COURSE OUTLINE

Course Number	Course Title	Credits
EET 130	**Fundamentals of Electronics**	**3**
Hours: Lecture/Lab/Other	**Co- or Pre-requisite**	**Implementation Semester & Year**
2 Lecture/2 Lab	**MAT 037 or equivalent**	**Spring 2022**

Catalog description:
Introduction to DC and AC circuits, electromagnetic devices, electronic components, and analog and digital circuits. For non-electronics majors.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:
Introduction to Electronics by Earl Gates, Delmar/Cengage, 2012, 6th ed., ISBN 9781111128531 (Online pdf 9781111645236)

Course Student Learning Outcomes (SLO):

Upon successful completion of this course the student will be able to:

1. Compute circuit values using basic electrical theory. [ILG # 2, 3, 4, 10, 11; PLO # 2, 4]
2. Wire simple series and parallel circuits. [ILG # 3, 4, 10, 11; PLO # 2, 8]
3. Test and troubleshoot the operations of basic electrical circuits. [ILG # 2, 3, 4, 10, 11; PLO # 4, 8]
4. Effectively communicate findings with fellow students and others using appropriate electrical terminology. [ILG # 1, 10; PLO # 1, 3]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.
Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Electronics Engineering Technology (PLO)

1. Communicate effectively in English, both orally and in written form.
2. Demonstrate an understanding of the fundamentals of AC and DC electricity.
3. Work as a team with fellow workers.
4. Demonstrate mastery of college algebra and trigonometry.
8. Set up and operate modern electronic equipment such as DMM, oscilloscope, and signal generators.

Units of study in detail – Unit Student Learning Outcomes:

Unit I **Introduction to Electrical Terms and Concepts** [Supports Course SLO #1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Describe the following terms: open circuit, closed circuit, voltage, current, power, ampere, ohm, conductor, insulator.
2. Convert basic electrical units into their sub or multiple unit equivalents using metric prefixes.
3. Determine the acceptable resistance range for a given resistor color code.
4. Calculate the resistance of a wire given the length and gauge.
5. Calculate the energy usage and cost for one month for a given set of appliances.
6. Calculate the thickness required for a given insulator and voltage requirement.
7. Use Ohms law to find voltage, current or resistance given any two values.
8. Use a multimeter to measure voltage, current or resistance.
9. Calculate the power dissipated by a resistor.

Unit II **Introduction to Direct Current (DC) Circuits** [Supports Course SLOs #1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Identify and/or wire series and parallel elements and circuits.
2. Calculate the current, voltages and power in a series circuit.
3. Calculate the currents and power in a parallel circuit.
4. Calculate the total resistance for a series or parallel circuit.
5. Calculate the total voltage for two or more batteries in series.
6. Calculate the total current available from a set of batteries in parallel.
7. Read current and voltage from either an analog or digital meter.
8. Calculate percent error between two values.
9. Calculate the resistance values for a given potentiometer setting.
10. Identify circuit “ground”

Unit III **Inductors, Capacitors, and Magnetism** [Supports Course SLOs # 1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Describe the basic construction of a capacitor or inductor.
2. Describe the effects of modifying the construction of a capacitor or inductor.
3. Calculate the total capacitance for two capacitors in series or parallel.
4. Calculate the total inductance for two inductors in series or parallel.
5. Calculate and/or measure the time constant for an RC or RL circuit.
6. Calculate the charging time for an RC or RL circuit.
7. Determine the magnetic poles of an energized coil.
8. Calculate the magnetomotive force (mmf) of a coil.

Unit IV **Alternating Current Circuits** [Supports Course SLOs # 1, 3, 4]

Learning Objectives
The student will be able to:

1. Distinguish between alternating current (AC) and direct current (DC).
2. Identify a sine wave, square wave, or triangle wave.
3. Calculate the period and frequency of an AC wave.
4. Convert between V_{pk}, $V_{p\text{-}p}$, or V_{RMS}.
5. Calculate the instantaneous voltage for a sine wave.
6. Calculate the voltage and frequency of a sine wave from an oscilloscope.
7. Calculate the secondary voltage of a transformer.
8. Distinguish between resistance and reactance.
9. Calculate capacitive reactance and inductive reactance.

Evaluation of student learning: [Evaluates SLOs # 1, 2, 3, 4]

Students' achievement of the course objectives will be evaluated through the use of the following:

- Four unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives. [SLO 1, 3]
- Participation grade based on participation, attendance, and individual reports on experimental results. [SLO 1,2,3,4]

Evaluation Tools	Percentage Of Grade
4 Unit Tests	80%
Participation	20%
Total	100%