



INDT 1800 Introduction to Instrumentation

Jared Pettit

CENTRAL COMMUNITY COLLEGE

INSTRUCTOR

Jared Pettit

Email: jaredpettit@cccneb.edu

Office Phone: (308)338-4010

Mobile Phone: (308)440-2059

Office Location: Room #117 Kearney Center

Office Hours: 10:00- 12:00 PM Monday - Friday

COURSE INFORMATION

An introduction to the trade, terminology, and basic principles of instrumentation. Included are job descriptions, working conditions, and safety considerations for those employed in the field of industrial instrumentation, and an overview of measurement devices, control devices, and control loops, including P&ID symbols and loop sheets.

Contact Hours: Class- 45 Practical Lab- 0 Clinical- 0 Internship- 0

Homework Expectations:

For each hour of classroom time, typically you can expect two hours of homework per week.

Proposed contact hour change: Class - 30 Practical Lab - 45 Clinical - 0 Internship - 0 (effective 2022-23 catalog)

Credits: 3

Total Hours: 45

Pre/Corequisites:

- none

CLASS INFORMATION

Term: Spring Year: 2022 Start Date: 1/10/2022 End Date: 5/5/2022

TEXTBOOKS

Textbook information may be found in **WebCentral** through My Services, Services for Students, Academic Planning, Student Planning, Go to Plan & Schedule, Timeline tab or use this quick link:

[Student Planning Timeline Tab](#) > Sign In, if applicable > Navigate to Term > Click on Course Name > Scroll to the bottom of the **Section Details** popup window > Click the link to **Bookstore Information**

SUPPLIES

- - Safety glasses are required.
- - A scientific calculator is required.

GRADING INFORMATION

97-100	A+
93-96	A
89-92	B+
85-88	B
81-84	C+
77-80	C
73-76	D+
69-72	D
≤68	F

GRADING AND PERFORMANCE EXPECTATIONS

Final grades are determined through a weighted average of examinations, lab activities, assignments and performance expectations. Assignments, labs, and exams must be completed by the due date. Please contact me should an unexpected or emergency situation arise where you cannot complete an assignment. I will consider and grant extensions on a case by case basis. Please contact me via the *Canvas Inbox* (green global navigation bar on the left) with your assignment of concern, class name, and first and last name, and I will work with you. Your final grade in the course will be based on the following:

- Exams = 40% of course grade (Students must average at least 60% on exams)
- Lab activities = 25%
- Assignments = 25%
- Performance Expectations = 10%

Assignments that are turned in late are subject to a 10% grade reduction for each day they are late.

Performance Expectations

Ten percent of the course grade comes from the student's demonstrated performance of expected behaviors of successful employees. The *Performance Expectations* include:

- Attendance / Punctuality / Reliability
- Safety
- Productivity
- Teamwork / Human Relations Skills
- Personal Standards / Professional Image
- Communication

- Problem Solving / Decision Making
- Attitude

I believe it is important for you know these attributes are evaluated by employers in a work environment. I also realize it is difficult to assess all of these qualities in an online course. The instructor and the classroom facilitator will work together to help ensure students are meeting these performance expectations.

Student Responsibility

Success in this course and in this career field depend on your responsible participation. You are expected to view or read the chapters, attend class, and complete the assigned homework and labs in a timely manner. Since labs and certain activities can only be accomplished when you are present for class, your active participation is very important. Attendance will be taken daily. Responsible attendance means that you will plan your schedule so that you can be present for scheduled class sessions and manage your time so that you can complete your assignments and assessments on or before the date they are due.

If you miss a class session unexpectedly:

Contact me or the class facilitator in person, via the Canvas Inbox, or via voicemail message, explaining why you were gone as soon as you are physically able. If you do not notify as soon as you are physically able or in advance you will be given an unexcused absence. You are only allowed 3 unexcused absences before you are docked a letter grade. In order to receive full credit for work missed during your absence, you must notify me in advance of your absence or as soon as you are physically able. An unexcused absence is any instance where you do not notify me in advance of your absence. You are responsible for identifying what you have missed and for obtaining handouts or other learning materials that were distributed during your absence. Any missed activities or quizzes due to unexcused absences may receive a zero grade.

