



Course Syllabus

ELPT 1345 - Commercial Wiring

Catalog Description: This course teaches commercial and residential wiring methods and includes overcurrent protection, raceway panel board installation, proper grounding techniques, and associated safety procedures.

Lecture hours = 2, Lab hours = 3

Prerequisites: None

Semester Credit Hours: 3

Lecture Hours per Week: 2

Lab Hours per Week: 3

Extended hours:

Contact Hours per Semester: 80

State Approval Code: 46.0301

Class section meeting time:

Alternate Operations During Campus Closure: In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue the delivery of instruction through methods that include but are not limited to, an online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Use of generated AI Permitted under some classroom circumstances with permission: There are situations throughout the course where you may be asked to use artificial intelligence (AI) tools to explore how they can be used. Outside of those circumstances, you should not use AI tools to generate content that will end up in any student work (assignments, activities, discussion responses, etc.). In such cases for Option #2, no more than 25% of the student work should be generated by AI. Use of any AI-generated content in this course without the instructor's consent qualifies as academic dishonesty and violates Panola College's standards of academic integrity

Instructional Goals and Purposes: The purpose of this course is to interpret electrical blueprints/drawings; compute the circuit sizes and overcurrent protection needed for the installation of branch circuits, feeders, and service entrance conductors; explain the proper installation of wiring devices according to the National Electrical Code (NEC) and local electrical codes; demonstrate grounding methods; identify commercial wiring methods including conduit bending, and demonstrate proper safety procedures.

Learning Outcomes:

1. Electrical Fundamentals Review
2. Safety
3. Tools
4. Electrical Prints, Specifications, and Codes
5. Commercial Wiring Methods
6. Conductors.
7. Boxes and Conduit Bodies
8. Overcurrent Protection
9. Service and Distribution
10. Grounding
11. Branch Circuits and Feeders
12. Hazardous Locations

Specific Course Objectives (includes SCANS):

After studying all materials and resources presented in the course, the student will be able to:

1. Electrical Fundamentals Review. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Basic Electrical Circuit Units
 - b. Basic Circuits
 - c. Alternating Current
 - d. Utilization Voltages
2. Safety. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Cause of Accidents
 - b. Accident Prevention
 - c. Helping an Injured Worker
 - d. First Aid Preparation
3. Tools. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Standard Construction Tools
 - b. Electrical Tools
4. Electrical Print Reading. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Electrical Print Reading
 - b. Electrical Specifications
 - c. Building Codes
5. Wiring Methods. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. General Rules and Requirements
 - b. Wiring Methods

6. Conductors. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Conductors
 - b. Code Requirements for Conductors
 - c. Allowable Ampacities in Conductors
 - d. Voltage Drop
 - e. Conduit Capacity
7. Boxes and Conduit Bodies. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Enclosures
 - b. Enclosure Sizing
 - c. Outlet and Device
8. Overcurrent Protection. SCANS (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Overcurrent
 - b. Overcurrent Protection Requirements
 - c. Overcurrent Protective Devices
 - d. Conductor Taps
9. Service and Distribution. (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Service
 - b. Distribution Systems
10. Grounding. (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Grounding Theory
 - b. System Grounding
 - c. Equipment Grounding
 - d. Grounding Electrode System
 - e. Grounding Methods
11. Branch Circuits and Feeders. (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Definitions
 - b. Branch Circuits
 - c. Branch Circuit Loads
 - d. Feeders
 - e. Summary of Commercial Service Load Computational Procedure
12. Hazardous Locations. (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C- ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
 - a. Explosions
 - b. Hazardous Locations
 - c. Class I Locations
 - d. Class II Locations
 - e. Class III Locations
 - f. Repair and Storage Garages
 - g. Aircraft Hangars

- h. Motor Fuel Dispensing Facilities
- i. Spraying, Dipping, and Coating

Course Content:

A general description of lecture/discussion topics included in this course is listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

Students in all sections of this course will be required to do the following:

1. Attend scheduled classes regularly and be on time for every class period. Students can be dropped from a class due to excessive absences. More than **two (2)** unexcused absences are considered to be excessive.
2. Study the assigned materials, complete and submit homework assignments on time, and complete quizzes and exams to assess understanding and comprehension of the material presented.
3. Complete scheduled lab assignments. Personal Protective Equipment (PPE) is required to be worn in the lab.

