Module Syllabus: Circuits and Devices

1. Module Information

- **Module Name:** Circuits and Devices
- **Course Code:** EEE60804
- **Credit Value:** 4 Credits
- **Prerequisites:** N/A
- **Department:** School of Engineering
- **Semester Availability:** March, August

2. Course Synopsis

This module provides a comprehensive introduction to two core engineering domains: circuit theory and semiconductor devices.

- **Circuit Theory:** Students will apply network theorems and Kirchhoff's laws to analyze both Direct Current (DC) and Alternating Current (AC) circuits. The course also investigates the transient response of RL (Resistor-Inductor) and RC (Resistor-Capacitor) circuits.
- **Semiconductor Devices:** The module introduces the physics of conduction in solids and explores the functionality of electronic semiconductor components.

The content is designed to equip students with the fundamental skills for circuit analysis and an understanding of common electronic components.

3. Learning Outcomes

Upon successful completion of this module, students will be able to:

1. **Circuit Analysis:** Analyze DC and AC circuits utilizing network theorems and Kirchhoff's laws.
2. **Device Behavior:** Analyze the behavior and characteristics of Diodes, Bipolar Junction Transistors (BJTs), and Field Effect Transistors (FETs).
3. **Transient Response:** Evaluate the transient response of RL and RC circuits.

4. **Practical Application:** Demonstrate the functional workings of DC and AC circuits through practical implementation.

4. Teaching & Learning Approach

The module utilizes a blend of problem-based learning and self-directed study.

- **Lectures:** Delivered via slides, encompassing discussions, recitations, and class exercises.
- **Tutorials:** Supervised sessions focused on improving critical thinking and problem-solving abilities.
- **Laboratory Work:** Group activities (max 5 students) focused on building circuits and submitting written lab reports.
- **Online Resources:** Teaching materials and relevant video links will be uploaded to the learning management system.

5. Assessment Breakdown

The final grade is calculated based on Continuous Assessments and a Summative Final Examination.

Assessment Component	**Task Description**	**Weighting**	**Learning Outcomes**
Practical 1	**Laboratory Assessment:** Students build circuits using basic electronic components (e.g., resistors) and measure current/voltage values.	**20%**	LO4

Practical 2	**Laboratory Assessment:** Students build circuits using semiconductor components and report findings.	**20%**	LO4
Mid-Semester Test	**Written Test:** Evaluates key concepts of circuit analysis (DC/AC), power, voltage, and current determination.	**10%**	LO1, LO3
Assignment	**Case Study:** Individual assignment presenting a case-based scenario where students design a circuit to resolve a specific problem.	**20%**	LO1
Final Examination	**Written Exam:** Comprehensive assessment covering circuit analysis, PN junctions, diodes, BJTs, FETs, and	**30%**	LO1, LO2, LO3

	transient responses.		

6. Recommended Resources

Primary Textbooks:

- *Engineering Circuit Analysis* (9th Ed.) – Hayt, Kemmerly, Phillips & Durbin (2019).
- *Principles of Electric Circuits: Conventional Current* (10th Ed.) – Floyd & Buchla (2020).
- *Introductory Circuit Analysis* (13th Global Ed.) – Boylestad (2016).

Additional References:

- *Electronic Devices and Circuit Theory* – Boylestad & Nashelsky (2014).
- *Fundamentals of Electric Circuits* – Alexander & Sadiku (2013).
- *Electric Circuits* – Nilsson & Riedel (2015).