lab projects. One half of grade will come from lecture quizzes and exams.
- P. DETAILED TOPICAL OUTLINE:
1. Layout and installation of half-bathroom
 - a. Select proper location of DWV and supply piping;
 - b. Install leak-free fixtures;
 - c. Provide a detailed material list.
 2. Replacing fixtures
 - d. Diagnostic check of existing fixture reliability;
 - d. Understanding and applying manufacturer data sheets for fixture replacement;
 - e. Job cost estimating.
 3. Water heater installation and service
 - f. Calculating hot water demand;
 - g. Sizing of gas, oil or electrical supply lines;
 - h. Determining flue connections as required;
 - i. Use of multimeter and manufacturer wiring diagrams for troubleshooting.
 4. Sheet metal pattern drafting and fabrication
 - j. Basic sheet metal patterns;
 - k. Construction of at least (2) sheet metal projects;
 - l. Demonstrate ability with sheet metal tools.
 5. Oil fired equipment controls
 - m. Ignition transformers;
 - n. Primary Controls;
 - o. Cad cell sensors;
 - p. Fan and limit control.
 6. Hydronic system installation

- q. Boiler and sundry installation;
- r. Fuel and flue sizing;
- s. Supply and return piping sizing for a single zone;
- t. Combustion efficiency calculation;
- u. Complete material list.

7. Well pump installation

- v. Shallow well, single pipe;
- w. Shallow well, (2) pipe;
- x. Submersible pumps;
- y. Determining pump efficiency.

Q. LABORATORY OUTLINE:

1. Design and install a half-bath
2. Design and install a single zone oil boiler system.
3. Install an oil, gas or electric water heater.
4. Post-job estimate and job cost out for above 3 installations.
5. Combustion testing and troubleshooting on 3 lab units.
6. Electrical testing and multimeter usage on lab breadboards.
7. Sheet metal pattern drafting and fabrication, using basic methods.
8. Testing and inspecting plumbing systems;
9. Replacing fixtures;
10. Water heater installation and service;
11. Sheet metal pattern drafting and fabrication;
12. Oil fired equipment controls;
13. Hydronic system installation;