Methods of Instruction/Course Format/Delivery:

Students will have access to this course in Canvas and will meet regularly for class each week. Classes will consist of lectures, labs, and online exercises as appropriate. Quizzes and exams may be administered by the Instructor or by an approved testing facility.

Students in traditional, hybrid, and Internet classes will have access to courses via Canvas. Students in the traditional class will meet regularly for the lecture. Students in the Internet class will be required to take quizzes and exams at an approved testing facility or, they may also be administered by the instructor. Students in hybrid classes will have both in-class and online assignments. Hybrid classes are required to read the assigned material, take quizzes and exams as assigned by the instructor, and complete assigned homework before meeting for the face-to-face lecture or lab.

The following will be used to calculate the student's final grade:

Attendance and Participation

Students are expected to attend face-to-face classes and be on time. Students are required to participate in class discussions and work with other students during class exercises.

Attendance is based on the student missing no more than 10% of class periods in the semester without a valid excuse (10% equals two class periods). Any student thirty minutes late will be counted absent. Students that leave before being dismissed will be counted absent.

Lab Exercises

Students will complete lab assignments designed to teach them how to apply knowledge gained from the textbook to actual electrical circuits.

Quizzes

Upon completion of each major assignment, students will take online quizzes on the material covered. Quizzes will generally contain true/false, multiple-choice, matching, or fill-in-the-blank questions.

Midterm and Final Exams

There will be two major exams consisting of a Midterm Exam and a Final Exam. The Final Exam will be cumulative.

Grading Notes

- **Grading Notes:**

Late Work: All listed assignments are due according to the due date provided in Canvas and on the course calendar if you do not complete the assignments on time a **5% per day penalty** will automatically be applied to all assignments. If you have missed an assignment due to an approved class absence please contact your instructor for further instructions.

Missed Exams: Missed exams due to legitimate reasons should be taken before the reporting of a midterm or final grade as applicable. It is the responsibility of the student to reschedule the makeup with the instructor. The Instructor reserves the right to change the test format of any makeup. Instructors are not required to issue make-up work for an unexcused class absence. Instructor also reserves the right to give full or partial credit for any makeup work that is allowed and that resulted from an unexcused absence.

Missed Quizzes: Missed quizzes due to legitimate reasons should be rescheduled within one week of the scheduled quiz or a date assigned by the Instructor. It is the responsibility of the student to reschedule makeup quizzes. The Instructor reserves the right to change the test format of the makeup quiz. The instructor is not required to make up work for unexcused class absences. The instructor reserves the right to give full or partial credit for any makeup work that is allowed resulting from an unexcused absence.

Attendance: Attendance is based on the student missing no more than 10% of the semester without a valid excuse. After the 10%, the instructor may withdraw the student at their discretion. Any student thirty or more minutes late will be counted absent. Students who leave before class is dismissed will be counted absent. The Instructor reserves the right to dock points for any missed class without a legitimate excuse.

Missed Lab Exercises: Students will have one day out of the semester assigned by the instructor to make up any lab exercises missed due to the student being absent for legitimate reasons. Instructors are not required to make up work for unexcused class absences. Instructors reserve the right to give full or partial credit for makeup work that is given because of unexcused absences.

Plagiarism: Plagiarism shall be defined as appropriating, buying, receiving as a gift, or obtaining by any other means, another person's work and the unacknowledged submission or incorporation of it in one's own written work. All papers submitted to Canvas will be scanned with [turnitin.com](https://www.turnitin.com) and the instructor reserves the right to dock points based on the results.

