**Course Code: LCM 121 Credit: 3.00 Contact Hour: 3 per week Total marks: 100**

**11.1 Rationale:**

**11.2 Objectives:**

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| **11.3**  **Learning Outcomes** | **11.4**  **Course Content** | **11.5**  **Teaching / Learning Strategy** | **11.6 Assessment Strategy** |
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**RECOMMENDED BOOKS AND PERIODICALS**

**Text Books**:

**References:**

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| **Course-16 Title: Electronic Devices and Circuits** |  |
| Course No.: EEE 121 Credit : 3 Contact Hours: 3 | Total Marks: 100 |

**11.1 Rationale:** In order to serve the nation as a computer engineer its practitioner needs to know about concepts, characteristics and working principles of basic electronic devices and their applications in electronic circuits.

* 1. **Objectives:**

1. To learn basic concepts about semiconductor physics.
2. To know about formation of semiconductor diodes, transistors, field effect transistors, Oscillators and their working principle..
3. To know about power electronics devices and its operation.

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| **11.3**  **Learning Outcomes** | **11.4**  **Course Content** | **11.5**  **Teaching Strategy/ Learning Experience** | **11.6 Assessment Strategy** |
| 1. Define and discuss semiconductor physics and semiconductors | Introduction to semiconductors, p-type and n-type semiconductors; p-n junction diode characteristics; | Lecture, Reading, Assignment,  BrainStroming | Short answer,  Essay, Assignment |
| 1. Define and explain semiconductor diodes. 2. Derive equations for diode circuits. 3. Draw and describe diode clipping and clamping circuits. 4. Define and explain zener diode. | Diode applications: half and full wave rectifiers, clipping and clamping circuits, regulated power supply using zener diode. | Lecture, Assignment, | Short answer,  Essay, Assignment, Exercise |
| 1. Define and discuss Transistor. 2. Classify Transistor circuits. 3. Describe different transistor circuits. 4. Draw and describe different transistor models. 5. Explain frequency response of different transistor circuits. 6. Design and solve different transistors circuits. | Bipolar Junction Transistor (BJT): principle of operation, I-V characteristics; Transistor circuit configurations (CE, CB, CC), BJT biasing, load lines; BJTs at low frequencies; Hybrid model, h parameters, simplified hybrid model; Small-signal analysis of single and multi-stage amplifiers, frequency response of BJT amplifier. | Lecture, Reading, Assignment | Short answer,  Essay, Assignment, Exercise |
| 1. Define and explain Field Effect Transistors. 2. Classify Field Effect Transistors. 3. Draw and Describe different FET circuits. 4. Design and solve different FET circuits. | Field Effect Transistors (FET): principle of operation of JFET and MOSFET; Depletion and enhancement type NMOS and PMOS; biasing of FETs; Low and high frequency models of FETs, Switching circuits using FETs; Introduction to CMOS. | Lecture, Reading, Assignment | Short answer,  Essay, Assignment, Exercise |
| 1. Define and explain Operational Amplifiers. 2. Design and explain OPAMP circuits. 3. Describe frequency response of OPAMP circuits. | Operational Amplifiers (OPAMP): linear applications of OPAMPs, gain, input and output impedances, active filters, frequency response and noise. | Lecture, Reading, Assignment | Short answer,  Essay, Assignment |
| 1. Define and explain Oscillators 2. Classify Oscillators. 3. Classify power electronics devices 4. Explain characteristics of power electronics devices. 5. Solve Oscillatory circuits. | Introduction to feedback, Oscillators, Silicon Controlled Rectifiers (SCR), TRIAC, DIAC and UJT: characteristics and applications; Introduction to IC fabrication processes. | Lecture, Reading, Assignment | Short answer,  Essay, Assignment, Exercise |

**RECOMMENDED BOOKS AND PERIODICALS**

**Recommended Books**:

1. V.K. Mehta : Principles of Electronics
2. R.L. Boylestad : Electronic Devices and Circuit Theory
3. Millman & Halkias: Electronic Devices and Circuits