City University of Hong Kong
Course Syllabus

offered by Department of Electrical Engineering
with effect from Semester A in 2021/2022

Part I Course Overview

Course Title:	Electronic Devices and Circuits
Course Code:	EE2005
Course Duration:	One Semester (13 weeks)
Credit Units:	3
Level:	B2
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	EE1002 Principles of Electrical Engineering
Equivalent Courses: *(Course Code and Title)*	EE2301 Basic Electronic Circuits
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

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

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Apply the essential skills in analysing AC and AC circuits		✓	✓	
2.	Apply the concepts of transient and frequency responses of dynamic circuits		✓	✓	
3.	Construct and apply ideal operational amplifier circuits		✓	✓	
4.	Describe the basic characteristics, operations and applications of some basic electronic devices (including diodes and transistors)		✓	✓	
5.	Apply basic techniques for effective analysis of electronic circuits		✓	✓	
	** If weighting is assigned to CILOs, they should add up to 100%.*	100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5		
Lectures	Key concepts are described and illustrated	✓	✓	✓	✓	✓		2 hrs/wk
Tutorials	Key concepts are worked out based on problems	✓	✓	✓	✓	✓		1hr/wk
Labs/Practice Classes	Key concepts are applied to build practical circuits and essential skills to be mastered by practice	✓	✓	✓	✓	✓		3 hrs/wk (4-7 weeks)

4. Assessment Tasks/Activities (ATs)

(Ats are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5			
Continuous Assessment: 50%								
Tests (min.: 2)	✓	✓	✓	✓	✓		30%	
#Assignments (min.: 3)	✓	✓	✓	✓	✓		10%	
Lab Exercises and Reports	✓	✓	✓	✓	✓		10%	
Examination: 50% (duration: 2hrs , if applicable)								
Examination	✓	✓	✓	✓	✓		50%	
** The weightings should add up to 100%.*							100%	

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

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Examination	Achieving all CILOs	High	Significant	Moderate	Margin	Not even reaching marginal
2. Coursework	Achieving all CILOs	High	Significant	Moderate	Margin	Not even reaching marginal

6. Constructive Alignment with Major Outcomes

Please state how the course contribute to the specific MILO(s)

MILO	How the course contribute to the specific MILO(s)
1, 2, 5	Through the study and practice of analysis methods, students are expected to develop an ability to apply basic knowledge of mathematics, science and engineering principles for identifying the problems, formulating solutions, and implementing the solutions to solve engineering problems.
7, 10	The lab sessions involve active sharing of ideas and applying engineering principles and tools to solve hands-on problems. Report write-ups, discussions, and demonstrations will directly contribute to the development of effective communication skills effectively.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

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

Operational Amplifier Circuits
Ideal operational amplifier; inverting amplifier, non-inverting amplifier, summing amplifier, differential amplifier, instrumentation amp.

Passive and Active Filters
Passive filter circuits; RC active filter circuits: low-pass, high-pass, band-pass, band-stop, all-pass, notch filters.

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.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	C. K. Alexander and M. N. O. Sadiku, Fundamentals of Electric Circuits, 6th Edition, (McGraw-Hill Higher Education 2016)
2.	Donald Neamen, Microelectronics Circuit Analysis & Design, 4th Edition, (McGraw Hill 2009)

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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)