Cheating: Cheating on a test shall include:

- a. Copying from another student's test
- b. Using test materials not authorized by the person administering the test
- c. Collaborating with or seeking aid from another student during a test without permission from the test administrator
- d. Knowingly using, buying, selling, stealing, or soliciting, in whole or part, the contents of an unadministered test.
- e. The unauthorized transporting or removal, in whole or in part, of the contents of the unadministered test.
- f. Substituting for another student, or permitting another student to substitute for one's self, to take a test.
- g. Bribing another person to obtain an unadministered test or information about an unadministered test.
- h. If a student is observed cheating they will be sent home immediately counted absent and given a zero on the assignment they were cheating on.

Safety: All students are required in lab exercises to bring and wear the proper PPE as instructed by their instructor. Failure to do so will result in one warning; if a student continues to violate safety rules the student will be sent home and counted absent.

Class Conduct: All cell phones should be turned off in all classes. If you must receive a call notify your instructor and step out of the classroom. No cell phones are allowed during testing. No disruptive

behavior is allowed in class; if a student is being disruptive as determined by the instructor one warning will be given. If the behavior persists, the student will be sent home and counted absent.

Some mandatory meetings outside of class days and times may be required to attend for credit. Valid excuses must be submitted with proof via email to your professor to avoid grade penalties.

Grading Scale A=90-100, B=80-89, C=70-79, D=60-69, F=69 and below

Major Assignments / Assessments:

The following items will be assigned and assessed during the semester and used to calculate the student's final grade.

Assignments

1. Chapter 1 Electrical Fundamentals Review
2. Chapter 2: Safety
3. Chapter 3: Tools
4. Chapter 4: Electrical Prints, Specifications, and Codes
5. Chapter 5: Commercial Wiring Methods
6. Chapter 6: Conductors
7. Chapter 7: Boxes and Conduit Bodies
8. Chapter 8: Overcurrent Protection
9. Chapter 9: Service and Distribution
10. Chapter 11: Grounding
11. Chapter 12: Branch Circuits and Feeders
12. Chapter 16: Hazardous Locations

Assessment(s):

1. Chapter 1 Quiz
2. Chapter 2 Quiz
3. Chapter 3 Quiz
4. Chapter 4 Quiz
5. Chapter 5 Quiz
6. Chapter 6 Quiz
7. Chapter 7 Quiz
8. Chapter 8 Quiz
9. Chapter 9 Quiz
10. Chapter 11 Quiz
11. Chapter 12 Quiz
12. Chapter 16 Quiz
13. Unit Labs
14. Mid-Term Exam
15. Final Exam

Course Grade:

The grading scale for this course is as follows:

- Attendance – 10%
- Lab Exercises – 20%
- Quizzes – 30%
- Exams – 40%

Texts, Materials, and Supplies:

- *Modern Commercial Wiring, 9th Edition textbook*
- ISBN-13: 978-1685845933
Author: Harvey N. Holzman
Publisher: The Goodheart-Willcox Company, Inc.
Tinley Park, IL, www.g-w.com
- Calculator
- Notepad and pen or pencil
- Safety Glasses and PPE as appropriate
Refer to: ***School of Energy Safety Contract***

Required Readings:

- None

Recommended Readings:

- NFPA 70 National Electrical Code Book

Other:

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings:
<https://www.panolacollegestore.com>
- For testing services, use the following link: <https://www.panola.edu/elearning/testing.html>
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Charles C. Matthews Student Center or go to <https://www.panola.edu/student-success/disability-support-services/> for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.

- Student Handbook, *The Pathfinder*:
<https://www.panola.edu/student-success/documents/pathfinder.pdf>

