

# University of Toledo

## Electrical Engineering Technology

### Master Syllabus

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**Course Title: Electronic Principles**

**Course Code & Number: EET 2010**

**Credit Hour Total: 4 Semester Hours**

**Lecture Contact Hours: 3**

**Lab Contact Hours: 2**

**Prerequisite: EET1020, Reactive Circuits**

**Texts: Electronic Devices, 7<sup>th</sup> Edition, Floyd, Prentice Hall.**

**Laboratory Exercises for Electronic Devices, Buchla, Prentice Hall**

**Software: Multisim 7 (Electronics Workbench)**

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#### **A. Course Description**

This course constitutes an introduction to semiconductor devices and applications with emphasis on power supplies and amplifiers. AC/DC analysis of small-signal amplifiers using both bipolar junction and field effect transistors in various biasing configurations. A frequency analysis of amplifiers is also included. The Electronics Workbench simulation software is used for circuit analysis.

#### **B. Related Program Outcomes (a, b, c):**

- An understanding of the analytical and laboratory skills associated with electrical engineering technology, as evidenced by analyzing various transistor amplifier configurations in homework and exams.
- An ability to apply current knowledge and adapt to emerging applications of mathematics, science and technology, as evidenced by the use of mathematical equations to analyze electronic circuits in homework and exams.
- An ability to conduct, analyze and interpret experiments concerning electrical engineering technology, as evidenced by data collection and analysis in lab reports.

#### **C. Course Objectives:**

- To understand basic semiconductor theory.
- To study basic diodes and their applications.
- To study DC Biasing of Bipolar Junction Transistors (BJT).
- To use the BJT as an electronic switch.
- To study small signal BJT amplifiers, multistage amplifiers and their applications.
- To study DC Biasing of Field Effect Transistors (FET).
- To use the FET as an electronic switch.
- To study small signal FET amplifiers, multistage amplifiers and their applications.
- To study amplifier frequency response.

- To verify circuits using Electronics Workbench simulation software.
- To use math and science in deriving the transistor models.
- To apply theoretical knowledge to applications in the lab.
- To design and build projects in a team environments.

#### **D. Course Outline – Major Content Areas**

- Introduction to Semiconductors.
- Diode Applications.
- Special-Purpose Diodes.
- Bipolar Junction Transistors.
- BJT Biasing Circuits.
- Transistor Bias Stability.
- BJT Amplifier Circuits.
- Multistage amplifier Design.
- Power Amplifiers.
- Field Effect Transistors.
- JFET Biasing Circuits.
- MOSFET Biasing Circuits.
- Small Signal FET Amplifiers.
- BJT Frequency Analysis.
- FET Frequency Analysis.

#### **E. Laboratory Topics**

- The Diode Characteristics.
- Rectifier Circuits.
- Diode Limiting and Clamping Circuits.
- The Zener Regulator.
- Bipolar Junction Transistor Characteristics.
- Transistor Switches.
- Bipolar Transistor Biasing.
- The Common Emitter Amplifier.
- The Common Collector Amplifier.
- JFET Characteristics.
- JFET Biasing.
- FET Amplifiers.
- Class B Push-Pull Amplifier.
- Amplifier Simulation Analysis

