FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Electromagnetic Waves 1

Information :

Course Code :	COM 213	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours
Department :	Department of Electrical Engineering				

Instructor Information :

Title	Name	Office hours
Professor	Ibrahim Ahmed Mohamed Salem	8
Assistant Lecturer	Ahmed Essam Fahim Zahran	3
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Area Of Study :

- Enrich students' knowledge of fundamentals of steady electric and magnetic fields
- Prepare the students to analyze different magnetic circuits.
- Prepare the students to use Gauss's, Stoke's, and Maxwell' equations.

Description :

Different coordinate systems used in solving vector field problems. Coulomb's law- relation of electric field intensity with different charges, the electric flux density, Gauss' law and the divergence theorem. Relation between the electric field and the force exerted on charges, and energy expended in this motion. The potential gradient, and the dipole moment. The application of the previous laws to some materials – conductors- semiconductors- and dielectrics. Boundary conditions. Definition of susceptibility and permittivity. Laplace and Poisson equations in three coordinate systems, example of their solution. Relation of steady magnetic field, its curl, and Stoke's theorem. Maxwell' equations. Faraday' law. Magnetization, relation between magnetic flux density and magnetic field. Magnetic reluctance and magnetic circuit. Magnetic materials. .

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1. Recognize the electric field due to different charges.
2 -	a2. Estimate the proper equation to find the electric flux.
3 -	a3. Select different coordinates for solving electrostatic problems.
4 -	a4. Explain different magnetic circuits.
5 -	a5. Estimate the electric and magnetic forces and stored energies.
b.Intellectual Skills: :	
1 -	b1. Compare between the different boundary conditions for electric and magnetic fields.
2 -	b2. Investigate the best current intensity suitable to create a necessary magnetic flux density.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Vector analysis	5	3	2
Coulomb's law, Force, Electric field	10	6	4
Divergence law	5	3	2
Energy and potential	5	3	2
Flux, Flux density, Gauss' law	10	6	4
Material; conductors, semiconductors,. &midterm 1	10	6	4
Dielectrics and capacitors	5	3	2
Steady state magnetic fields, Faraday' law	10	6	4
Magnetic flux, flux density, current & midterm 2	5	3	2
Magnetic materials	5	3	2
Magnetic circuits	5	3	2

Teaching And Learning Methodologies :

Lecture
Research
Studio Work

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final-term	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied
First Mid-Term Exam	15.00	7	to assess the skills of problem solving, understanding of related topics.
Performance	10.00	14	
Quizzes and Assignments	20.00	14	to assess the ability of applying electromagnetic laws in solving and understanding of different technical issues.
Second Mid-Term Exam	15.00	11	to assess the skills of problem solving, understanding of related topics.

Books :

Book	Author	Publisher
Engineering Electromagnetics	William H.Hayt,Jr	Mcgraw Hill

Course Notes :

No course notes are required

Recommended books :

1. Text Book: W.H. Hayat, J. A. Buck," Engineering Electromagnetics" McGraw Hill, 8th edition , 2012.
2. Handouts
3. Recommended Readings:
John Kraus, Daniel Fleisch," Electromagnetics" McGraw Hill, 5th edition