

Electrical Fundamentals

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COURSE OVERVIEW

Electricity class is a combination of house wiring and basic electronics. Students have instruction and lab activities in electron flow, ohms law, series/parallel/combination circuits, schematics, soldering, multimeters, oscilloscope, and power supply. Trouble shooting and component theory is studied.

ORGANIZATION

Safety, tools and equipment, material processes, design and manufacturing products.

LEARNING TARGETS

1.
 - 1.1. Describe the relationships between voltage, current, resistance, and power.
 - 1.2. Apply Ohm's law and Power formulas to various electrical circuits.
 - 1.3. Identify series and parallel circuits from diagrams or physical circuits
 - 1.4. Relate circuit types to sources of electricity.
 - 1.5. Convert between quantities using SI prefixes mega-, kilo-, milli-, and micro-.
2. Use electrical test and prototyping equipment.
 - 2.1. Demonstrate the proper operation of a multimeter to measure voltage, current, and resistance
 - 2.2. Demonstrate the proper use of power sources
 - 2.3. Interpret readings of an oscilloscope in time, voltage, and frequency
 - 2.4. Recognize the differences between AC and DC waveforms using an oscilloscope.
3. Use electrical design terminology, diagrams, symbols, and schematics.
 - 3.1. Identify basic electrical components (resistors, capacitors, transistors inductors, integrated circuits, diodes, LEDs) using devices, symbols, or descriptions.
 - 3.2. Determine the value of a resistor from its color code
 - 3.3. Draw a schematic from a pictorial or physical representation of a circuit.
 - 3.4. Prototype circuits from schematics.
4. Construct simple circuits from wiring diagrams, schematics, or instructions.
 - 4.1. Demonstrate proper soldering technique by the assembly of simple circuits.
 - 4.2. Develop house-wiring circuits including switches, outlets, and lights using a training board.

5. Explore and document career pathways related to electricity occupations.
 - 5.1. Identify the skills, education, and training required for a variety of electricity occupations
 - 5.2. Research an electricity or electricity-related career and communicate by report, presentation, or resume/job application.

INSTRUCTIONAL MATERIALS

Book: Electricity & Electronics 10th Edition Gerrish, Dugger, Roberts

Supplies: Student will need to supply calculator, pencil, notebook and folder.

Attendance and Tardy Policies:

Refer to the student hand book all rules will be enforced.

Personal Electronic Devices:

Electronic devices such as cell phones, MP3 players, and portable gaming devices are strictly prohibited from being used in class. Any and all electronic devices will be handled according to school policies.

Assignments, Make-Up work, and Late work:

Class assignments are due on the date specified by the instructor. Written assignments will be accepted up to 10 school days beyond the due date resulting to excused absence or illness. Tests and quizzes must be made up within 10 days of excused absence. Late work will not be accepted after assignments have been graded and returned. **If a student is truant on a day that an assignment is due or an assessment is given the student will receive an “M” and will need to follow the procedure for Make-up. The following assessment will be different and up to teacher discretion.**

Academic Honesty:

It is expected that all work submitted in the class is that of the individual whose name appears on the material. Violations of academic honesty include, but are not limited to cheating, plagiarism, and receiving help on a test. Copying another person’s assignment will result in both persons being found guilty of academic dishonesty. A student being found guilty of academic dishonesty is subject to failure for the assignment in question or failure of the course.

STUDENT EVALUATION

Matrix for Determining Grade from Formative/Summative/Lab/Final Exam Standards

4	3	2	1
4-3	2-4	2-3	1-4
4-2	3-2	2-1	1-3
3-4	4-1	3-1	1-2

4 point- This grade reflects **excellence** in which the student demonstrates knowledge of **ALL** learning targets.

3 point- This grade reflects **thorough** achievement in class. It will be awarded to students who demonstrate continuous growth.

2 point- This grade reflects a **basic** achievement in class.

1 point- This grade reflects a **minimal** achievement in class.

“M” - Denotes complete lack of evidence to demonstrate knowledge of learning targets.

- Student did not attempt or completed less than 50% of the assessment.
- Lack of evidence in summative assessments can result in a failure of the course

If a student receives an “M” the student is allowed to take a reassessment on any standard.

