



Philadelphia University

Faculty of Engineering - Department of Electrical Engineering

Course Details:

- Title:** Electromagnetics (1) (610213)
- Prerequisite:** Basis of Engineering Analysis (650163)
Engineering Analysis (1) (650260)
- Credit Hours:** 3 credit hours (16 weeks per semester, approximately 45 contact hours)
- Textbook:** “Electromagnetics”, J. D. Kraus, 1992.
“Elements of Electromagnetics”, M. Sadiku, 2014.
- References:** “Engineering Electromagnetics”, W.H. Hayt, Jr., J.A. Buck, 2011.
“Elements of Engineering Electromagnetics”, N.N. Rao, 2004.
- Course Description:** This is an introductory course on electromagnetism. It emphasizes fundamental concepts and laws leading to the formulation and application of mathematical equations to describe electric and magnetic fields.

Course Outlines:

Week	Topic
1	Vector Algebra: Scalars and Vectors, Unit Vectors, Vector Arithmetic
2	Systems Coordinate : Cartesian, Cylindrical, Spherical
3	Vector Calculus: Line Surface and Volume Integrals, Gradient Divergence, Curl and Laplacian
4	Coulomb's Law and Field Intensity, Electric Flux Density, Gauss's Law, Electric Potential
5	Electric Dipole, Polarization, Capacitors and Energy Density
6	Boundary Conditions, Poisson's and Laplace's Equations
7	Steady Electric Current, Current Density, Conductivity, Resistivity, and Dielectrics
8	Magnetic Flux and Biotsavart Law
9	Magnetic Field and Ampere's Law
10	Magnetization Curve, Reluctance, Permittivity , Boundary Conditions
11	Inductors and Energy Density, Solenoid, Toroid
12	Magnetic Circuits, Magnetic Circuit With Airgap
13	Charge Moving In Static Magnetic Field
14	Magnetic Force, Torque, Moment, Motor
15	Faraday's Law, Moving Conductor In Magnetic Field, and Generator
16	Self and Mutual Inductance

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	Understand the basic principles of electric and magnetic fields	[a , e]
2.	Understand the basic of vectors and calculus in field theory	[a]
3.	Relate electromagnetic concepts to electric circuit concepts	[a]
4.	Have basic knowledge of time changing electric and magnetic fields	[a]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

- Sub-Exams:** The students will be subjected to two scheduled written exams, first exam and second exam during the semester. Each exam will cover materials given in lectures in the previous 3-4 weeks.
- Quizzes:** (3-5) quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.
- Homework** Homework should be solved individually and submitted before or on a set agreed date.
Cheating by copying homework from others is strictly forbidden and punishable by awarding the work with zero mark.
- Final Exam:** The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy:

First Exam	20%
Second Exam	20%
Quizzes/Homework	20%
Final Exam	40%
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Total:	100%

Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.

May , 2018