

Core Electronics Syllabus*

Instructor: Mr. Michael S. Houck E-Mail: mhouck@rvh.richland2.org 803.699.2999x368

COURSE DESCRIPTION:

Course Code: 6133

This high school/secondary course is designed to teach the basics of electrical/electronics theory in which concepts will be reinforced daily through hands-on practical applications. Students taking this course should have knowledge of the essential concepts of physical science and have algebraic and geometric reasoning skills. Core electronics provides students with a solid foundation for college and/or other postsecondary opportunities.

CREDIT: 1 Unit

OBJECTIVES:

Given the necessary equipment, materials, and instruction, the student, on completion of the prescribed course of study, will be able to successfully accomplish the following standards.

A: DEMONSTRATING SAFE WORK HABITS AND PROCEDURES

1. Identify various types, purposes, and operation of fire extinguishers.
2. Identify and practice shop safety, including eye protection and environmental hazards.
3. Identify electrical hazards.
4. Identify and practice safe soldering methods.
5. Demonstrate safe and proper use of hand tools.
6. Demonstrate safe and proper use of test equipment.
7. Complete safety test.
8. Identify various safety measures and procedures and when and how to use them.
9. Identify environmental protection measures and procedures and when and how to use them.

B: DEMONSTRATING PROFICIENCY IN DC ELECTRONICS

1. Apply Ohm's law in solving basic DC electronic problems.
2. Apply Watt's law in solving DC electronic power problems.
3. Evaluate and test DC series circuits.
4. Evaluate and test DC parallel circuits.
5. Evaluate and test DC series-parallel circuits.
6. Evaluate and test sources of DC signals and power.
7. Evaluate and test DC resistive devices.
8. Evaluate and test circuit controls (e.g., switches, fuses, circuit breakers, and relays).

C: DEMONSTRATING PROFICIENCY IN AC ELECTRONICS

1. Solve basic DC electronics problems involving current, voltage, resistance, and power.
2. Describe the function and operation of capacitors in DC circuits.
3. Describe the function and operation of inductors in DC circuits.
4. Describe the function and operation of transformers.

D: DEMONSTRATING PROFICIENCY IN SEMICONDUCTOR DEVICES

1. Describe the function and operation of semiconductor devices.
2. Demonstrate techniques for handling and replacing semiconductors.

E: DEMONSTRATING PROFICIENCY IN ELECTRONIC CIRCUITS

1. Identify electronic component schematic symbols.
2. Interpret schematic, block, and pictorial diagrams.

F: DEMONSTRATING PROFICIENCY IN SOLDERING AND ASSEMBLING TECHNIQUES

1. Select, maintain, and use soldering and desoldering tools.
2. Solder and desolder components.

G: DEMONSTRATING PROFICIENCY IN USE OF TEST EQUIPMENT

1. Measure voltage, current, and resistance using multimeters (e.g., VOM, DMM, and DVM).

BASIC INSTALLATION TECHNICIAN CERTIFICATION

The Basic Installation Technician Certification examination contains 150 multiple choice questions which are broken down into three 50 questions sections. The questions within the three sections can be further broken down into the 15 categories listed below. The numbers in parentheses indicate the approximate portion of the 50 section question devoted to each subject matter.

Basic Electrical Section Questions

1) Ohm's Law (18%) – These questions require basic knowledge and understanding of Ohm's Law and the math involved to solve specific problems. Since calculators are not allowed on the MECP Basic Installation Technician Exam, the actual math is considered to be at a basic grade school level.

2) Electronic Components (44%) – These questions deal with physical electronics components, such as resistors, capacitors, relays, diodes, batteries, etc. The section also covers related units of measure, such as Ohms, Farads, and Henries.

3) Measurements and Applications (38%) – This section test on measurement and application of learned principles. The section also covers units of measure such as volts, dBs, and amperes.

Installation Technique & Shop Safety

4) Components Applications and Usage (18%) – These questions pertain to the way that a component is applied or used in an installation. For example, selecting the appropriate size or type of wire.

5) Troubleshooting, Measurements, and Analysis (60%) – This section covers the identification and diagnosis of common installation errors and components that don't operate properly. This section also includes the use of tools that aid in diagnosis, most notably the Digital Multi-meter (DMM).

6) Power and Hand Tools (16%) – These questions are classified as tools that are not considered to be measurement and troubleshooting tools.

7) Safety Issues (6%) – This section includes questions directly related to shop safety and proper use of safety equipment.

