IND244 Process Control Syllabus

Course Information

Credits 3
Campus Washburn Institute of Technology (Forbes Facility)
Address 6530 SE Forbes Avenue
City/State/Zip Topeka, Kansas 66619
Office Fax 785-670-2734

Description
This course provides understanding of different types of process control systems like temperature, flow and level control. The course includes process control principles, thermocouples, RTD's, temperature measurement devices, On/Off temperature controllers, programmable process heat controllers, transmitters, process loop test equipment and final control elements. Using this information students learn to construct, test and operate systems found in industrial applications.
Prerequisites: IND152, IND112, IND208 or consent of instructor.

Textbooks
ISBN: 978-0-826-93430-7

Student Learning Outcomes:
A. Communicate effectively
B. Integrate technology
C. Learn effectively
D. Demonstrate cooperative teamwork skills
E. Apply safety in the workplace
F. Think critically and creatively
G. Demonstrate responsible work ethics

Competencies
1. Define the terms "Process" and "Process Variable" as they apply to an Industrial Control System.
2. Identify the four main elements (Primary Element, Measuring Element, Controlling Element and Final Control Element) of an Automatic Control System and explain what each element does.
3. Describe the difference between Closed Loop and Open Loop control systems.
4. Explain what a Process Disturbance is and how a Process Disturbance can affect a Process Control System.
5. Explain how the electrical terms Resistance and Capacitance can also apply to Fluid Processes,
Thermal Processes and Pneumatic Processes.

6. Explain how Feedback Control and Feedforward Control are accomplished by a Manual Control System and by an Automatic Control System in a process with a supply and a demand.

7. Explain the ways in which a Controller can be identified (by its power source, by the process variable it controls and by the kind of controlling action it provides).

8. Describe the four basic functions of Controllers (Measuring, Comparing, Computing and Correcting).

9. Compare the terms Proportional, Integral and Derivative with the terms Gain, Reset and Rate and determine how these Modes of Operation affect Controller Response.

10. Describe what constitutes a Single Element Control Loop and a Multiple Element Control Loop.

11. Explain why the following Control Loops are considered Multi-Element Control Loops: Ratio, Cascade and Auctioneering.

12. Demonstrate the ability to monitor and troubleshoot a Resistance Temperature Device (RTD) and a Thermocouple using a Multimeter.

Guidelines for Success

Assessment Plan
Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution’s technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

Grading Rationale
Class sessions and assignments will include daily homework, in-class review of homework, quizzes. Grades will be based on: Attendance and general participation, daily homework, quizzes and tests and final exam.

Grading Scale
90% or higher A
80% to 89% B
70% to 79% C
60% to 69% D
Less than 60% F

Attendance
Tardies and absences will affect the daily grade for attendance. Students who miss class should inform the instructor beforehand whenever possible, and are responsible for course content, for turning in any required homework, and for taking the initiative to make up any missed tests, labs or quizzes.
Disability
The Special Support Services (SSS) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities MUST register and provide documentation with the office to be eligible for services. New requests for accommodations should be submitted two months or more prior to the date services should begin; however, contact the SSS Office as soon as a need may arise. Depending on the accommodation request, four to eight week lead time may be needed for timely and effective provision of services. SSS coordinates and assist in arranging services it deems appropriate of eligible students on a case-by-case basis.

If you are a student with a disability that may substantially limit your ability to participate in this class and believe you will need accommodations, it is your responsibility to contact:

Special Support Services Coordinator
Phone: 785-228-6356
E-Mail: ssscoordinator@washburn.edu