EEE111.11/ETE111.11
Fall 2025

Introductory Class

Class Information

- Course Name: Analog Electronics I
- Course Code: EEE111/ETE111
- Credit Hours: 3
- Pre-requisites: EEE141/ETE141 Electrical Circuits-I
- Class time: ST 08:00 AM - 09:30 AM

Instructor Information

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- Position: Lecturer, ECE
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Course Summary

- In this course, a variety of electronic devices used in the design of analog electronics are studied.
- The basics of semiconductor devices are covered. Emphasis is placed on diodes, BJT, and FET.
- Small and large-signal characteristics and models of electronic devices, analysis and design of elementary electronic circuits are also included.
- This course has a mandatory laboratory session every week.

Textbook

1. “Electronic Devices and Circuit Theory” by Boylestad & Nashelsky, 11th edition. (Main textbook)
2. “Microelectronic Circuits” by Sedra and Smith, 6th edition.

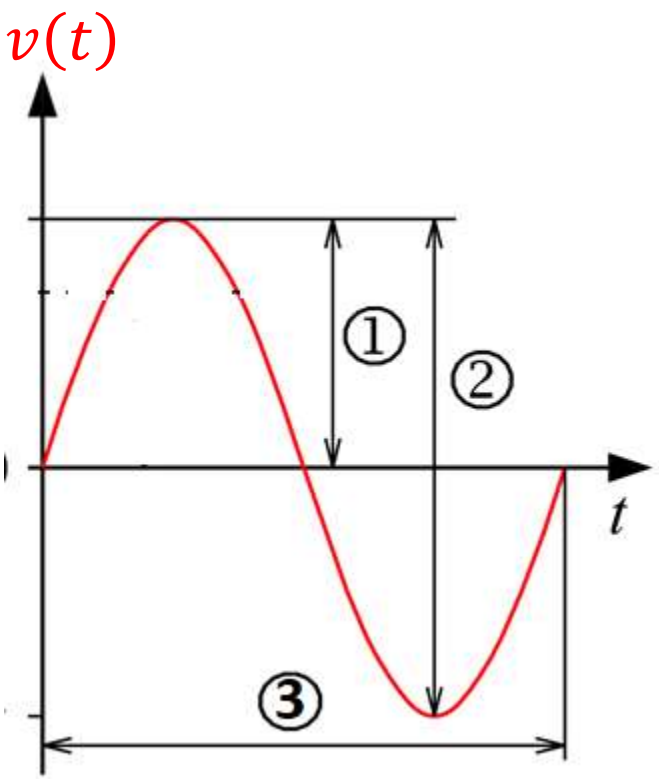
Lecture Plan (Tentative)

Contents	Book Sections	Tentative # of Lectures
Semiconductor Diodes: Intrinsic, Extrinsic Materials, Junctions & Diodes, Diode Equivalent Circuit, I-V characteristics, Zener Diode, LED	1.1-1.11, 1.15, 1.16	3
Diode Applications: Load Line Analysis, Series-Parallel Diode Configurations, HW & FW Rectification, Clippers & Clampers,	2.1-2.11	4
BJT: Construction & Operation, Amplifying Action, Configurations (CB, CE, CC)	3.1-3.7	2
DC Biasing: Operating Point, Configurations (CE FB, CE EB, CE VDB, CF, EF, CB)	4.1-4.8, 4.16	3
MID TERM EXAM		
AC Analysis: r_e and hybrid Transistor Models, Configurations (CE FB, CE VDB, CB)	5.1-5.10, 5.19, 5.22	3
FET: Construction & Transfer Characteristics, Depletion and Enhancement Type MOSFET, CMOS	6.1-6.3, 6.6-6.8, 6.11	2
FET Biasing: Self and Voltage Divider Biasing Configuration, Biasing for Depletion and Enhancement Type MOSFET	7.1-7.4, 7.7-7.8	3
FET Amplifier: E-MOSFET Drain Feedback and Voltage Divider Configuration	8.8-8.11	3
FINAL EXAM		

