

**Bangladesh University of Engineering and Technology
Department of Electrical and Electronic Engineering**

PART A: General Information

Course Number:	EEE 263
1. Course Title:	Electronic Circuits
Credit (Contact) Hours:	3.0
2. Level and Term:	Level-2, Term-1 (July 2025 academic term)
3. Course Type:	Non-departmental course
4. Pre-requisite Courses:	EEE 163
5. Course Website:	Designated Microsoft Teams for each section
6. Lecture Schedule:	Section A: Sun 8 am, Mon 10 am, Wed 11 am Section B: Sun 9 pm, Mon 11 am, Wed 9 am Section C: Sun 10 am, Mon 9 am, Wed 10 am
7. Important Dates:	For important dates and examination schedules please follow the classes and corresponding teams.

Section A: Tanushri Medha Kundu

Lecturer
Dept. of EEE, BUET
Email: tanushrimkundu@eee.buet.ac.bd
Office: ECE 430

Section B: Dr. Md. Mohsinur Rahman Adnan

Assistant Professor
Dept. of EEE, BUET
Email: mmradnan@eee.buet.ac.bd
Office: ECE 915 (B)

Section C: Md. Tanvir Hossain

Lecturer
Dept. of EEE, BUET
Email: tanvirhossain1940@gmail.com
Office: ECE 633

PART B: Course Details

1. Course Content:

Ideal device characteristics of Diode, Bipolar Junction Transistor (BJT), Metal-Oxide-Semiconductor Field Effect Transistor (MOSFET); Wave shaping circuits: Diode wave shaping techniques, clipping and clamping circuits, comparator circuits, switching circuits; Amplifiers: BJT and MOSFET amplifiers; Linear Integrated Circuits: Op-amps, linear applications of Op-Amps; Oscillators: Timers (555), function generators.

2. Course Objectives:

- The main objective of this course is to learn about characteristics and operation of basic electronic circuit elements like diode, BJT, MOSFET and understand the application of these elements in various electronic circuits like rectifier and amplifier.
- The course talks about the characteristics, operation, and application of Op-amps in linear Circuits.
- The course also aims to teach the students the design principles and/or applications of Oscillators, Timers (555) and Function generators.

- Thus, the course teaches students how to design amplifiers, oscillators, switches and other electronic circuits using electronic circuit elements like diode, BJT, MOSFET, Op-amps and other linear ICs.
 - The course also generates ability in the student so that he can understand any electronic circuit and discuss electronic circuits with specialists as necessary in his academic and professional life.
- 3. Background Knowledge required:** Basics of electrical circuits, equation solver, calculus and differential equation solver.
- 4. Course Outcomes (COs):**

Upon completion of this course, the successful student will be able to-

COs	CO Statements	Corresponding PO(s)*	Domains and Taxonomy level(s)**	Delivery Method(s) and Activity(-ies)	Assessment Tool(s)
CO1	Explain the operation, characteristics, and application of diode, BJT, MOSFET, Op-amps. Learn about various wave shaping circuits using diodes	PO1	C2	Lectures, Tutorials, Homeworks	Assignment, Class test, Final exam
CO2	Analyse electronic circuits using DC and AC equivalent circuit models of BJTs and MOSFETs	PO2	C4	Lectures, Tutorials, Homeworks	Assignment, Class test, Final exam
CO3	Explain operation and application of Oscillators, Timers (555), Function generators	PO1	C2	Lectures, Tutorials, Homeworks	Assignment, Class test, Final exam
CO4	Design amplifiers, oscillators, switches and other electronic circuits using electronic circuit elements like diode, BJT, MOSFET, Op-amps and other linear ICs	PO3	C5	Lectures, Tutorials, Homeworks	Assignment, Class test, Final exam

*Program Outcomes (PO): **PO1** Engineering Knowledge, **PO2** Problem Analysis, **PO3** Design/development Solution, **PO4** Investigation, **PO5** Modern tool usage, **PO6** The Engineer and Society, **PO7** Environment and sustainability, **PO8** Ethics, **PO9** Individual work and team work, **PO10**. Communication, **PO11** Project management and finance, **PO12** Life-long Learning

Cognitive Domain Taxonomy Levels: **C1 – Remember, **C2** – Explain, **C3** – Apply, **C4** – Analysis, **C5** – Synthesis/Design, **C6** – Evaluation

5. Assessment Strategy:

a. Class Attendance and Participation

Class participation and attendance will be recorded in every class. Participation and attendance for the students may be considered in case the student could not attend the class due to a valid reason (power failure, internet problem, device problem, health problem, etc.). The student has to inform the teacher over email in case of such occurrences. A maximum of three (03) such missed classes can be considered for this course

b. Quiz, Assignment, Viva and Presentation

Four nos. of tests (Quiz, Assignment, Viva and Presentation) will be taken and best 3 nos. will be counted.

c. Final Examination

A comprehensive term final examination will be held at the end of the Term following the guideline of academic Council.

6. Distribution of Marks:

Individual student will be evaluated based on the following criteria as approved by the University:

a. Class Participation	10%
b. Homework Assignment and Quizzes	20%
c. Final Examination (3 hours)	70%
Total	100%

7. Learning Resources:

a) Text Books

- **Microelectronic circuits ~ Adel Sedra, Kenneth C. Smith**

b) Reference Books:

- Electronic Devices and Circuits ~ Louis Nashelsky, Robert Boylestad
- Operational Amplifiers and Linear Integrated Circuits ~ Frederick F. Driscoll and Robert F. Coughlin
- Digital Fundamentals ~ Thomas L. Floyd
- c) Other Resources: Online resources or supplementary materials will be shared with the class on a need basis

N.B. Besides going through relevant topics of the textbook, it is strongly advised that the students follow the class lectures and discussions regularly for a thorough understanding of the topics.

8. Course Contents and Lecture Plan:

Topic	Lectures (Week)
Diode: Ideal and non-ideal device characteristics and operation. Rectifier circuits, ripple factor, RC time constants. Wave shaping circuits, diode wave shaping techniques, clipping and clamping circuits.	10 (1-4)
Bipolar junction transistor (BJT): Operation and characteristics. Transistor Configuration: CB, CE and CC-operation and characteristics. Early effect. Transistor biasing. Amplifiers: BJT amplifiers. DC and AC equivalent circuits. Amplifier and other circuit analysis using equivalent circuits,	7 (4-6)
Metal oxide semiconductor field effect transistor (MOSFET): Operation and characteristics. Current saturation in MOSFET. Depletion and Enhancement type MOSFET. DC and AC equivalent circuits. Amplifier and other circuit analysis using equivalent circuits	7 (6-8)
Operational Amplifiers (Op-amps): Operation and characteristics, inverting and non-inverting amplifiers, summer, integrator, differentiator, Electronic Analog Computation.	3 (9)
Linear Integrated Circuits: <ul style="list-style-type: none"> • Oscillators: Barkhausen criteria, Wein bridge oscillator, Crystal oscillator, LC tuned oscillator • Timers (555) • Monostable, astable, bistable multivibrator • Function generators 	12 (10-13)
Review	3 (14)

9. Important University Policies

- Please check the following link for Rules and regulations for the undergraduate programs:
<https://www.buet.ac.bd/info/Academicinformation/RulesUndergradprogram>

Course Outline Prepared by	Dr. Mahbub Alam	28/07/2022
Course Outline Reviewed by	Dr. Quazi Deen Mohd Khosru	29/07/2022
	Dr. Ahmed Zubair	29/07/2022
	Nafis Sadik	20/11/2023
	Md. Jawad Ul Islam	20/11/2023