

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: ENGY 120 Department: Energy Systems Technology

Course Title: Energy Systems Lab 1 Semester: Spring Year: 1997

Objectives/Competencies

Course Objective	Competencies
1. Proper use and care for hand tools.	<ol style="list-style-type: none">1. Be able to identify various screwdriver types.2. Identify the purpose of a pipe wrench.3. Identify the correct use of closed and open end wrenches.4. Describe various plier types.
2. Properties of copper and iron pipe.	<ol style="list-style-type: none">1. Identify sizing procedure.2. Explain types of tubing and pipe.3. Explain the strengths of tube and pipe.4. Identify various materials for pipes.
3. Operation of pipe threading.	<ol style="list-style-type: none">1. Explain die sizes and types.2. Explain procedure for threading.3. Explain purpose for reaming.4. Explain procedure of attaching fittings to pipe.
4. Operation of flaring copper tubing.	<ol style="list-style-type: none">1. Explain proper cutting operation.2. Explain reaming and de-burring.3. Describe flaring tools.

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	<ol style="list-style-type: none"> 4. Make a proper single and double flare.
<ol style="list-style-type: none"> 5. Operation of swaging copper tubing. 	<ol style="list-style-type: none"> 1. Describe swaging tool. 2. Explain purpose of swaging. 3. Swage copper tubing and soldering together.
<ol style="list-style-type: none"> 6. Operation of sweating (soldering) copper tubing. 	<ol style="list-style-type: none"> 1. Explain purpose of flux. 2. Explain types of solder. 3. Properly prepare a copper joint for sweating. 4. Apply heat and solder to joint.
<ol style="list-style-type: none"> 7. Construction of residential oil burner. 	<ol style="list-style-type: none"> 1. Identify parts of burner. 2. Describe the operation of the fuel unit. 3. Describe the air handling parts. 4. Test transformer output.
<ol style="list-style-type: none"> 8. Fuel unit test procedure. 	<ol style="list-style-type: none"> 1. Select proper nozzle for test. 2. Describe vacuum test. 3. Describe operating pressure test. 4. Describe cut-off pressure test.
<ol style="list-style-type: none"> 9. Service air handling parts. 	<ol style="list-style-type: none"> 1. Select correct combustion head. 2. Adjust throttle ring to combustion head. 3. Properly adjust initial air band setting.
<ol style="list-style-type: none"> 10. Ignition system inspection and tests. 	<ol style="list-style-type: none"> 1. Inspect insulators for damage. 2. Check transformer performance. 3. Properly space electrodes.

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11. Fuel line service procedure.	4. Properly install electrode assembly.
12. Purpose and function of chimney.	1. Change in-line filter. 2. Service fuel pump screen. 3. Describe location and function of safety valves.
13. Combustion theory.	1. Describe natural and current draft. 2. Explain operation of barometric damper. 3. Describe proper draft readings.
14. Combustion test procedure.	1. Describe chemical composition of fuel oil and air. 2. List items needed to burn fuel. 3. Describe the combustion process. 4. Describe the perfect combustion.
15. Combustion chambers.	1. Perform draft test over fire and at breech. 2. Perform CO-2 test. 3. Perform smoke test. 4. Perform net stack temperature test. 5. Interpret results of combustion test. 6. Adjust burner for proper combustion.
16. Series and parallel wiring.	1. Name combustion chamber materials. 2. Describe purpose of wing walls and corbels. 3. Properly size nozzle to combustion chamber.
	1. Properly wire series safety switches. 2. Properly wire series limit switches.

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17. Electrical components in a residential steam system.	3. Properly wire loads in parallel. 1. Properly wire low water cut-off. 2. Properly wire and adjust pressure control. 3. Properly wire oil burner and primary control. 4. Properly wire and adjust thermostat.
18. Electrical components in a forced warm air system.	1. Properly wire fan and limit switches. 2. Adjust fan and limit settings. 3. Properly wire primary control, motor, transformer. 4. Properly wire and adjust thermostat.
19. Electrical components in a forced hot water system.	1. Properly wire and adjust aquastat controls. 2. Properly wire switching relay control. 3. Properly wire circulating pump. 4. Properly wire primary control, motor, transformer.
20. Electrical zones in a forced hot water heating system.	1. Properly wire zone valves. 2. Properly wire and adjust thermostat. 3. Properly wire switching relay. 4. Properly wire and adjust aquastat control.