

| Course code: Course Title | Course Structure | | | Pre-Requisite |
|---|------------------|----------|----------|---------------|
| AE102: Electronics and Communication concepts for Mechanical Engineers | L | T | P | NIL |
| | 3 | 0 | 2 | |

Course Objective: To familiarize the students with the fundamentals of analog electronic devices and circuits, digital circuits, and schemes for analog and digital communications.

| S. NO | Course Outcomes (CO) |
|------------|---|
| CO1 | Explain the principles of operation of semiconductor devices such as diode, BJT, JFET and MOSFET. |
| CO2 | Design and analysis of CE-amplifier using small signal hybrid-pi model. |
| CO3 | Simplify logic expression using Boolean law, Skills to minimize logic expression using k-map and design of various combinational and sequential logic circuits. |
| CO4 | Explain the concepts of various Analog modulation schemes. |
| CO5 | Illustrate the concepts of various Digital modulation schemes. |

| S. NO | Contents | Contact Hours |
|---------------|---|---------------|
| UNIT 1 | PN junction diode, V-I characteristics, Half wave and full wave rectifiers, Clipping and Clamping circuits, Zener diode as a voltage regulator. | 6 |
| UNIT 2 | Bipolar Junction Transistor: Physical operation, CB, CC, CE Characteristics, operating point, load line, DC biasing circuit: Self Bias. Common emitter amplifier: Small signal model (Hybrid Pi-model), Current gain, voltage gain, input/output Impedance. Introduction to JFET and MOSFET: Structure and Characteristics. | 12 |
| UNIT 3 | Digital circuits: Boolean algebra, Logic gates, K map up to 4 variables, Binary Adder and subtractor, MUX and DMUX, Flip flops: SR, JK, D, T. | 10 |
| UNIT 4 | Basic Block Diagram of Analog Communication system, Concepts of Analog modulation Schemes: AM, FM, PM. | 6 |
| UNIT 5 | Basic Block Diagram of Digital Communication system, Concepts of Sampling, Pulse code modulation, Concepts of Digital modulation Schemes: ASK, FSK, PSK. | 8 |
| TOTAL | | 42 |

| REFERENCES | | |
|-------------------|--|--------------------------------------|
| S.No. | Name of Books/Authors/Publishers | Year of Publication / Reprint |
| 1 | Electronic Devices and Circuit Theory; R. Boylestad, L. Nashelsky, Prentice Hall, 7th edition. | 1998 |
| 2 | Digital Design; M. M. Mano, Pearson Education, 4th edition. | 2006 |
| 3 | Modern Analog and Digital Communication; B. P. Lathi, Oxford, 3rd edition. | 1998 |
| 4 | Communication Systems; H. Simon, John Wiley & Sons, 4th edition. | 2006 |