Course Description: Process Technology II - The 16 week program has been created to train students for careers as Process Technicians in the chemical and refining process industries.

Process Technology II - Systems builds on the information presented in the Introduction to Process Technology and Process Technology I – Equipment courses, putting the components of each system together. Students will apply the knowledge taught in previous courses to understand how individual systems work, how they are interconnected, and how they contribute to overall plant operations.

Statement of Prerequisites:
None

Program goals:
The process technology certificate provides the necessary foundational skills for participants interested in entering petrochemical, electric power, and oil and gas refining career fields. This certificate program is designed to be completed in a 16-week (one-semester) Monday through Friday format. Participants will be issued an OSHA General Industry 10-hour card upon successful completion. Students also gain valuable knowledge in mechanical, electrical, and process technology areas.

Course goals: The purpose of this course is to study the interrelation of process equipment and process systems. Specifically, students will be able to arrange process equipment into basic systems; describe the purpose and function of specific process systems; explain how factors affecting process systems are controlled under normal conditions; and recognize abnormal process conditions. In addition, students are also introduced to the concept of system and plant economics. There will be a great deal of emphasis on safety and emergency procedures.
Outcomes:
Upon completion of this course, students will be able to:
1. Demonstrate effective oral and written communication
2. Solve problems using critical thinking and creativity
3. Use appropriate technology and information to conduct research
4. Describe the value of personal, civic, and social responsibilities
5. Use quantitative analytical skills to evaluate and process numerical data
6. Describe the purpose of a system.
7. Identify the basic equipment components found in a system.
8. Explain the purpose of equipment components found in a system.
9. Define terms associated with the system. Explain the system theory of operation. List variables that must be controlled to ensure proper operation of the system.
10. Describe factors that affect normal system operation.
11. Identify system instrumentation.
12. Trace flows through a system on a PFD.
13. Discuss the specific safety, health and environmental concerns associated with the system.
14. Describe how process industry facilities are divided into systems.
15. Identify the types of systems used in the process industry.
16. Compare and contrast types of reactions that occur in industry.
17. Describe how the system design determines tower diameter, height, feed entry point, and control point.
18. Describe typical process technician responsibilities for the following:
   • operating systems
   • monitoring systems
   • troubleshooting systems
   • completing rounds
   • communication between inside and outside operator
   • communication between process technician and other departments
   • implementing established procedures and specifications
   • completing maintenance tasks as assigned
   • monitoring and maintaining auxiliary equipment
   • completing related sampling and analysis tasks and responding appropriately to results
   • communicating problems to appropriate personnel
   • communicating relevant information to other units.
19. Discuss the Process Technician’s role in identifying system problems.
20. Compare and contrast control systems used in utility, auxiliary and process systems.
21. Discuss the process technician’s role in process optimization and control for the following systems:
   • cooling water
   • steam generation and distribution
   • reaction
   • distillation
   • stripping
   • absorption
   • dehydration
   • filtration.
Methodology:
Sessions are a combination of lecture, experiential activities and team exercises, and are based on a design philosophy that emphasizes the utilization of:
- Detailed lesson plans
- Interactive classroom activities
- Real-world examples
- Team activities
- Repetition of concepts to ensure retention
- Regular homework assignments
- High student performance expectations

Evaluation Criteria:
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Attendance/Participation</td>
<td>10%</td>
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<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Labs/Activities/Projects</td>
<td>30%</td>
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<tr>
<td>Tests</td>
<td>40%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Grading Scale:
- A = 90-100%
- B = 80-90%
- C = 70-80%
- D = 60-70%
- F < 60%

Required Text, Readings, and Materials:
Reading material will consist of a combination of all PTEC text from previous courses.

Class Policies: Last Date to Change to Audit Status or to Withdraw with a W Grade:
April 14th, 2015

Casper College may collect samples of student work demonstrating achievement of the above outcomes. Any personally identifying information will be removed from student work.

Student Rights and Responsibilities: Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

Chain of Command: If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

Academic Dishonesty: (Cheating & Plagiarism) Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct for more information on this topic.
Official Means of Communication: Casper College faculty and staff will employ the student's assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly. This is also, where you will find course evaluation links during course evaluation periods.

ADA Accommodations Policy: If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college’s Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, bheuer@caspercollege.edu. The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.

Calendar schedule indicating course content:

<table>
<thead>
<tr>
<th>Week #</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1.</td>
<td>Course Overview / Intro to Instrumentation: Reading Chapters: 1,2</td>
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<tr>
<td>2.</td>
<td>Process Variables: Pressure, Temperature, Level: Reading Chapters: 3,4</td>
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<td>4.</td>
<td>Intro to Control Loops: Simple Loops and Sensors, Transmitters and Transducers Reading Chapters: 9,10</td>
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<tr>
<td>5.</td>
<td>Control Loops: Controllers, Valves and Regulators Reading Chapters: 11,12</td>
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<tr>
<td>6.</td>
<td>Symbology and Diagrams: Reading Chapter: 12</td>
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<tr>
<td>7.</td>
<td>Troubleshooting / Switches, Relays, and Annunciators</td>
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<tr>
<td>8.</td>
<td>Signals and Controllers: Reading Chapters: 15,16</td>
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<tr>
<td>9.</td>
<td>Control Schemes: Reading Chapters: 17,18</td>
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<tr>
<td>10.</td>
<td>Intro to digital Controls / PLC’s Reading Chapters: 19,20</td>
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<tr>
<td>11.</td>
<td>Distributed Control Systems Reading Chapter: 21</td>
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<tr>
<td>12.</td>
<td>Instrument Power Supply: Reading Chapter: 22</td>
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<tr>
<td>13.</td>
<td>Emergency Shutdown and Protective Devices Reading Chapter: 23</td>
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<tr>
<td>15.</td>
<td>Review for Final / Resumes and Job Searching</td>
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<tr>
<td>16.</td>
<td>Final</td>
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