If you know you will miss a class session:

Plan ahead to submit assignments or complete assessments that will be due during your absence prior to your absence. Notify me or the class facilitator in person, via Canvas Inbox, or via voicemail message prior to your absence, explaining how you intend to make up missed work. Notifying me in advance does not count toward your unexcused absence allowance.

It is also expected that you arrive to class on time, not 5, 10, or 15 minutes late. Attendance will be taken when class is scheduled to start. If you are not in the classroom when attendance is taken, you will be marked tardy or absent. Three tardies are equal to one unexcused absence.

Test Policy

Please plan to complete all scheduled tests during the allotted times. There are no retakes for exams. If you miss a scheduled exam and did not discuss your absence prior to the exam date with your instructor (or as soon as you are physically able), you will receive a zero for the exam. Emergency situations need to be discussed with your instructor when possible.

No Class Dates

There will be no class during the following college dates:

- September 6, 2021 - Labor Day Break
- October 8-12, 2021 - Fall Break
- November 24-26, 2021 - Thanksgiving Break

The schedule is subject to change upon notice from your instructor.

COURSE COMPETENCIES

1. Explain the relationship between industrial instrumentation and process control.

Criteria

Performance will meet expectations when the student:

- defines industrial instrumentation.
- defines process control.
- identifies instrument components as part of an industrial process.
- defines terms associated with instrumentation.
- explains the purpose and operation of transmitters.

Learning Objectives

- Overview instrumentation in an industrial environment.
- Explain process control.

2. Investigate important current trends in the instrumentation field.

Criteria

Performance will meet expectations when the student:

- describes key trends in instrumentation.
- explains the impact of instrumentation trends.
- infers a detailed list of knowledge, skills, and abilities needed to address the important trends in the instrumentation field.

Learning Objectives

- Characterize the effects of technology on instrumentation and the process industry.
- Categorize the skills required in competent technicians based upon current trends in the instrumentation field.

3. Review sources for training process industry professionals.

Criteria

Performance will meet expectations when the student:

- describes two types of formal training pathways for process control instrumentation.
- describes how the majority of technicians learn instrumentation and control systems.
- provides examples of how trade union training programs help technicians gain and develop skills.
- explains the role of training simulation in process control instrumentation.
- describes key trends in instrumentation and their impact.

Learning Objectives

- Explore instrumentation training programs.
- Explain the importance of lifelong learning.
- Investigate non-traditional training sources.
- Outline new trends in education and training in the instrumentation field.
- Characterize the role of Industry and Standards organizations on the process industry.

4. *Examine the essential elements of a typical process control system.

Criteria

Performance will meet expectations when the student:

- describes the primary element.
- identifies common instrument devices used by industry for sensing and measuring temperature, pressure, flow, level, and analytical characteristics of a process.
- explains the purpose of a controller.
- defines final control element.
- identifies common final elements used by industry.
- distinguishes between valves and control valves.
- identifies control valve components on a drawing or actual device.
- relates an overview of control valve theory.
- identifies different types of control valve actuators.

Learning Objectives

- Explain the purpose of the primary element and the measurement of a process variable.
- Explain the purpose of the evaluation element.
- Explain the purpose of the control element.

5. Review safety systems for working in a process instrumentation and control environment.

Criteria

Performance will meet expectations when the student:

- identifies the proper PPE for a given environment.
- describes the function valves, rupture discs, and alarm systems play with process safety.
- describes burner control system operations and the use of hazardous atmosphere detectors.
- recognizes hazardous location classes, divisions, and groups based upon National Electric Code standards.
- describes the types of electrical protections commonly used for instruments in North America.
- defines safety instrumented system (SIS) and lists several organizations and standards that define processes for safe automation of chemical processes.

Learning Objectives

- Summarize the use of personal protective equipment (PPE).
- Explain the types of valves used in safety systems and describe their use.
- Express the function and use of rupture discs.
- Describe the operation of burner control systems.
- Outline the function of alarm systems.
- Describe the use of hazardous atmosphere detectors.
- Explore the role of the National Electric Code in establishing hazardous location classifications.
- Explain electrical protections used with safety systems.
- Summarize a safety instrumented system (SIS) and its importance.

