

# EE2005: ELECTRONIC DEVICES AND CIRCUITS

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## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Electronic Devices and Circuits

### Subject Code

EE - Electrical Engineering

### Course Number

2005

### Academic Unit

Electrical Engineering (EE)

### College/School

College of Engineering (EG)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

EE1002 Principles of Electrical Engineering

### Equivalent Courses

EE2301 Basic Electronic Circuits

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

The aim of this course is to provide students with the basic principles of electronic circuits and devices for analyzing simple circuits, and the characteristics of some commonly used electronic devices.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Apply the essential skills in analysing AC and AC circuits		x	x	
2	Construct and apply ideal operational amplifier circuits		x	x	
3	Describe the basic characteristics, operations and applications of some basic electronic devices (including diodes and transistors)		x	x	
4	Apply basic techniques for effective analysis of electronic circuits		x	x	

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will participate in lectures where they will learn various fundamental knowledge and concepts in simple electronic systems, which they will apply in subsequent activities to deepen their understanding and practical skills.	1, 2, 3, 4	3 hrs/wk
2	Labs/Practice Classes	Students will engage in lab sessions designed to reinforce key concepts covered in lectures and tutorials, enabling them to apply theoretical knowledge through hands-on practice and collaborative problem-solving.	1, 2, 3, 4	3 hrs/wk (4-7 weeks)

**Assessment Tasks / Activities (ATs)**

	<b>ATs</b>	<b>CILO No.</b>	<b>Weighting (%)</b>	<b>Remarks ("- " for nil entry)</b>	<b>Allow Use of GenAI?</b>
1	Tests (min.: 2)	1, 2, 3, 4	30	-	No
2	#Assignments (min.: 3)	1, 2, 3, 4	10	-	Yes
3	Lab Exercises and Reports	1, 2, 3, 4	10	to assist in report writing, comprehending the lab contents.	Yes

**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

2

**Minimum Continuous Assessment Passing Requirement (%)**

30

**Minimum Examination Passing Requirement (%)**

30

**Additional Information for ATs**

Remark: To pass the course, students are required to achieve at least 30% in course work and 30% in the examination. Also, 75% laboratory attendance rate must be obtained. # may include homework, tutorial exercise, project/mini-project, presentation

**Assessment Rubrics (AR)****Assessment Task**

Examination

**Criterion**

Achieving all CILOs

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Margin

**Failure (F)**

Not even reaching marginal

**Assessment Task**

Coursework

**Criterion**

Achieving all CILOs

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Margin

**Failure (F)**

Not even reaching marginal

**Part III Other Information****Keyword Syllabus**Circuit Analysis

DC circuits; review of systematic circuit analysis; AC circuits; transient and steady-state solutions; introduction to frequency response; passive filter circuits.

Operational Amplifier Circuits

Ideal operational amplifier; inverting amplifier, non-inverting amplifier, summing amplifier; differential amplifier, instrumentation amp; RC active filter circuits: low-pass, high-pass, band-pass.

Diode Circuits

PN junction; diode characteristics and models; ideal diode model and offset diode model; load line and operating point; Zener diode; Applications: rectifier and clamping circuits.

Transistor Circuits

Operating principles of BJT/MOSFET devices; input and output characteristics; transistor biasing and active operating points; different types of single-stage amplifiers; small-signal analysis of amplifying circuits; input and output resistances; AC voltage gain.

**Reading List****Compulsory Readings**

	Title
1	C. K. Alexander and M. N. O. Sadiku, Fundamentals of Electric Circuits, 7th Edition, (McGraw-Hill Higher Education 2020)
2	Donald Neamen, Microelectronics Circuit Analysis & Design, 4th Edition, (McGraw Hill 2009)

**Additional Readings**

<b>Title</b>	
1	W. Hayt, J. Kemmerly, J. Philips and S. Durbin, Engineering Circuit Analysis, 9th Edition, (McGraw-Hill Higher Education 2018)
2	C. K. Tse, Linear Circuit Analysis, (Addison-Wesley and Pearson Education, 1998)