



**Course Syllabus**  
**ELPT 1311 – Basic Electrical Theory**

**Catalog Description:** Basic theory and practice of electrical circuits. Includes calculations as applied to alternating and direct current.

**Lecture hours = 2, Lab hours = 3**

**Prerequisites:** None

**Semester Credit Hours:** 3

**Lecture Hours per Week:** 2

**Lab Hours per Week:** 3

**Extended hours:** 0

**Contact Hours per Semester:** 80

**State Approval Code:** 46.03017:

**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 delivery of instruction through methods that include, but are not limited to: 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](http://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.

**Artificial Intelligence (AI) Course Policy: No use of Generative AI permitted.**

All work submitted by students will be generated by the students themselves, whether they are working individually or in groups. Students should not have another person or entity do the writing of any portion of an assignment, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

**Instructional Goals and Purposes:** The purpose of this course is to teach students how to explain the atomic structure and basic values such as voltage, current, resistance, and power; determine electrical values for combination circuits in direct current (DC) and alternating current (AC) containing resistance, inductance, and capacitance; summarize the principles of magnetism; calculate voltage drop based on conductor length, type of material, and size; and utilize electrical measuring instruments.

**Learning Outcomes:**

1. Identify electrical symbols and measuring instruments
2. Explain how to find resistor values with a meter and color code
3. Use an electrical meter to measure voltage, amperage, diodes, continuity, farads, and ohms
4. Use Ohm's law to find unknown values and calculate voltage drop

5. Define a series circuit and its properties
6. Define a parallel circuit and its properties
7. Solve a combination circuit using the laws of series and parallel
8. Explain how capacitance and inductance influence voltage and current relationships

**Specific Course Objectives (includes SCANS):**

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

1. **Identify electrical symbols and measuring instruments.** (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. Sketch and use electrical schematics in class.
  - b. Identify and define electrical Symbols used on electrical measuring instruments.
  - c. Describe the functional differences and operation of digital and analog meters as well as an oscilloscope.
2. **Explain how to find resistor values with a meter and color code.** (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. Use an Ohmmeter to measure a resistor.
  - b. Identify resistor values with a color code and prove that reading with a meter.
3. **Use an electrical meter to measure voltage, current, continuity, farads, diodes, and ohms.** (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. Explain the use of a meter in a class experiment to measure various values.
  - b. Describe the differences between the functions of different models and makes of electrical meters.
4. **Use Ohm's law to find unknown values and calculate voltage drop.** (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. Identify Ohm's law and use the correct formula to solve for unknowns in a given circuit.
  - b. Calculate the voltage drop with the given wire size and length.
5. **Define a series circuit and their properties.** (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1 C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C-ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
  - a. List the formulas that apply to a series circuit.
  - b. Define series circuit construction and prove the applicable laws.
6. **Define a parallel circuit and their properties.** (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. List the formulas that apply to a parallel circuit.
  - b. Define parallel circuit construction and prove the applicable laws.
7. **Solve a combination circuit using the laws of series and parallel.** (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. Explain how a combination circuit uses the laws of series and parallel circuits
  - b. Construct a combination circuit and demonstrate the applicable laws.
8. **Explain how capacitance and inductance influence voltage and current relationships.** (1 A-I, 1A-ii, 1A-iv, 1B-iii, 1B-iv, 1 C-I, 1C-iv, 2A-I, 2A-iii, 2B-I, 2C-i, 2C-ii, 2C-iii, 2D-ii, 2D-iii, 2E-ii)
  - a. Define how transformers operate and compute primary and secondary supplies.
  - b. Explain how inductance changes an AC waveform.
  - c. Explain how capacitance changes an AC waveform.

**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, complete quizzes and exams to assess understanding and comprehension of the material presented.
3. Complete scheduled lab assignments. **Personal Protective Equipment (PPE) is required 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 lecture, lab, 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 lectures. 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 assigned material, take quizzes and exams as assigned by the instructor, and complete assigned homework prior to meeting for the face-to-face lecture or lab.

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

- **Unit Tests, Homework Assignments**  
Students are expected to complete "Unit Test" for each unit studied in the course. Additionally, students are required to complete homework assignments.
- **Lab Exercises**  
Students will complete lab assignments as assigned by the instructor.
- **Quizzes – Review Questions**  
Students will take online quizzes in Canvas over course materials covered in each unit.
- **Midterm and Final Exams**  
There will be two major exams consisting of a Midterm Exam and a Final Exam. The instructor will provide a study guide for each exam.

#### **Grading Notes**

**Due Dates:** All lab assignments and quizzes will be due at the beginning of the next class. If there is a Federal Holiday, such as Labor Day, they will be due at the beginning of class the following week.

**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 **10% 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 makeup 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 and that resulted from an unexcused absence.

**Attendance:** Attendance is based on the student missing no more than 10% out 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 that 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.

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

### ***Scholastic Dishonesty***

**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 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 in 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 no cheating is tolerated.
- 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 your 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.

**Grading Scale: A=90-100, B=80-89, C=70-79, D=60-69, F=59 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.

- **Lab Exercises**

Hands-on lab exercises will be conducted with one or more students in a group, full participation and demonstration of the skills are required to pass the skill and move to the next.

- **Exams**

Multiple exams may be given during the semester with the final exam being cumulative in one or

two parts will assess the student's various skills and may include lab exercises.

- Quizzes, Review Questions

After working through the chapter or chapters and completing the assignments, the student will take online or paper quizzes over the chapters studied. Quizzes will generally contain True/False, Multiple Choice, Matching, and/or Fill In-The-Blank questions.

- Attendance

Students are expected to attend face-to-face classes and labs and be on time. Students are also required to participate with other students during class exercises. Attendance is based on the student missing no more than 10% out of the semester without a valid excuse. After the 10%, the instructor will withdraw the student from the course. Any student thirty or more minutes late will be counted absent. Students that leave before the class is released will be counted absent.

### Course Grade:

The grading scale for this course is as follows:

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

### Texts, Materials, and Supplies:

- **Delmar's Standard Textbook of Electricity**, 7<sup>th</sup> Edition by Stephen L. Herman
- **Experiments in Electricity for Use with Lab - Volt EMS Equipment**
- **Calculator (Your phone is not a calculator!)**
- **Notepad and pen or pencil**
- **Hardhat (NO EXCEPTIONS)**
- **Safety Glasses (NO EXCEPTIONS)**
- **Gloves (Recommended)**

### Required Reading

- *Course Materials (Provided in Canvas)*

### Recommended Readings:

- N/A

### 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/student-services/student-support/academic-testing-center>
- 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-services/student-support/disability-support-services> for more information.
- Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in *The Pathfinder* or may request the form from the course instructor.
- 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/> (located at the bottom under

students)

## 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 in 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 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: exert a high level of effort and persevere toward goal attainment.
    - ii) Self-Esteem: believe in one's own self-worth and maintain 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 group effort.

- ii) Teach Others New Skills.
- iii) Serve Clients/Customers: work to satisfy customer's expectations.
- iv) Exercise Leadership: communicate ideas to justify position, persuade and convince others, responsibly challenge existing procedures and policies.
- v) Negotiate: work toward agreements involving exchange of resources, 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.