**Lec.1**. Introduction. Stages of electronics development. Terminology. Signals, their classification, parameters, the discrete and continuous spectrum of signals. **Fourier Transform and Laplace transform.**

**Lec.2**. Basic circuit elements: voltage sources, current sources, resistors, inductors, and capacitors. Superposition principle. Thevenin Equivalent.

**Lec.3**. Techniques of Circuit Analysis. The Phasor. Phasor Diagrams. Impedance and Reactance. Admittance. The Node-Voltage Method. The Mesh-Current Method. Kirchhoff's laws. Applying Ohm's Law and Kirchhoffs Laws to Find an Unknown Current.

**Lect.4**. Nonlinear circuits, analysis graphical method, load line, regime on a constant current.

**Lect.5**. Metals, insulators and semiconductors. Electrons and holes in semiconductors. Carrier Generation and Recombination. Carrier Transport Phenomena

**Lect.6.** p-n junction and its properties. Semiconductor diodes, Zener diodes, tunnel diodes.

**Lect.7.** Light-Emitting Diodes. Light-Sensitive Diodes. Solar Cells. Circuit Applications of Ordinary Diodes. Rectification. Transients in p-n – junction.

**Lect.8**. Bipolar Junction Transistors (BJT). Ideal transistor model. Analyze BJT band diagrams and understand current gain, base transport factor, and emitter injection efficiency. General bias modes of a bipolar transistor. Common emitter (CE) Fixed bias configuration, Voltage divider bias, Emitter follower, Common Base (CB) configuration, Collector feedback configuration. I-V characteristics in different configurations.

**Lect.9.** Analysis of CE configuration using h- parameter model. Relationship between h-parameter model of CE configuration and its implication

**Lect.10.** Transit Time Effects in Bipolar Junction Transistors. Transistor Frequency Response: General frequency considerations, low frequency response.

**Lect.11**. The field-effect transistors. Junction Field Effect Transistor (JFET)– N-channel and P-channel. Metal Oxide Semiconductor FET (MOSFET). Depletion type (n- and p-channel) and enhancement type (n- and p-channel). Distinctive features of Field Effect Transistors. I-V characteristics in different configurations.

**Lect.12**. Amplifiers. Types of amplifiers. Basic amplifiers specifications. Basic bipolar amplifier circuit. Basic FET amplifier circuit.

**Lect. 13.** Feedback Amplifier: Feedback concept, Feedback connections type, Practical feedback circuits. Design procedures for the feedback amplifiers. Operational Amplifiers. Ideal Amplifier Approximation. Non-inverting Amplifiers. Inverting Amplifiers. Differential Amplifiers.

**Lect.14**. Oscillator operation, Phase shift Oscillator, Wienbridge Oscillator, Tuned Oscillator circuits, Crystal Oscillator. (BJT Version Only)

**Lect.15.** Digital Circuits. Boolean Algebra. Logic Gates. Combinational Logic. The AND-OR Gate. Exclusive-OR Gate. Combinational Logic Design Using Truth Tables..

Lab.1 Electronic devices and elements.

Lab.2. Direct current linear electric circuits.

**Lab.3. Research of sinusoidal current circuits.**

**Lab.3. Research of sinusoidal current circuits.**

Lab.5. Resonance in Series RLC Circuit

Lab. 6. Investigation of termistors`s characteristics

**Lab. 7. Investigation of semiconductor diodes**

**Lab. 8. Investigation of semiconductor diodes**

**Lab. 9. IV- characteristics of bipolar transistor**

**Lab. 10. IV- characteristics of bipolar transistor**

Lab.11. Field-effect transistors

Lab. 12. Probing of the logic inverted rectifier based on a microcircuit

**Lab. 13. The study of properties of semiconductor photoresistors**

**Lab. 14 The study of properties of semiconductor photoresistors**

Lab. 15. The method of ring oscillator.