Analog Signal

- Continuous signal
- Can be sinusoidal, triangular.
- Example: sine wave
- Equation: $v(t) = V_{peak}\sin(\omega t)$

1. $V_{peak} = V_m$= Constant = 10V
2. $V_{p-p} = 2 * V_m$= Constant = 20V
3. Angular frequency, $\omega = 2\pi f$
4. Time period, $T = \frac{1}{f}$



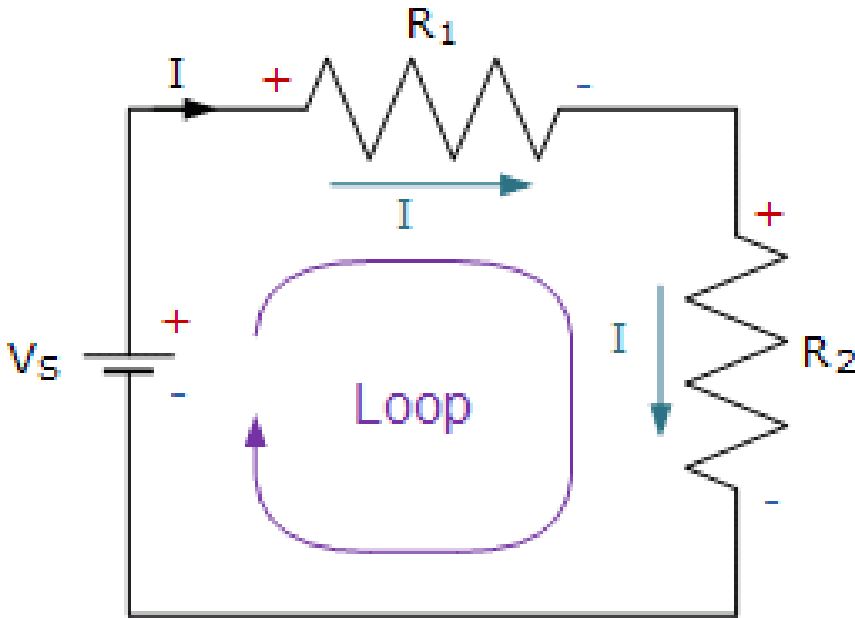
Electronic Devices

- Electronic devices are components for controlling the flow of electrical currents for the purpose of information processing and system control.
- Constructed from semiconductor (silicon Si, germanium Ge, Gallium Arsenide GaAs)
- Conductivity: Conductor > Semiconductor>Insulator
- Resistivity: Conductor < Semiconductor < Insulator
- Example: Diodes, Transistors
- Transistors:

1. BJT: Bipolar Junction Transistor
2. FET: Field Effect Transistor

KVL

- KVL→ Loop/path. KCL→ Node/junction.
- Sum of voltages in a loop is ZERO
- In a loop: $\sum V_{rise} = \sum V_{drop}$
- I leaves positive terminal of source (battery)
- I enters positive terminal of load (resistors)
- KVL: $-V_S + V_1 + V_2 = 0$
- Ohm's law: $V_1 = \mathrm{I}R_1$
- $-V_S + IR_1 + IR_2 = 0$
- R_1 and R_2 series: I same



KCL

- KVL→ Loop/path. KCL→ Node/junction.
- Sum of currents in a node is ZERO
- In a node: $\sum I_{enter} = \sum I_{leave}$
- KVL (loop 1): $-V_S + V_1 + V_2 = 0$
- Ohm's law: $V_1 = I_1 R_1; V_2 = I_2 R_2; V_3 = I_3 R_3$
- R_2 and R_3 parallel: V same
- $V_2 = I_2 R_2 = V_3 = I_3 R_3$
- KCL Node a:
- $-I_1 + I_2 + I_3 = 0$
- $I_1 = I_2 + I_3$