MIDSEM 2 Syllabus

Basic Electronics (3110016)

1. Diode theory and applications
Clipping circuit, clamping circuit, voltage multiplier circuit, Reading datasheet of semiconductor diode.

2. Bipolar junction transistors and its biasing
Collector feedback bias, voltage divider bias, Thermal stability.

3. Special purpose diodes and transistors
Light emitting diode (LED). Zener diode, Zener diode circuit for voltage regulation, Seven Segment display, Sixteen segment display, Identify segments on pin using multi-meter, Dot-matrix LED display

Physics (3110018)

MODULE 1: ELECTRONIC MATERIALS

- Basic terminology related to electrical conductivity
- Free electron theories- classical, quantum and Bloach/zone theorem
- Kronig-Penny model (to introduce origin of band gap),
- Energy bands in solids,
- E-k diagram, Direct and indirect bandgaps,
- Types of electronic materials: metals, semiconductors, and insulators,
- Density of states,
- Occupation probability(Fermi Dirac distribution function), Fermi level
- Effective mass, Phonons.

Basic Electrical Engineering (3110005)

1. DC Circuits: Time-domain analysis of first-order RL and RC circuits.

2. AC Circuits: Analysis of single phase ac circuits consisting of R, L, C, R-L in series and R-C in series

Mathematics (3110014)

1. **System of Linear equations, Eigen value and Eigen vectors**
   - Elementary row operations in matrix, Row Echelon and Row Reduced Forms
   - Rank by echelon forms
   - Inverse by Gauss Jordan Method

- Solution of linear equations by Gauss Elimination and Gauss Jordan Method
- Eigen Values and Eigen Vectors
- Cayley – Hamilton Theorem
- Diagonalization of Matrix

2. **Sequence and Series**
   - Convergence and Divergence of Sequences, The Sandwich Theorem of Sequences
   - The Continuous function theorem for Sequences, Bounded Monotonic Sequences
   - Convergence and divergence of an infinite series, geometric series, telescopic series
   - N^{th} term test for divergent series
   - Integral test, p series, The Comparison test, The Limit Comparison Test
   - Ratio test, root test, Alternating Series test.
   - Absolute and Conditional Convergence, Power Series
   - Radius of convergence of power series

Engineering Graphics & Design (3110013)

Engineering Curves: Classification and application of Engineering Curves, Construction of Conics, Cycloidal Curves, Involutes and Spirals along with normal and tangent to each curve

Projections of Points and Lines: Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes

Isometric Projections and Isometric View or Drawing: Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing of simple objects