Introduction to Mobile Electronics Components

Wireless (25% of Intro test section)

8) Components (17%) – These questions include all that pertain to the equipment found in a wireless communication installation, such as antennas and hands free speakers.

9) Installation (83%) – This section covers questions directly related to the installation of wireless communication products such as antenna and microphone placement.

Security (25% of Intro test section)

10) Components (53%) – These questions directly related to the installation of mobile security and convenience products, such as proper fusing and programming.

11) Installation (47%) – This section covers questions directly related to the installation of mobile security and convenience products, such as proper fusing and programming.

Navigation (25% of Intro test section)

12) Components (58%) – These questions include all that pertain to the equipment found in a navigation installation, including all forms of data collection for location plotting.

13) Installation (42%) – This section covers questions directly related to the installation of navigation products, such as antenna placement and wired connections.

Autosound (25% of Intro test section)

14) Basic Audio Theory and Analysis (83%) – These questions deal with basic acoustic theory as it relates to sound in the mobile environment.

15) Installation (17%) – This section covers questions directly related to the installation of a mobile audio system.

Note* The instructor reserves the right to change or alter this document as needed.

INSTRUCTIONAL MATERIALS, SUPPLIES, AND EQUIPMENT:

All books and equipment are provided by the instructor. Students are required to provide paper, pencil, pen, 3-Ring Binder, and 5 floppy disks.

REQUIRED TEXTBOOKS / INSTRUCTIONAL MATERIAL:

MECP. Basis Installer Study Guide, 1st Ed.
Consumer Electronics Association, Arlington, Virginia 2000

Various other reference material will be utilized in this course.

EVALUATION SYSTEM: Students will be given five (5) minutes to calculate and record his/her class average and attendance each Friday and will be graded using the following criteria each grading period:

“Students will be held to the Academic Integrity policy of Richland District II.”

STUDENTS WHO TAKE THE MECP BASIC INSTALLER EXAM AND PASS IT WILL RECEIVE 100% AS THEIR SEMESTER GRADE. THIS TEST CAN BE TAKEN AT ANY TIME DURING THE SEMESTER .

Daily Grade = 15% to include:

- a. Attendance
- b. Participation
 1. Includes bringing required supplies to class each day.
- c. Safety
- d. Leadership
- e. Self-control

Homework = 10% (includes Students' Notebook and Review Questions.)

Quizzes = 20%

Tests = 25%

Hands-On Projects = 30%. Each hands-on activity is graded on the following criteria:

- a. Safety
- b. Preparation
- c. Logical Sequence
- d. Workmanship

Semester Examination = 20% of Semester Grade

ALL WRITTEN TESTS MUST BE PASSED WITH 70% ACCURACY.

Students who score below 70% will be allowed one re-test after a 24 hour waiting period. All re-tests will be taken on the student's time.

GRADING CRITERIA:

A = 100 – 93

B = 92 – 85

C = 84 – 77

D = 76 – 70

F = 69 or below

CLASSROOM RULES:

- 1. Enter the classroom quietly before the tardy bell rings.**
- 2. Begin working on class assignments.**
- 3. Do not sit on top of tables, desks, or AC Units.**
- 4. Bring all required class materials (i.e., paper, pencil) to class everyday.**
- 5. Only one student may leave the classroom at any time during class.**
- 6. No Food or Drinks are allowed within six (6) feet of any electrical/electronic equipment.**
- 7. No horse-playing is allowed.**
- 8. Do not energize any equipment without permission.**
- 9. You are responsible for cleaning up after yourself.**
- 10. Listen to the teacher and follow his instructions.**

PENALTIES FOR VIOLATING CLASS RULES :

Rule 1

- First Offense: Oral Warning
- Second Offense: Tardy Issued
- Third Offense: Tardy Issued / Conference with Parents

Rules 2, 3, 4, & 9

- First Offense: Oral Warning
- Second Offense: Conference with Parents
- Third Offense: Discipline Referral

Rule 5

Students may only leave the classroom in case of an emergency. If the student leaves the classroom without permission or goes anywhere except to the destination where permission was granted, the student will be referred to an Administrator.

Rules 6, 7, & 8

- First Offense: Conference with Parents and Administration Notified
- Second Offense: Discipline Referral
- Third Offense: Discipline Referral

Rule 10 - Covers all rules not previously listed.

- First Offense: Conference with student
- Second Offense: Conference with Parents and Administration
- Third Offense: Discipline Referral