

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

**ACADEMIC AFFAIRS**

Course Number: ENGY 350 Department: Energy Systems Technology

Course Title: Microprocessor Controls Semester: Spring Year: 1999

**Objectives/Competencies**

<b>Course Objective</b>	<b>Competencies</b>
1. Define series circuits.	1. Describe series circuits.
	2. Describe parallel circuits.
	3. Describe series/parallel circuits.
2. Define the use of electrical meters	1. Describe meter placement for voltage.
	2. Describe meter placement for resistance.
	3. Describe meter placement for amperage.
3. Define Kircoff's laws.	1. Apply Kircoff's laws for series circuits.
	2. Apply Kircoff's laws for parallel circuits.
	3. Apply Kircoff's laws for series/parallel circuits.
4. Solve electrical word problems using understood laws.	1. Calculate resistance.
	2. Calculate amperage.
	3. Calculate voltage.
	4. Calculate power.
5. Identify electrical symbols on schematic diagrams.	1. Read and interpret ladder type electrical schematics.

Course Objective	Competencies
6. Define basic electrical control techniques.	2. Read and interpret pictorial type electrical schematics. 3. Illustrate both ladder and pictorial diagrams.  1. Describe heating circuits. 2. Describe cooling circuits. 3. Describe heat/cool circuits. 4. Describe fan circuits.
7. Define basic control theory.	1. Identify components of a basic control sequence. 2. Identify basic order of a control sequence. 3. Illustrate feedback with a control system.
8. Define control fundamentals.	1. Describe why we need control 2. Describe the conditions which need to be set for a building. 3. Describe facilities management functions.
9. Define electronic control.	1. Describe the microprocessor. 2. Identify steps of microprocessor control. 3. Compare electronic control to conventional control.
10. Define control system terminology.	1. Describe controlled variable. 2. Describe controlled medium. 3. Describe controlled device.
11. Define system components.	1. Describe sensors. 2. Describe inputs

Course Objective	Competencies
12. Define automatic control actions.	<ol style="list-style-type: none"> <li>3. Describe output devices.</li> </ol>
13. Define system air flow terminology.	<ol style="list-style-type: none"> <li>1. Describe tow position and floating control.</li> <li>2. Describe proportional control.</li> <li>3. Describe proportional plus integral control.</li> <li>4. Describe proportional plus integral plus derivative control.</li> </ol>
14. Define a single zone control system.	<ol style="list-style-type: none"> <li>1. Identify constant volume.</li> <li>2. Identify variable volume.</li> <li>3. Identify basic volume control methods.</li> </ol>
15. Define a multizone control system.	<ol style="list-style-type: none"> <li>1. Identify single zone advantages and disadvantages.</li> <li>2. Examine cost benefit analysis.</li> <li>3. Illustrate single zone control strategies.</li> </ol>
16. Describe control system communications.	<ol style="list-style-type: none"> <li>1. Discuss multizone advantages and disadvantages.</li> <li>2. Examine cost benefit analysis.</li> <li>3. Illustrate multizone control strategies.</li> </ol>
17. Define programmable controllers.	<ol style="list-style-type: none"> <li>1. Discuss communication methods.</li> <li>2. Discuss communication functions.</li> <li>3. Illustrate network designs and limitations.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Describe programmable controller features.</li> <li>2. Describe programmable controller network functions.</li> <li>3. Identify programmable controller advantages and</li> </ol>

<b>Course Objective</b>	<b>Competencies</b>
18. Define microprocessor controls troubleshooting.	disadvantages.
19. Draw and wire electrical control schematics.	<ol style="list-style-type: none"> <li>1. Identify inputs and outputs.</li> <li>2. Utilize manufacturer's literature.</li> <li>3. Describe methods of avoiding confusion.</li> </ol>
20. Retrofit a conventional control with a microprocessor control.	<ol style="list-style-type: none"> <li>1. Illustrate and wire single stage heat/cool circuits.</li> <li>2. Illustrate and wire electric heat/electric cooling circuits.</li> <li>3. Illustrate and wire gas/oil heat/electric cooling control circuits.</li> <li>4. Illustrate and wire heat pump control circuits.</li> </ol>
21. Program a microprocessor control.	<ol style="list-style-type: none"> <li>1. Identify procedures on electrical schematics.</li> <li>2. Identify procedures for wiring change.</li> <li>3. Identify basic start up and check out procedures.</li> </ol>
22. Utilize advanced features of microprocessor controls.	<ol style="list-style-type: none"> <li>1. Set up a control sequence for heat, cool systems operation.</li> <li>2. Set setpoint and time scheduling functions.</li> <li>3. Verify operation of controls.</li> </ol> <ol style="list-style-type: none"> <li>1. Program setback override.</li> <li>2. Program metering run time.</li> <li>3. Program local setback control.</li> </ol>