

**INDUSTRIAL ELECTRICITY DEPARTMENT**

**COURSE SYLLABUS**

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COURSE NUMBER: **ELPT 1311**  
COURSE TITLE: **BASIC ELECTRICAL THEORY**  
CREDITS: 3 (2 lecture, 3 lab)

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**COURSE DESCRIPTION**

Basic theory and practice of wiring basic circuits. Includes calculations as applied to alternating and direct current.

**END-OF-COURSE-OUTCOMES**

Explain 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.

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**COURSE OBJECTIVES**

Upon completion of this course, the student will:

- Exhibit knowledge of safety rules and demonstrate awareness of electrical hazards.
- Explain the scientific concepts of force, work, energy, power and efficiency.
- Exhibit knowledge of electrical materials, their properties, and discuss the concepts of conductor, insulators and semiconductors, wire gauges and resistors.
- Explain the significance of fundamental electrical quantities: current, voltage, resistance and power, units of measurement and their use in formulas and equations.
- Demonstrate proficiency in the use of analog and digital multimeters to measure voltage, current, resistance and continuity.
- Exhibit knowledge of Ohm's Law, formula usage and it's applications to basic circuits.
- Describe the composition, properties and functions of series, parallel and combination circuits, and use appropriate formulas to determine voltage, current, resistance and power.
- Demonstrate proficiency in reading, formulation and solving electrical problems by applying formulas, writing simple equations and expressing answers in acceptable format and units.
- Identify and utilize appropriate National Electrical Code tables to determine wire ampacities, correction factors and resistance.
- Utilize circuit properties to troubleshoot, diagnose and repair faults encountered in circuits.
- Describe the concepts of alternating current, sinewave, cycle, period, frequency, peak and RMS values.
- Describe the basic principles and laws of electromagnetism.
- Explain the operation and application of conductors, capacitors, inductance, inductive reactance, capacitance, capacitive reactance, resonance and impedance.
- Exhibit knowledge of trigonometry and trigonometric functions as they apply to solve electrical problems.
- Explain the concepts of single-phase and three-phase power, motor & transformer.

## COURSE POLICIES

### Attendance

Students are expected to attend classes regularly, and to be on time for every class period. Students can be dropped from a class due to excessive absences. Excessive tardiness may be considered absences. Students are responsible for subjects, assignments, and projects covered during their absences. Consult the **Student Handbook** for more details or visit <http://www.hccs.edu/hccs/current-students/student-handbook>

### Academic Honesty

Scholastic dishonesty is treated with the utmost seriousness by the instructor and the College. Academic dishonesty includes, but it is not limited to the willful attempt to misrepresent one's work, cheat, plagiarize, or impede other students' scholastic progress. Consult the **Student Handbook** for more details.

### Students with Disabilities

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to <http://www.hccs.edu/district/students/disability-services/>. Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the **Disability Support Services Office** at his / her respective college at the beginning of each semester. Faculties are authorized to provide only the accommodations requested by the **Disability Support Services Office**. For Central College, call 713 – 718 – 6164.

### Cell Phones

All cell phones must be muted, set to vibrate, or turned off during class. Cell phone activity during class is deemed disruptive to the academic process and will not be tolerated. If you need to make or receive an emergency call, please leave the classroom.

### Calculators

If the course allows the use of a calculator during class, lab projects, and exams, the student is responsible to bring his/her calculator. Cell phones are not calculators, and are not allowed to be used for that purpose during class, tests, or exams.

### Student ID

Students are required to obtain a Student ID. For additional information, consult the **Student Handbook**.

### Parking Rules and Regulations

Students are required to follow HCC's regulations regarding parking and permits. For additional information, visit <http://www.hccs.edu/hccs/about-hcc/police/parking/parking-rules-and-regulations>

### Books, Tools and Supplies

Students are required to purchase and bring to class the required textbooks, tools, notebooks, supplies, and writing instruments as required by the instructor.

### Dress Code

Dress code must be appropriate for the class. Students must dress in a way that clothing and accessories do not compromise their safety, and the safety of others. Proper foot wear is required in all laboratories. Absolutely no sandals or other footwear that exposes the feet will be allowed.

### Classroom & Laboratory Conduct

Proper behavior is expected in all classes and laboratories. Foul language and horseplay are not allowed. Making or receiving cell phone calls during class are not allowed. Sleeping in class is not allowed.

### Course Withdrawal

It is the responsibility of the student to officially withdraw from a course before the official withdrawal deadline. A student who does not withdraw from a course by the deadline will receive an "F" as the final grade. Also note that under Section 51.907 of the Texas Education Code, an institution of higher education may not allow a student to drop more than six courses.

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status-in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to: David Cross, Director EEO/Compliance, Office of Institutional Equity & Diversity, 3100 Main, (713) 718-8271, Houston, TX 77266-7517 or Houston, TX 77266-7517 or [Institutional.Equity@hccs.edu](mailto:Institutional.Equity@hccs.edu)

## COURSE TIMELINE, CONTENTS & ACTIVITIES

### WEEK # 1: COURSE RULES AND ORIENTATION

- Introduction
- Purpose of the course
- Overview of course syllabus
- Course policies
- Required materials, textbook(s), supplies, and resources (if applicable)
- Disability Support Services
- Registration, schedules, receipts, and student ID
- Importance of updating and maintaining student data (Name, Address, ID #, phone numbers, emails)
- Parking rules and regulations
- Classroom and laboratory safety
- Course withdrawal, **Official Day of Record**, and last day for withdrawal
- Course tests, quizzes, exams, and assignments
- Course grading policies
- Instructor information
- Campus orientation

### Lectures On:

- Basic safety
- Basic atomic theory
- Basic concepts: force, work, energy, and power.
- Electrical materials
- Basic electrical qualities: voltage, current, resistance, and power
- Ohm's Law
- Static Electricity
- Magnetism
- Resistors
- Series Circuits
- Parallel Circuits
- Combination Circuit
- Measuring Instruments
- Using Tables and Determining Conductor Sizes
- Batteries and Other Sources of Electricity
- Magnetic Induction
- Alternating Current

- Induction in AC Circuits
- Resistance-Inductive Series Circuits
- Resistance-Inductive Parallel Circuits
- Capacitor
- Resistance-capacitance Series Circuits
- Resistance-capacitance Parallel Circuits
- Filters
- Single-Phase Circuits
- Three-Phase Circuits
- Single-Phase Transformers
- Three-Phase Transformers
- DC Generators
- DC Motors
- Three-Phase Alternators
- Single-Phase Motors
- Three-Phase Motors

**Labs** will be conducted on various topic as the course progresses through the semester.

**Lab tools** will be needed for this course and a list of those tools will be handed out on the 1<sup>st</sup> day of class.