EE1002: PRINCIPLES OF ELECTRICAL ENGINEERING

Effective Term
Semester A 2022/23

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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Lectures on various fundamental knowledge and concepts in the field of electronic engineering.	1, 2, 3, 4	3 hrs/wk
2	Tests	To test the students’ understanding on the lecture materials.	1, 2, 3, 4	
3	Labs / Practice Classes	Conduct experiments and class exercises to deepen key concepts covered in lectures and tutorials	3, 4	2hrs/wk (4 week)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tests (min.: 2)	1, 2, 3, 4	30	
2	#Assignments (min.: 3)	1, 2, 3, 4	10	
3	Lab exercises and reports	3, 4	10	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

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 Syllabus

Mathematical 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.

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.