Hashemite University
College of Engineering
Department of Electrical Engineering
Antennas and Wave Propagation (3 Credit Hours/Dept. Compulsory)

Instructor

Omar A Saraereh	
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Office hours:	10:00-11:00 (daily)

Grading info

Mid term test	40%
Project	20%
Final	40%

Class Info

Days	Sun/Tue/Thurs
Time	1:00-2:00 PM
Location	Eng. 2010

Course

Course Number:	110409429
Prerequisite:	Electromagnetic II (110409324)
Textbook:	**"Fundamental of Applied Electromagnetics",** Fawwaz T. Ulaby, Chapter (9-10), Prentice Hall, 2015. Edition 8. Cheng, David. K., Field and Wave Electromagnetics, 2nd Ed., Addison-Wesley, Reading MA, 1989 .
Course Description:	Review of electromagnetic fundamentals, antennas and radio wave propagation. Antenna fundamentals, antenna radiation characteristics, Hertizian or short dipole, half wavelength dipole, monopole antenna, loop antenna, horn Antenna, patch antenna, antenna arrays, aperture antenna, friis transmission formula. Electromagnetic waves and its properties, propagation of waves, modes of propagation, waves attenuation and absorption, ground waves, sky waves space wave, radio VHF/UHF and microwave wave propagation, Wave guides. Terrestrial fixed links, and link budgets.
Specific Outcomes of Instruction (Course Learning Outcomes):	At the completion of the course, students will be able to… 1. Identify basic antenna parameters (A, E) 2. Design and analyze wire and aperture antennas (A, C, E, K) 3. Design and analyze matching and feeding networks for antennas (A, C, E, K) 4. Design and analyze antenna arrays (A, C, E, K) 5. Analyze wireless transmit-receive systems (A, E) 6. Identify the characteristics of radio-wave propagation (A, E)
Important material	- Lecture notes - References - Internet resources

References:

[1] R.E. Collin, Antennas and Radio Wave Propagation, McGraw-Hill, N.Y., 1985.
[2] R.E. Collin and F.J. Zucker (Eds.), Antenna Theory, Vols. I and II, McGraw-Hill, N.Y., 1969.
[3] S. Silver (Ed.), Microwave Antenna Theory and Design, MIT Radiation Lab. Series, McGraw- Hill, N.Y., 1949.

Major Topics Covered and Schedule in Weeks:

Topic	# Weeks	# Contact hours*
Introduction: design issues, examples of typical antennas	1	3
Fundamentals of electromagnetic radiation:	1	3
Basic antenna parameters	1	3
Design of simple wire antennas	1	3
Design of matching and feeding networks	2	6
Design of antenna arrays:	2	6

Design of aperture-type antennas:	2	6
Properties of receiving antennas:	1	3
Transmit-receive system:	2	6
Radio-wave propagation:	2	6
Total	**15**	**45**

Course Policy

- If you miss class, there won't be a makeup test, quiz, etc. and you WILL get a zero unless you have a valid excuse.
- Cheating and plagiarism are completely prohibited.
- If you miss more than 15% of classes you will automatically fail the class.

Student Outcomes (SO) Addressed by the Course:

#	*Outcome Description*	*Contribution*
	General Engineering Student Outcomes	
(a)	An ability to apply knowledge of mathematics, science, and engineering	***H***
(b)	An ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	***H***
(d)	An ability to function on multidisciplinary teams	
(e)	An ability to identify, formulate, and solve engineering problems	***H***
(f)	An understanding of professional and ethical responsibility	
(g)	An ability to communicate effectively	
(h)	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	A knowledge of contemporary issues	
(k)	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	***H***

H=High, **M**= Medium, **L**=Low