6. Explore plant instrumentation documents.

Criteria

Performance will meet expectations when the student:

- describes the purpose of different levels of processing drawings.

- defines the function of a piping and instrumentation diagram (P&ID).
- uses documentation standards from ANSI/ISA-5.1-2009 to correctly identify instruments and device connections on a P&ID.
- defines the purpose of a process flow diagram and distinguishes it from a P&ID.

Learning Objectives

- Explore different types of instrumentation documentation used by the processing industry.
- Explain the function of a piping and instrumentation diagram (P&ID).
- Explain the means of identifying instruments on a P&ID.
- Compare and contrast P&IDs with process flow diagrams (PFDs).

7. Investigate the work environment common to the process industry and the characteristics of successful instrumentation and control technicians.

Criteria

Performance will meet expectations when the student:

- describes the typical work environment and schedule, dress code, and equipment used by an instrumentation and control technician in the process industry.
- describes common qualities found in successful instrumentation and control technicians.

Learning Objectives

- Explore the role of instrumentation and control technicians in the process industry.
- Examine and describe the qualities of successful instrumentation and control technicians.

CCC-AMERICANS WITH DISABILITIES ACT

If you have a disability or want to know if you qualify for accommodations as defined by the Americans with Disabilities Act, you are invited to contact the campus Director of [Disability Support Services](#). You are not required to disclose or reveal information about your disability to anyone at any time, however, in order to receive accommodations in college, you must make those needs known and request services from the Disability Support Services office on one of the three CCC campuses. Inquiries concerning the application of the laws and regulations cited above may be directed to the Human Resources Office, Central Community College, P.O. Box 4903, Grand Island, NE 68802-4903; (308) 398-7325, or to the Director, Office of Civil Rights, U.S. Department of Education, Washington, DC 20201.

CCC-ARCHIVING OF STUDENT WORK

To protect the original work of students from plagiarism and to uphold the high academic standards and integrity of CCC, any written assignment in this course may be submitted to an internet based plagiarism detection service such as [Turnitin.com](#) by the student or the instructor. All submitted written assignments will be archived and may be referenced for the purpose of detecting plagiarism.

CCC-ATTENDANCE--ONLINE, FACE-TO-FACE, HYBRID

Central Community College faculty record attendance in courses- including online courses. Class attendance and participation contribute significantly to student academic success. Commonly, students who attend class get more out of their college investment through increased learning, stronger relationships with instructors and classmates, earning higher grades, achieving increased passing rates in courses, which leads to completion of academic, and ultimately, career goals. Attendance in an online course may include timely participation in discussions, submitting assignments,

activities, projects, etc. (i.e. completing assignments by their deadline). Students should regularly participate in weekly course activities as led by your instructor to ensure meeting attendance requirements. Failure to consistently attend class(es) - even online class(es) - may jeopardize your financial aid.

CCC-COURSE MEETING TIME AND LOCATION

Course meeting time and location may be found in **WebCentral** through My Services, Services for Students, Academic Planning, Student Planning, Go to Plan & Schedule, Timeline tab or use this quick link:

[Student Planning Timeline Tab](#) > Sign In, if applicable > Navigate to Term > Click on Course Name

CCC-EQUAL OPPORTUNITY/AFFIRMATIVE ACTION

Central Community College does not discriminate on the basis of race, religion, national origin, gender, age, disability, marital status, or military veteran status as is defined by law in employment, admission, scholarship and financial aid programs or operation of its educational programs and activities as prescribed by Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Executive Order 11246 as amended, sections 503 and 504 of the Rehabilitation Act of 1973, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, the Age Discrimination Acts of 1974 and 1975, and other federal and state laws and regulations.

Central Community College offers career and technical education programs for all students regardless of race, color, national origin, age, religion, marital status, including those with limited English proficiency, sex or disability. For a complete list of programs, go to www.cccneb.edu/programs. Educational programs are offered at but not limited to the following locations: Columbus Campus, Grand Island Campus, Hastings Campus, Holdrege Center, Kearney Center, Lexington Center and Ord Learning Center.

