ELPT 1311 - Basic Electrical Theory 2H1 Course Syllabus

Description
Basic theory and practice of electrical circuits. Includes calculations as applied to alternating and direct current.
Credits 3
Lecture Hours 2
Lab Hours 3
Extended Hours 0
Contact Hours 80
State Approval Code 46.03017
Instructor Name David West
Semester/Year Fall 2025

Meeting Time and Location
R 01:25PM - 03:30PM SRTC 118

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) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs
Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance
Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

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 Student Handbook or may request the form from the course instructor.

Artificial Intelligence (AI) Course Policy

No use of Generative AI permitted.

This option assumes that 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.

Major Assignments/Assessments
The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Assignments

Assignments
Hands-on lab exercises will be conducted with one or more students in a group, full participation and demonstration of the skill 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, which will assess the student's various skills and may include lab exercises.

- 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% 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.

- Quizzes

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.

- Lab Exercises

Weekly lab exercises and or assignments will be administered during face-to-face meetings as assigned by the instructor.

Assessments

Assessments

- **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% 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 provided 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* 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.

Students may be dropped from the course on the 12th class day if they have not completed any assignments.

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.

Course Grade

The grading scale for this course is as follows:

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

Texts Materials, and Supplies

Delmar's Standard Textbook of Electricity, 7th Edition by Stephen L. Herman

- *Calculator* ***(Your phone is not a calculator!)***
- *Notepad and pen or pencil*
- *Hardhat* ***(NO EXCEPTIONS)***

Safety Glasses ***(NO EXCEPTIONS)***

Required Readings

Delmar's Standard Textbook of Electricity, 7th Edition by Stephen L. Herman

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/studentsupport/academic-testing-center.
- The Accommodations & Disability Support (A&DS) Office at Panola College provides and facilitates support services and accommodations for students with disabilities. The A&DS office works under the federal guidelines included in Section 503 of the Rehabilitation Act of 1973 and the American with Disabilities Act. Please contact the Accommodations & Disability Support (A&DS) Office located in the Charles C. Matthews Student Center or go to https://www.panola.edu/disabilitysupport 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: https://www.panola.edu/ (located on at the bottom under student)

SCANS Criteria

1. Foundation skills are defined in three areas: basic skills, thinking skills, and personal qualities.
    1. Basic Skills: A worker must read, write, perform arithmetic and mathematical operations, listen, and speak effectively. These skills include:
        1. Reading: locate, understand, and interpret written information in prose and in documents such as manuals, graphs, and schedules.
        2. Writing: communicate thoughts, ideas, information, and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
        3. Arithmetic and Mathematical Operations: perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
        4. Listening: receive, attend to, interpret, and respond to verbal messages and other cues.
        5. Speaking: Organize ideas and communicate orally.
    2. Thinking Skills: A worker must think creatively, make decisions, solve problems, visualize, know how to learn, and reason effectively. These skills include:
        1. Creative Thinking: generate new ideas.
        2. Decision Making: specify goals and constraints, generate alternatives, consider risks, and evaluate and choose the best alternative.
        3. Problem Solving: recognize problems and devise and implement plan of action.
        4. Visualize ("Seeing Things in the Mind's Eye"): organize and process symbols, pictures, graphs, objects, and other information.
        5. Knowing How to Learn: use efficient learning techniques to acquire and apply new knowledge and skills.
        6. Reasoning: discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.
    3. Personal Qualities: A worker must display responsibility, self-esteem, sociability, self management, integrity, and honesty.
        1. Responsibility: exert a high level of effort and persevere toward goal attainment.
        2. Self-Esteem: believe in one's own self-worth and maintain a positive view of oneself.
        3. Sociability: demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.

4. Self-Management: assess oneself accurately, set personal goals, monitor progress, and exhibit self-control.
5. Integrity and Honesty: choose ethical courses of action.

2. Workplace competencies are defined in five areas: resources, interpersonal skills, information, systems, and technology.
    1. Resources: A worker must identify, organize, plan, and allocate resources effectively.
        1. Time: select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
        2. Money: Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
        3. 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.
    2. Interpersonal Skills: A worker must work with others effectively.
        1. Participate as a Member of a Team: contribute to group effort.
        2. Teach Others New Skills.
        3. Serve Clients/Customers: work to satisfy customer's expectations.
        4. Exercise Leadership: communicate ideas to justify position, persuade and convince others, responsibly challenge existing procedures and policies.
        5. Negotiate: work toward agreements involving exchange of resources, resolve divergent interests.
        6. 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.
    3. Information: A worker must be able to acquire and use information.
        1. Acquire and Evaluate Information.
        2. Organize and Maintain Information.
        3. Interpret and Communicate Information.
        4. 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 on-line computer databases to research a report; use a computer spreadsheet to develop a budget.
    4. Systems: A worker must understand complex interrelationships.
        1. Understand Systems: know how social, organizational, and technological systems work and operate effectively with them.
        2. Monitor and Correct Performance: distinguish trends, predict impacts on system operations, diagnose deviations in systems' performance and correct malfunctions.
        3. 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.
    5. Technology: A worker must be able to work with a variety of technologies.
        1. Select Technology: choose procedures, tools or equipment including computers and related technologies.
        2. Apply Technologies to Task: understand overall intent and proper procedures for setup and operation of equipment.
        3. 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.