



# SYLLABUS

## 1. Course name: ELECTRIC CIRCUITS

**Course code:** ELCII40144

## 2. Course code: ELCII40144

## 3. Credits: 4 (4:0:8) (4 for theory, 0 for practice/experiment)

Duration: 15 weeks (including 4 hours for attending class and 8 hours for self-study per week)

## 4. Instructors:

1/ Chief lecturer: MEng. Senior Lecturer. Le Thi Thanh Hoang

2/ Co-lecturers:

- MEng. Senior Lecturer. Tran Tung Giang
- Assoc. Prof. Dr. Le My Ha
- MEng. Lecturer. Tran Duc Loi
- MEng. Senior Lecturer. Le Thi Hong Nhung

## 5. Course conditions

Prerequisite course(s): None

Previous course(s): Advanced Mathematics1,2,3

## 6. Course description

This course aims to supply learners with knowledge to solve problems related to electric circuit analysis. Learners will learn laws, principles and maths such as Ohm's, Faraday's and Kirchoff's laws to solve problems related to electrical and electronics circuits. Moreover, learners will learn how to analyse circuits with mutual inductance, op-amps, three phase systems, two-ports networks, linear and nonlinear circuits in time domain and frequency domain using Laplace transform, Fouries transform and bode plot with their applications in the real world.

## 7. Course Learning Outcomes (CLOs)

CLOs	Description <i>(After completing this course, students have)</i>	ELO(s) /PI(s)	Competency
CLO1	Ability to apply electric laws for electrical and electronics circuit analysis.	ELO1/PI1.1	R
CLO2	Ability to apply given methods to analyse electric circuit analysis.	ELO1/PI1.3	R
CLO3	Ability to work in teams and contribute to class	ELO5/PI5.1	R
CLO4	Ability to apply techniques and skills to analyse basic electric circuits.	ELO4/PI4.1	R

Where: I (Introduction); R (Reinforce); M (Mastery)

## 8. Content outline

- Overview of electric circuits including fundamental elements, laws and methods of equivalent transformations.
- Methods for electric circuit analysis such as: node-voltage, mesh-current, Thevenin and Norton equivalents, and superposition property.
- Overview of sinusoidal circuits, relationship between voltage, current, impedance, admittance, phasor vector in RLC circuits.
- Methods to solve AC circuits: compute powers including parent, active and reactive, and maximum powers.
- Impedance matching between source and load: resonant circuits.
- Op-amp, mutual inductance.
- Three phase systems: introduction, star and delta connection, solution for three phase systems with balance and unbalance.
- Introduction to two-ports networks and state space equations. Types of two-ports networks, their parameters and applications.
- Introduction to transient process. Application of Laplace transform to solve transient problems.
- Fourier series analysis. Introduction to transfer function and how to derive transfer function for some basic electric circuits. Introduction to Bel and Decibel and Bode magnitude and phase plots.
- Nonlinear circuits and methods for their analysis.

## 9. Teaching methods

- Powerpoint presentation
- Teamwork activities

## 10. Student Assessments

- Grading points: **10**
- Planning for students assessment is followed:

No.	Contents	CLOs	Competency	Assessment techniques	Assessment tools	Weighing (%)
<b>Formative assessment</b>						<b>50</b>
1	Knowledge, basic definitions and laws about electric circuits.	CLO1 (PI1.1)	R	- Assignments -Oral	- Quizes - Questions	10
2	Application of methods learned to analyse electric circuits.	CLO2 (PI1.3)	R	- Assignments	Questions	30
3	Tham gia tích cực các buổi học, trao đổi nhóm.	CLO3 PI5.1	R	- Assignments	Questions	10
<b>Summative assessment</b>						<b>50</b>
Lần 4	Analysis, calculation of current, voltage, power in basic electric circuit analysis.	CLO4 (PI4.1)	R	- Assignments	Questions	50

## 11. Learning materials

### - Textbooks:

- [1] Nguyen Minh Tam, Tran Tung Giang, Le Thi Thanh Hoang, Le My Ha. *Electric Circuit Analysis*, HCMC National University Publication, 2017.
- [2] Tran Tung Giang, Le Thi Thanh Hoang. *Electric Circuit Analysis*, HCMC National University Publication, 2013.

### - Reference books:

- [1] Pham Thi Cu; Le Minh Cuong, Truong Trong Tuan My. *Problems of Electric Circuits – Part II*, HCMC National University Publication, 2014.
- [2] Charles K. Alexander, Matthew N. O. Sadiku *Fundamentals of electric circuits*, 2nd ed., Boston, McGraw-Hill, 2004.

## 12. General Information

### Academic Integrity

All students in this class are subject to HCMUTE's Academic Integrity Policy (<http://sao.hcmute.edu.vn/>) and should acquaint themselves with its content and requirements, including a strict prohibition against plagiarism. Any violations will be reported to the Faculty of Electrical and Electronic Engineering Dean's office.

### Flexibility Notice

Any information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advanced notice. Students need to regularly update the information of their registered class.

### Intellectual Property

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**13. Date of Approval:** 01/8/2021 <dd/mm/yyyy>

### 14. Approval

Dean

Head of Department

Chief lecturer

## 15. Revision History

<b>1<sup>st</sup> Revision:</b> <dd/mm/yyyy>	<Lecturer>
<b>2<sup>nd</sup> Revision:</b> <dd/mm/yyyy>	Head of Department: <Approved>
	Dr. Nguyen Ngoc Au