GAU, Faculty of Engineering

Course Unit Title	Electromagnetic Theory II
Course Unit Code	EEN347
Type of Course Unit	Compulsory, Electrical-Electronics Engineering
Level of Course Unit	3rd Year, Undergraduate
National Credits	4
Number of ECTS Credits Allocated	7 ECTS
Theoretical (hour/week)	4
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	5. Semester, Fall
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisities and co-requisities	PS112 General Physics II
Recommended Optional Programme Components	Vector Calculus

Objectives of the Course: At the end of the course, students will,

- Improve their mathematical skills in order to understand Electromagnetic theory.
- Discover electrostatic fields and their applications.
- Discover the magnetic fields and their applications.
- Be introduced to the time varying fields and Maxwell's equations.

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	Apply vector algebra and vector calculus on problems	1
2	Conceive relationships of forces, fields and potantial concepts	1
3	Solve problems on static electric fields	1
4	Solve problems on static magnetic fields	1
5	Solve problems on capacitance and capacitors	1

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	5
2	Ability to design and conduct experiments as well as to analyze and interpret data	1
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	1
4	Ability to apply systems thinking in problem solving and system design	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	1
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	1
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	2
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	1
10	Strong foundation on the fundamentals of Electrical and Electronics Engineering such as Circuit Theory, Signals, Systems, Control and Communications, which are necessary for successful practice in the field	5
11	Awareness on the contemporary requirements, methods and applications of the Electrical and Electronics Engineering	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Content

Week			Exams
1		Electromagnetic Model	
2		Vector Algebra	
3		Orthogonal Coordinate Systems	
4		Vector Calculus	
5		"	
6		Coulomb's Law	
7		Gauss's Law	
8		Electric Potential	Midterm
9		Capacitances and Capacitors Steady Electric Currents	
10		Vector Magnetic Potential	
11		Biot-Savart Law	
12		Inductances and Inductors	Quiz
13		Magnetic Energy, Magnetic Forces	
14		Time varying Fields, Faraday's Law	
15			Final

Recommended Sources

Textbook: David K. Cheng, Fundamentals of Electromagnetic Theory, Addison-Wesley, 1994.

Supplementary Material (s): 1. W. Hayt, Engineering Electromagnetics, McGraw-Hill, 1989.
2. Free e-book) Bo Thidé, Electromagnetic Field Theory, http://www.plasma.uu.se/CED/Book/, 2010.

Assessment

Attendance	5%	
Midterm Exam	30%	Written
Quiz	20%	Written
Final Exam	45%	Written
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	4	60
Labs and Tutorials	-	-	-
Assignments	4	4	16
Project/Presentation/Report Writing	1	8	8
E-learning Activities	8	2	16
Quizzes	1	15	15
Midterm Examination	1	15	15
Final Examination	1	15	15
Self Study	13	4	52
Total Workload			197
Total Workload/30 (h)			6.567
ECTS Credit of the Course			7