

EE1002: PRINCIPLES OF ELECTRICAL ENGINEERING

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Principles of Electrical Engineering

Subject Code

EE - Electrical Engineering

Course Number

1002

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

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course is aimed at providing students with an understanding of the concepts, impacts, and basic principles of electronic engineering.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Consolidate mathematical concepts on differentiation, integration, trigonometry and complex numbers		x	x	
2	Describe the basic principles of electric charges and electrical conduction		x	x	
3	Apply Kirchhoff's laws to analyze DC circuits		x	x	
4	Apply complex impedance concept to analyze simple AC circuits with capacitors and inductors		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	Various fundamental knowledge and concepts in the field of electrical engineering are introduced, aiming to equip students with the necessary background to continue pursuing their studies in electrical engineering.	1, 2, 3, 4	3 hrs/wk
2	Labs / Practice Classes	Experiments and class exercises are conducted to deepen understanding of key concepts covered in lectures.	3, 4	2 hrs/wk (3 weeks)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
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	3, 4	10	-	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

Achievements in CILOs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Coursework

Criterion

Achievements in CILOs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword SyllabusMathematical Foundations for Circuit Analysis

Introduction to differentiation, derivative, gradient, rate of change; introduction to integration, integral, area; fundamentals to differential equations; trigonometry; complex numbers (rectangular form and phasor form)

Review of Electrical Conduction

Atomic structure and electric charge, conductors, insulators, electric field and magnetic field, electric current, resistance, potential

DC Circuit analysis

Ohm's law, Kirchhoff's law, power and energy; resistor, sources, open- and short- circuit; series and parallel networks; ammeter, voltmeter; mesh and nodal analysis, Thevenin's and Norton's theorems; maximum power transfer

AC Circuit Analysis

Capacitor and inductor; first-order transient circuit (RL and RC circuits); complex impedance; sinusoids; instantaneous and average power

Reading List**Compulsory Readings**

Title	
1	M. O. Sadiku, S. M. Musa and C. K. Alexander, "Applied Circuit Analysis," McGraw Hill, 2012.
2	C. K. Tse, Linear Circuit Analysis, London: Addison-Wesley, 1998.

Additional Readings

Title	
1	N. Storey, "Electronics: A System Approach," Pearson, 5th edition, 2013.
2	A. R. Hambley, "Electrical Engineering: Principles and Applications," Pearson, 6th edition, 2013.
3	J. N. Burghartz, "Guide to State-of-the-Art Electron Devices" , Wiley and IEEE Press, 2013.