



Syllabus

1. **Course name:** Electromagnetic Field

2. **Course code:** ELFI230344

3. **Credits:** 3 credits (3:0:6) (3 lecture periods, 0 lab period, 6 self-study periods per week)

4. **Instructors**

a. Chief lecturer: MEng. Nguyen Ngoc Hung

b. Co-lecturers: MEng. Truong Van Hien

5. **Course Requirements:**

Prerequisite course(s): None

Previous course(s): Advanced Mathematics, General Physics

6. **Course Description**

This course provides learners fundamental knowledge related to electromagnetic field, laws and equations for describing electromagnetic field. In addition, the course also equips with the knowledge of the static electromagnetic field, steady electromagnetic field, time-varying electromagnetic field, electromagnetic waves, electromagnetic radiation; calculate the characteristic parameters of electric field, magnetic field and electromagnetic waves.

7. **Learning Outcomes (CLOs)**

CLOs	Descriptions	ELO(s) /PI(s)	Compe- tency
	<i>On successful completion of this course students will be able to:</i>		
CLO1	Ability to apply concepts, laws and equations of the electromagnetic field.	ELO1/PI1.2	M
CLO2	Ability to apply the static, steady and time-varying electromagnetic field in electrical equipments.	ELO2/PI2.1	R
CLO3	Ability to calculate the characteristic parameters of electric field, magnetic field and electromagnetic waves.	ELO4/PI4.1	R
CLO4	Ability to analyze, explain the electromagnetic phenomena, electromagnetic waves to take out the appropriate methods in the use of biomedical equipments.	ELO7/PI7.3	R

8. **Content outline**

- *The concept of electromagnetic field, characteristic quantitative and fundamental laws of electromagnetic field*
- *Maxwell's equations, power and electromagnetic energy*
- *The static electromagnetic field.*
- *Laplace's and Poisson's equations and boundary conditions.*
- *Methods for solving the static electric field problems: superposition principle, application of Gauss's law, application of Laplace's and Poisson's equations, the method of images.*
- *The steady electromagnetic field*
- *The steady electric field in conductors.*
- *The steady magnetic field, magnetic force and magnetic field energy.*

- *Time-varying electromagnetic field, the equations of time-varying electromagnetic field.*
- *Uniform plane electromagnetic waves*
- *Electromagnetic radiation*

9. Teaching Methods

- *Powerpoint presentation*
- *Teamwork*

10. Assessment(s)

- Grading scale: **10**
- Assessment plan:

No.	Content	CLOs	Competency	Assessment methods	Assessment tools	Weighting %
Formative assessment						50
1.	Basic knowledge of electromagnetic field	CLO1	M	Multiple choice	Multiple choice questions	30
2.	The static electric field in dielectrics.	CLO2	R	Essay	Questions	20
3.	The steady electric field in conductors and the steady magnetic field.	CLO2	R	Essay	Questions	
Summative assessment						50
4.	Explain, calculate the parameters of the electromagnetic field	CLO3, CLO4	R R	Essay	Questions	50

11. Learning Materials:

- Textbook(s):
[1] Nguyễn Ngọc Hùng, Trương Văn Hiền, *Giáo trình Trường điện từ*, NXB Đại học Quốc gia, Tp.HCM, 2016.
- References:
[2] Ngô Nhật Ảnh, Trương Trọng Tuấn Mỹ, *Trường điện từ*, NXB Đại học Quốc gia, Tp.HCM, 2008
[3] John D. Kraus, *Electromagnetics*, 4th Edition, McGraw-Hill, 1992

12. General Information:

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13. Approval Date: <dd/mm/yyyy>

14. Endorsement:

Dean	Head of Department	Chief Lecturer
Assoc. Prof. Dr. Nguyen Minh Tam	Assoc. Prof. Dr. Nguyen Thanh Hai	<Full Name>

15. Revision History:

1st Revision: <dd/mm/yyyy>	Lecturer: Head of Department: Assoc. Prof. Dr. Nguyen Thanh Hai
2nd Revision: <dd/mm/yyyy>	Lecturer: Head of Department: