SYLLABUS

1. **Course name:** ELECTRIC MACHINES
2. **Course code:** ELMA240344
3. **Credits:** 4 (4/0/8)

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

   1- PhD. Le My Ha

   2- M.Eng. Tran Duc Loi

5. **Course conditions**

   Prerequisites: Mathematic 3, Electrical-Electronic Material, Electric Circuits
6. **Course description**

This course provides students the knowledge of the electrical machines in the industry, including the structure, working principles, the working mode, the application of various types of industrial electrical machines.

7. **Course Goals**

Goals	***Goal description*** *(This course provides students:)*	ELOs
G1	Master the relevant knowledge of the educational sector in the field of industrial electrical equipment	1.1, 1.2
G2	An ability to analyze, explain and solve technical problems related to electrical equipment electrical in industrial electronics	2.1
G3	Teamwork skills, communication and the ability to study the issues related to module	3.1
G4	The ability to choose, use and application of the calculation of technical parameters, operation, maintenance, repair of electrical equipment in relation to the training sector.	2.2

** Note: High: H; Medium: M; Low: L*

8. **Course Learning Outcomes (CLOs)**

CLOs		***Description*** *(After completing this course, students can have:)*	Outcome
G1	**G1.1**	Presentation, Structure description, work ethic, character and effect of the electrical machines in the automatic electric drive system, power plan and power stations, transmission system, supply and use of electricity. Analyze the basic working mode of electrical machines.	1.1, 1.2
	G1.2	Understand, explain the application of electrical equipment in industry training sector.	1.1, 1.2

G2	**G2.1**	Reading skills, identifying structural, electrical diagrams, technical parameters of various kinds of electrical equipment.	2.1
	G2.2	Math skills, analysis of power relations - since, according to the specifications of the corresponding working mode of electrical equipment.	2.1
	G2.3	Be able to search for documents, research and presentation of specialized content	2.1
G3	**G3.1**	The style industry, community responsibility, energy saving power	3.1
	G3.2	The positive attitude, initiative in learning, to complete the task of learning (attendance, homework, results presentation, exchange and cooperation groups, classes)	3.1
G4	**G4.1**	Calculation, choose the electrical equipment	2.2
	G4.2	Skills assessment about product quality of electrical equipment.	2.2
	G4.3	Product development direction to the electrical equipment industry	2.2

9. Study materials

- Textbooks:

[1] Hubert, Charles I, Electric machines, Prentice Hall, 2002.

10. Sudent Assessments

- Grading points: 10

- Planning for students assessment is followed:

Type	Contents	Linetime	Assessment techniques	CLOs	Rates (%)
Midterms					**50**
Exam01	DC Machine	Week 4	Individual paper assessment in class	G2.1, G2.2, G3.1, G4.1	12.5
Exam02	Transformer	Week 8	Individual paper assessment in class	G1.1, G1.2, G3.1, G4.1	12.5
Exam03	Asynchronous machine	Week 12	Individual paper assessment in class	G1.2, G2.2, G3.2	12.5
Exam04	Synchronous machine	Week 15	Individual paper assessment in class	G1.2, G2.2, G3.2	12.5
Final exam					**50**
Final Exam	- The exam covers all contents related to the expected learning outcomes of the course.		Individual paper assessment in class	G1.2, G1.3, G2.1, G3.1,	

				G3.2, G4.1, G4.2, G4.3	

11. Course details:

Weeks	Contents	CLOs
1	***Chapter 1:* < DC MACHINE>** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 1.1 Structure, working principle, specifications. 1.2 Power relations 1.3 Exercises **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G1.2
	***B/* Self-study contents**: *(8)* + DC machine Winding + Exercises and home works	G1.1 G1.2
2	***Chapter 1:* < DC MACHINE (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 1.4 DC Generator 1.5 Exercises **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G1.2 G4.1
	***B/* Self-study contents**: *(8)* + Calculate the specifications in the working mode of the DC Generator + Working modes, methods of operation, control, industrial applications of DC Generator + Exercises	G1.1 G1.2 G2.1 G2.2
3	***Chapter 1:* < DC MACHINE (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods:(4)* **Contents:** 1.6 DC Motor 1.7 Exercises **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G2.1 G2.2 G4.1 G4.2
	***B/* Self- study contents**: *(8)* + Calculate the specifications in the working mode of the DC Motor + Working modes, methods of operation, control, industrial applications of DC Motor + Exercises	G4.1 G4.2

4	***Chapter 1:* < DC MACHINE (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods:(4)* **Contents:** 1.8 DC Generator and DC Motor sumarization 1.9 Test **Teaching methods**: + Questions + Discussion	
	***B/* Self- study contents**: *(8)* + Sumarization of DC machine + Class test	
5	***Chapter 2:* < TRANSFORMER >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 2.1. Introduction 2.2. The structure, working principle and rated value. **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + The structure, working principle, calculate rated voltage, rated power + Exercises	G1.1 G2.1
6	***Chapter 2:* < TRANSFORMER >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 2.3 Equations and circuit replacement, vector graph of transformer. 2.4 The no load and short circuit experiment, parameter determines **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + Equations and circuit replacement, vector graph used in the calculation transformer parameters + Exercises	G1.1 G2.1
7	***Chapter 2:* < TRANSFORMER (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 2.4 Power calculation, losses, performance of transformer 2.5 Calculate the voltage change of transformer **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G4.1 G4.2
	***B/* Self- study contents**: *(8)* + Calculate Power, losses, performance of transformer	G4.1

	+ Calculate the voltage change of transformer + Exercises	
8	***Chapter 2:* < TRANSFORMER (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 2.6. Transformer working in parallel 2.7. Summarization 2.8 Test **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	
	***B/* Self- study contents**: *(8)* + Calculate the load factor, Current, Voltage, and capacity of transformer while working parallel. + Exercises + Test	
9	***Chapter 3:* < ASYNCHRONOUS MACHINE >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 3.1 Introduction 3.2 Structure, working principle, slip, rated value of the machine **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + Structure, working principle of asynchronous machine + Exercises	G1.1 G4.1
10	***Chapter 3:* < ASYNCHRONOUS MACHINE >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 3.3 Magnetic field in asynchronous machine 3.4 Equations and computational circuits in asynchronous machine. **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + Parameters in circuit equations of asynchronous machine + Exercises	G1.1 G4.1
11	***Chapter 3:* < ASYNCHRONOUS MACHINE (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 3.5 Energy conversion, power, loss, power efficiency 3.6 Electromagnetic torque, torque-speed characteristic curve **Teaching methods**:	G1.1 G1.2 G2.1

	+ Theoretical lectures using powerpoint + Questions + Discussion	
	***B/* Self- study contents**: *(8)* + Calculate the parameters of the starting mode, speed change and braking	G2.1
12	***Chapter 3:* < ASYNCHRONOUS MACHINE (cont.) >** *(16/0/32)*	
	A/* Contents and teaching methods: (4)* **Contents:** 3.6 Starting mode, speed change, braking of the machine. 3.7 Control and application of asynchronous machine 3.8 Summarization 3.9 Test **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G1.2 G2.1
	***B/* Self- study contents**: *(8)* + Calculate the parameters of the starting mode, speed change and braking + Test	G2.1
13	***Chapter 4:* < SYNCHRONOUS MACHINE >** *(12/0/24)*	
	A/* Contents and teaching methods: (4)* **Contents:** 4.1 Introduction 4.2 Structure, working principle, rated value of the machine 4.3 Electromagnetic relations in synchronous machine **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + Structure, working principle of synchronous machine + Circuit, equations, calculate the parameters + Exercises	G1.1 G1.2
14	***Chapter 4:* < SYNCHRONOUS MACHINE >** *(12/0/24)*	
	A/* Contents and teaching methods: (4)* **Contents:** 4.4 Synchronous Generator **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	G1.1 G2.1
	***B/* Self- study contents**: *(8)* + Working parameters of Synchronous Generator	G1.1 G1.2
15	***Chapter 4:* < SYNCHRONOUS MACHINE >** *(12/0/24)*	
	A/* Contents and teaching methods: (4)* **Contents:** 4.5 Synchronous Motor	G1.1 G2.1

	4.6 Summarization 4.7 Test **Teaching methods**: + Theoretical lectures using powerpoint + Questions + Discussion	
	***B/* Self- study contents**: *(8)* + Working parameters of Synchronous Motor + Test	G1.1 G1.2

12. Learning ethics:

- Home assignments and projects must be done by the students themselves. Plagiarism found in the assessments will get zero point

13. First approved date: June 01 2017

14. Approval level:

Dean	Department	Instructor
Assoc. Prof. PhD. Nguyen Minh Tam	**PhD. Le My Ha**	**M.Eng. Tran Duc Loi**

15. Syllabus updated process

1st time: Updated content dated	Instructors
2st time: Updated content dated	Head of department