Before reassessment is allowed, student will need to show evidence of continued learning. This work will be assigned by the teacher and must be shown to teacher before being reassessed on a standard. Students are not allowed unlimited reassessments and will be offered at teacher discretion. Students will have ten school days in which to retake any standard.

***A score of 1 for any of the standards will not be considered a passing score, so a student MUST be reassessed for that specific standard in order to pass.**

Example 1: Student A receives summative scores of 3, 3, 3, 4, 4 for Learning Standard 1. Using the matrix, Student A most frequently scored 3's for Learning Standard 1, followed by the second most frequent score of 4's. Therefore, Student A has received a score of “3-4” for Learning Standard 1, resulting in an overall score of 4 for that standard.

Example 2: Student B receives summative scores of 1, 1, 1, 4, 4, for Learning Standard 1. Using the matrix Student B most frequently scored 1's for Learning Standard 1, followed by the second most frequent score were 4's. Therefore, Student B has received a score of “1-4” for Learning Standard 1, resulting in an overall score of 1 for that standard.

Course Requirements:

- Have a good attitude.
- Be on time and prepared for class
- Participate in all stages of class room/lab activities
- Respect yourself, fellow classmates and instructor.
- Behave in class.
- Make up missed assignments in allotted time.
- Enjoy your time here and have a great year.

ELGIN HIGH INDUSTRIAL TECH CLASS/LAB

RULES

E

Earn and give respect!

- Raise hand for asking and answering questions
- Treat People right
- Only appropriate language

H

Hold your self responsible!

- Be on time with required class materials
- ID on
- Clean and put away lab materials

S

Safety first!

- Safety glasses on at all times in the lab
- Keep your hands to yourself (no horse play)
- Extra caution around live equipment/machinery

BEHAVIORAL EXPECTATIONS

All students are expected to be in compliance with all school district policies as outlined in the student handbook. Students are also strongly encouraged to **Earn** and give respect, **Hold** themselves responsible, and consider **Safety** first.

On classroom days students are expected to be in their seats and ready when the bell rings. All students should be courteous and respectful of their fellow students and should be on task. Students are expected to contribute to classroom discussions, demonstrations, and labs. Sleeping in class, lowering head to desk, or wondering around letting teammates do the work for you will result in a lowered participation grade and disciplinary actions. Students are expected to maintain academic honesty and integrity at all times. If a student is caught cheating on an assignment or test a grade of zero will be assigned.

Attendance in class on a daily basis is important for successful completion of this class. The attendance/behavior is outlined in the student handbook. Students will be held responsible for any material presented in class. If a student is absent due to a prearranged absence such as a field trip, court date, or medical appointment, the student is expected to turn in homework prior to the absence. If the student is absent due to a brief illness he/she is expected to make up the assignments quickly upon return. Make up plans for extended absences will be considered on an individual basis. Make up tests and quizzes may be different than the ones taken by the class, and may not be made up during class time. Students are expected to make up tests within a reasonable time or a grade of zero will be recorded for the test.

***This course outline cannot be inclusive of all the rules and regulations. Therefore all policies and procedures in the Student Day Planner are in effect unless specifically addressed in the course outline. **Daily attendance, contribution, and participation are necessary for the successful completion for this course.**

Class Room Requirements/Suggestions

The following is a list of requirements and suggestions that will help you to maximize your opportunities to be successful in this class.

- Professional behavior is expected towards both your fellow students and your instructors.
- You are expected to maintain a level of professionalism in this class. Any horseplay, (running, throwing objects, swearing, etc.) will not be tolerated.
- Students are expected to be in class and on time. With classes only being a limited amount of time every minute counts toward completing a class assignment.
- In Labs you are required to wear safety glasses and close top shoes.
- Avoid wearing jewelry in lab classes. Jewelry can cause accidents
- All coats, backpacks, purses and personal items should be left on student desks. Teacher is not responsible for any thefts. Keep your valuables in your locker.
- It is everyone's responsibility to keep the lab area clean. A good practice is to clean as you go. Part of

your lab grade is based on clean up, so let's work together and keep our facility clean.

- This school spends money every year on equipment and materials so that you have sufficient tools to work with in your classes. Please respect this equipment. Put it back where you got it after every use. If you are unsure of how to operate the equipment, please ask for assistance.
- Report any injuries to your instructor - **IMMEDIATELY!**
- Students must ask for permission to use all power tools.