# Foundations of Electronics Course No. 21201 Credit: 1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes: **Engineering & Applied Mathematics (14.0101)**; Manufacturing (48.0000) - Maintenance Strand; Aviation Maintenance & Operations (47.0607) – Maintenance & Avionics Strand; Energy (14.4801); Automation Engineering (15.0406)

Course Description: A **technical level** course that offers instruction in the basic concepts of electronics and electronic components; electrical quantities and units; basic circuits, laws and measurements; circuit components; multiple-load circuits; complex-circuit analysis; magnetism and electromagnetism; alternating current and voltage; power in ac circuits; capacitance; inductance; transformers; R, C, and L circuits; electric motors; instruments and measurements; algebraic, trigonometric, and logarithmic tenets as applied to electronic components, theory of electricity and in the terminology, skills, and safety procedures common to careers involving electricity and electronics. Students will demonstrate acceptable soldering and de-soldering techniques, knowledge of surface mount technology, methods for building circuitry and proper utilization of electronic components such as capacitors, LEDs, and transistors.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 0: The following competency is to be taught with in ALL technical level courses offered in your school's approved pathway. Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 0.1 | Demonstrate an understanding of industry standards for personal safety including the safe use of tools, equipment, and hazardous materials. |  |

## Benchmark 1: Lab practices

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Apply proper OSHA safety standards |  |
| 1.2 | Demonstrate acceptable soldering and desoldering techniques. |  |

## Benchmark 2: Demonstrate proficiency in DC Circuits

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Relate, identify, and apply Ohm’s law to voltage, current, resistance, power, and energy. |  |
| 2.2 | Read and interpret color codes and symbols to identify electrical components and values. |  |
| 2.3 | Measure properties of a circuit using DMM meters, oscilloscopes, and power supplies. |  |
| 2.4 | Compute, measure, apply, construct, and verify Ohm’s law to operation of series circuits. |  |
| 2.5 | Compute, measure, apply, construct, and verify Ohm’s law to operation of parallel circuits. |  |
| 2.6 | Compute, measure, apply, construct, and verify Ohm’s law to operation of series parallel circuits |  |
| 2.7 | Identify, define, construct, verify, and troubleshoot loaded and unloaded voltage divider circuits |  |
| 2.8 | Apply, construct, and verify the operation of DC circuits that demonstrate the maximum power transfer theory. |  |
| 2.9 | Define magnetic properties of circuits and devices. |  |
| 2.10 | Determine, define, identify, and troubleshoot RC and RL time constant circuits. |  |
| 2.11 | Define basic motor theory and operation. |  |

## Benchmark 3: Demonstrate proficiency in AC Circuits

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Identify, analyze, and measure AC signals. |  |
| 3.2 | Define, construct, verify, and troubleshoot AC capacitive circuits. |  |
| 3.3 | Define, construct, verify, and troubleshoot AC inductive circuits. |  |
| 3.4 | Construct, verify, and troubleshoot AC circuits utilizing transformers. |  |
| 3.5 | Define, construct, and verify series and parallel resonant circuits. |  |
| 3.6 | Define, construct, verify, and troubleshoot filter circuits. |  |
| 3.7 | Set up and operate DVMs, power supplies, oscilloscopes, and frequency counters for AC circuits. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.