



**Course description:** In this lab, the student performs several typical analog electronic experiments, such as oscilloscope, RC circuit, LRC circuit, Diode Basic characteristics, diode rectifier circuit, Zenner diode, diode limiter, transistor characteristics and CE transistor amplifier.

**Aims of the course:**

- To provide skills how to utilize the typical electronic tools, such as oscilloscope and DDM for AC, DC measurements for the circuit (AC and DC voltage and current passing each circuit elements).
- To learn how to measure capacitance, inductance and voltage across the diode terminals) using DDM tool.
- To provide hands on skills in construction of typical electronic circuits having different elements.
- To learn different types of electronic operations (biasing and operation of diodes, rectification and regulation).
- To provide a deep understanding of physics of different types of semi conductive electronic components (P-type and N-type diodes and NPN transistor).
- To learn some typical applications for diodes (diode limiters/clamper and signal regulator)
- To learn some typical application for transistor as on/off switch and amplifier).

**Intended Learning Outcomes: (ILOs)**

**A. Knowledge and Understanding**

- A1. Concepts and Theories:** Apply the principles of Semiconductor Physics for N-type and P-type materials including electron and hole currents, PN junction, biasing and electrical impedance in RC and RCL circuits.
- A2. Contemporary Trends, Problems and Research:** Diode Circuit Analysis, transistor circuit analysis, diode limiter /clamper circuits and special diodes( Zener and LED diodes). Students can team to perform special electronic circuit for real world applications.
- A3. Professional Responsibility:** Use electronic lab, graphical and algebraic tools to analyze the electronic circuit.

**B. Subject-specific skills**

- B1. Problem solving skills:** Students solve and overcome some realistic problems by conducting several troubleshooting techniques. In some cases, student should use computer programs to compute certain mathematical analysis. Also, student can run certain virtual electronic programs prior the conducting the experiment.
- B2. Modeling and Design:** Not applicable.
- B3. Application of Methods and Tools:** Students use typical tool such as DDM and oscilloscope and apply different types of troubleshooting methods for diodes and transistor circuits.

**C. Critical-Thinking Skills**

- C1. Analytic skills:** Assess the factors that affect of the signal generated by the diode when it is used in rectifier or in diode limiter circuit.
- C2. Strategic Thinking:** Formulate plans designed to achieve maximum useful of the special techniques that the student uses to solve the electronic devise.
- C3. Creative thinking and innovation:** Demonstrate easy methods to electronic circuit problems and engage students in more real world circuit for different applications.



