Hashemite University
College of Engineering
Department of Bio-medical Engineering
EE 110406425-Bio-Electromagnitic (3 Credit Hours/Dept. Elective)

Instructor

Dr. Haitham Al-obidollah	
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Office hours:	10:00-11:00 (daily)

Grading info

Test 1	25%	
Test 2	25%	
Class Activities	10%	
Final	40%	

Course

Course Number:	110409221
Prerequisite:	Physics II (0102102) and Calculus III (110101201) • Knowledge of physics, calculus and Multivariate Calculus. Magnetism: magnetic field and magnetic forces, electromagnetic induction and waves, Vector calculus, partial derivatives, and multiple integrals
Textbook:	**"Fundamental of Applied Electromagnetics",** Fawwaz T. Ulaby, Chapter (3-5), Prentice Hall, 2004. Fifth Edition.
Course Description:	Review of vector analysis, Divergence and Stokes's theorem, electrostatic fields, Coulomb's law, unbound electric fields, electrostatic boundary-value problems, Magnetostatic fields, Maxwell's equations for static EM fields. Magnetic force, Torque, and Moment. Magnetic materials, magnetic devices. Faraday's law, Displacement current.
Specific Outcomes of Instruction (Course Learning Outcomes):	1. Implement Coulomb's law and Gauss's law to find the electrostatic fields, potential, and capacitance. (a, e) 2. Implement Biot Savart's law and Ampere's law to find the magnetostatic fields and inductance.(a, e) 3. Recognize the behavior of electric and magnetic fields in the presence of dielectric and magnetic material boundaries. (a, e) 4. Apply Maxwell's Equations for time-harmonic fields and Faraday's law. (a, e) 5. Analyze electromagnetic through boundaries between media. (a, e)
Important material	- Lecture notes - References

References:
- Mathew N. O. Sadiku, "Elements of Electromagnetics", Third edition, Oxford University Press 2001.
- Constantine A. Balanis, "Antenna Theory: Analysis and Design", 2nd Edition, Wiley, 1996.
- Joseph A. E., "Theory and Problems of Electromagnetics" 2/ed, Shaum's Outline Series.

Major Topics Covered and Schedule in Weeks:

Topic	# Weeks	# Contact hours
Review of Vector Algebra & Review of Coordinate System and Transformation	2	6
Review of Vector Calculus	3	9
Electrostatic Fields and Electric Fields in Material	3	9
Magnetostatic Fields, Magnetic Forces and Materials	4	16
Maxwell's Equations for time-harmonic fields and Faraday's law	3	9