SCANS CRITERIA

- 1) **Foundation skills are defined in three areas: basic skills, thinking skills, and personal qualities.**
 - a) **Basic Skills:** A worker must read, write, perform arithmetic and mathematical operations, listen, and speak effectively. These skills include:
 - i) Reading: locate, understand, and interpret written information in prose and documents such as manuals, graphs, and schedules.
 - ii) Writing: communicate thoughts, ideas, information, and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flowcharts.
 - iii) Arithmetic and Mathematical Operations: perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
 - iv) Listening: receive, attend to, interpret, and respond to verbal messages and other cues.
 - v) Speaking: Organize ideas and communicate orally.
 - b) **Thinking Skills:** A worker must think creatively, make decisions, solve problems, visualize, know how to learn, and reason effectively. These skills include:
 - i) Creative Thinking: generate new ideas.
 - ii) Decision Making: specify goals and constraints, generate alternatives, consider risks, and evaluate and choose the best alternative.
 - iii) Problem-Solving: recognize problems and devise and implement a plan of action.
 - iv) Visualize ("Seeing Things in the Mind's Eye"): organize and process symbols, pictures, graphs, objects, and other information.
 - v) Knowing How to Learn: use efficient learning techniques to acquire and apply new knowledge and skills.
 - vi) Reasoning: discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.
 - c) **Personal Qualities:** A worker must display responsibility, self-esteem, sociability, self-management, integrity, and honesty.
 - i) Responsibility: Exerts a high level of effort and perseverance toward goal attainment.
 - ii) Self-Esteem: believing in one's self-worth and maintaining a positive view of oneself.
 - iii) Sociability: demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
 - iv) Self-Management: assess oneself accurately, set personal goals, monitor progress, and exhibit self-control.
 - v) Integrity and Honesty: choose ethical courses of action.
- 2) **Workplace competencies are defined in five areas: resources, interpersonal skills, information, systems, and technology.**
 - a) **Resources:** A worker must identify, organize, plan, and allocate resources effectively.
 - i) Time: select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
 - ii) Money: Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
 - iii) Material and Facilities: Acquire, store, allocate, and use materials or space efficiently.
Examples: construct a decision timeline chart; use computer software to plan a project; prepare a budget; conduct a cost/benefits analysis; design an RFP process; write a job description; develop a staffing plan.

- b) **Interpersonal Skills:** A worker must work with others effectively.
- i) Participate as a Member of a Team: contribute to the group effort.
 - ii) Teach Others New Skills.
 - iii) Serve Clients/Customers: work to satisfy customers' expectations.
 - iv) Exercise Leadership: communicate ideas to justify position, persuade and convince others, and responsibly challenge existing procedures and policies.
 - v) Negotiate: work toward agreements involving the exchange of resources, and resolve divergent interests.
 - vi) Work with Diversity: work well with men and women from diverse backgrounds.
- Examples: collaborate with a group member to solve a problem; work through a group conflict situation, train a colleague; deal with a dissatisfied customer in person; select and use appropriate leadership styles; use effective delegation techniques; conduct an individual or team negotiation; demonstrate an understanding of how people from different cultural backgrounds might behave in various situations.
- c) **Information:** A worker must be able to acquire and use information.
- i) Acquire and Evaluate Information.
 - ii) Organize and Maintain Information.
 - iii) Interpret and Communicate Information.
 - iv) Use Computers to Process Information.
- Examples: research and collect data from various sources; develop a form to collect data; develop an inventory record-keeping system; produce a report using graphics; make an oral presentation using various media; use online computer databases to research a report; use a computer spreadsheet to develop a budget.
- d) **Systems:** A worker must understand complex interrelationships.
- i) Understand Systems: know how social, organizational, and technological systems work and operate effectively with them.
 - ii) Monitor and Correct Performance: distinguish trends, predict impacts on system operations, diagnose deviations in systems' performance, and correct malfunctions.
 - iii) Improve or Design Systems: suggest modifications to existing systems and develop new or alternative systems to improve performance.
- Examples: draw and interpret an organizational chart; develop a monitoring process; choose a situation needing improvement, break it down, examine it, propose an improvement, and implement it.
- e) **Technology:** A worker must be able to work with a variety of technologies.
- i) Select Technology: choose procedures, tools, or equipment including computers and related technologies.
 - ii) Apply Technologies to Task: understand overall intent and proper procedures for setup and operation of equipment.
 - iii) Maintain and Troubleshoot Equipment: Prevent, identify, or solve problems with equipment, including computers and other technologies.
- Examples: read equipment descriptions and technical specifications to select equipment to meet needs; set up and assemble appropriate equipment from instructions; read and follow directions for troubleshooting and repairing equipment.