COURSE OUTLINE

Course Number	Course Title	Credits
EET 139	**Introduction to Electronics II**	**4**
Hours: Lecture/Lab/Other	**Pre-requisite**	**Implementation Semester & Year**
3 Lecture/3 Lab	**EET 138 or equivalent**	**Spring 2022**

Catalog description:
Continuation of EET 138. Covers the basics of AC circuits and devices including resistors, capacitors, inductors and semiconductors. Introduces fundamental waveforms such as sine waves and pulses and their behavior in solid state circuits.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:
Electronics Technology Fundamentals (Conventional Flow Version) by Robert Paynter and B.J. Boydell, 3rd Edition, Prentice Hall Publishing, ISBN 978-0-13-504874-0

Course Student Learning Outcomes (SLO):

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

1. Compute alternating current (AC) circuit values using electrical theory. [ILG # 2, 3, 4, 10, 11; PLO # 2, 4, 7]
2. Wire simple, series, parallel, and series-parallel AC circuits. [ILG # 3, 4, 10, 11; PLO # 2, 7, 8]
3. Test and troubleshoot the operations of AC circuits. [ILG # 2, 3, 4, 10, 11; PLO # 4, 7, 8]
4. Effectively communicate findings with fellow students and others using field appropriate 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.
7. Demonstrate an understanding of analog circuits, including linear integrated circuits.
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 Alternating Current, Inductors and Transformers** [Supports Course SLO #1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Identify an AC waveform based on the wave shape; giving appropriate amplitude, frequency, period, and duty factor measurements where applicable.
2. Calculate the voltage, current, or resistance of a resistive AC circuit using Ohm's Law.
3. Set up an oscilloscope to measure amplitude, frequency, and phase relationships of AC waveforms.
4. Set up a frequency generator to energize an AC circuit.
5. Measure inductance using an LCR meter.
6. Identify the effect on the total inductance when a coil parameters are physically altered.
7. Compute total inductance or reactance when wiring inductors in series and parallel.
8. Compute the reflected voltage, current, or resistance of a transformer given the turns ratio.
9. Effectively document and report lab results, comparing calculated responses to actual outcomes.
10. Exhibit effective time management through the division of responsibilities while working as a team partner.

Unit II **Resistive-Inductive (RL) Circuits and Capacitors** [Supports Course SLOs #1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Calculate and measure voltage, current, impedance, and phase angle measurements of an RL circuit.
2. Calculate power and power factor of an RL circuit.
3. Calculate total impedance and/or reactance of series and parallel RL circuits.
4. Build and test series and parallel RL circuits.
5. Identify the effect of increasing frequency on the circuit values of an RL circuit.
6. Identify the effect on capacitance when physically changing the plate size of a capacitor, distance between the plates, or the type of dielectric material.
7. Identify how series or parallel connected capacitors effects total capacitance and total reactance.
8. Identify a capacitor based on the alpha-numeric markings on the body.
9. Measure capacitance using an LCR meter.

10. Effectively document and report lab results, comparing calculated responses to actual outcomes.
11. Exhibit effective time management through the division of responsibilities while working as a team partner.

Unit III **Resistive-Capacitive (RC) Circuits, RLC Circuits, Resonance, & RL/RC Circuit Pulse Response** [Supports Course SLOs # 1, 2, 3, 4]

Learning Objectives
The student will be able to:

1. Calculate and measure voltage, current, impedance and phase angle measurements of RC, LC, and RLC circuits.
2. Calculate power and power factor of RC, LC, and RLC circuits.
3. Calculate total impedance and/or reactance of series and parallel connected RC, LC, and RLC circuits.
4. Build and test series and parallel RC, LC, and RLC circuits.
5. Identify the effect of increasing frequency on the circuit values for RC, LC, and RLC circuits.
6. Calculate the time for transition of voltages and currents in a pulse RL or RC circuit.
7. Calculate voltages and currents in a pulse RL or RC circuit given the time after the exciting energy has changed state.
8. Effectively document and report lab results, comparing calculated responses to actual outcomes.
9. Exhibit effective time management through the division of responsibilities while working as a team partner.

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:

- Three unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives.
- Lab grade based on individual reports on experimental results.
- In class participation and attendance.

Evaluation Tools	Percentage Of Grade
3 Unit Tests	60%
Lab Grade	30%
Participation	10%
Total	100%