CCC-EXPECTATIONS FOR ACADEMIC INTEGRITY

Central Community College believes successful students are independent critical thinkers who possess the work ethic and skills necessary to make a positive difference in their professions and communities. In order to maximize student and community success, CCC is devoted to maintaining an honest academic environment and upholding integrity as a core value. All individuals across all course modalities are expected to practice academic integrity, which encompasses the fundamental values of honesty, trust, respect, fairness, and responsibility. In the case of alleged violations of academic integrity, Central Community College strives for fair resolution.

Instances of Academic Dishonesty:

Behaviors that violate the fundamental values of academic integrity at Central Community College may include but are not limited to the following:

- Plagiarism - direct copying or paraphrasing without citation someone else's work (i.e. writing, images, video or audio)
- Cheating - engaging in any behavior intended to achieve an unfair advantage for self or another in any academic exercise (i.e. unauthorized collaboration or unauthorized use of resources or data in a study)
- Fabricating Information - inventing or falsifying information (i.e. making up resources and/or citations, falsifying academic records)

- Facilitating Academic Dishonesty - soliciting, furnishing, or offering to furnish unauthorized exams, quizzes, or academic materials; participating in academic sabotage

Read the [Expectations for Academic Integrity](#) in its entirety.

CCC-GENERAL INFORMATION

All college policies and procedures identified in the student handbook will be adhered to for the course. College policies and procedures include, but are not limited to, conditions for dropping or withdrawing from a class, student academic honesty, etc. A copy of the student handbook is available upon request from the Student Services office on each campus or you may utilize this link to the [Student Handbook](#).

CCC-TECHNOLOGY USAGE GUIDELINES

In order to support the activities for this course, Central Community College provides access to computers for students. The College established Technology Use Policy and Procedure documentation. This document can be found on the College web site. You may click this link to download a PDF document outlining the College's [Technology Use Guidelines](#).

CCC-TITLE IX POLICY

Members of the Central Community College community, guests and visitors have the right to be free from all forms of gender and sex-based discrimination, examples of which can include acts of sexual violence, sexual harassment, domestic violence, dating violence, and stalking. All members of the campus community are expected to conduct themselves in a manner that does not infringe upon the rights of others. Any member of the community, guest or visitor who believes that the policy on Equal Opportunity, Harassment and Nondiscrimination has been violated should contact the Title IX/Equity/AA Coordinator, Dr. Christopher Waddle, 308-398-7325 or TitleIXCoordinator@cccneb.edu. Students should understand that in cases of gender and sex based discrimination, no College employee, including members of the faculty, can guarantee confidentiality. For more information about CCC's policy please reference CCC's [Title IX Handbook](#). For counseling services which may remain confidential, CCC counselors are available for free to all currently enrolled students. To schedule an appointment or to receive additional information contact 402-562-1244 or email counselingservices@cccneb.edu.

Pregnancy Rights and Responsibilities

Title IX makes it illegal to discriminate on the basis of pregnancy and related conditions. All pregnancy concerns and pregnancy related absences are coordinated by the Disability Services office. You may not anticipate any academic needs associated with your pregnancy, however, your needs may change as your pregnancy progresses. Disclosure of your condition early in the pregnancy will help in making the planning process more proactive. To disclose your pregnancy to ensure proper accommodations and support, please contact the [Disability Services Director](#) on your campus. For additional information related to pregnancy rights and responsibilities, please visit <https://www.cccneb.edu/pregnantandparenting> or contact you campus Disability Services Office or CCC's Title IX Coordinator at titleixcoordinator@cccneb.edu

COVID-19 REQUIREMENTS AND EXPECTATIONS

Students diagnosed with COVID-19 are expected to confidentially report this information to any Associate Dean of Student Success or by calling our Grand Island Office at 308-398-7426. Further, Central Community College instructors will support flexible attendance for students exhibiting symptoms or illness.

Specific instructional programs may require industry-specific personal protective equipment (PPE) that must be maintained.

Central Community College reserves the right to require face coverings and to change mode of delivery, instructor, or class schedule due to pandemic response at the college, at a location, or in the community.