

Faculty of Engineering & Technology

Antennas and Propagation

Information :

Course Code : COM 521

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Professor	Fawzy Ibrahim Abdelghany Hamama	2
Teaching Assistant	Merna Mohamed Emad Khafagy	

Area Of Study :

- 1- Enrich students' knowledge of the Antenna theory, Types, Analysis and Design.
- 2- Develop students skills in the design of dipoles, Horns, reflector antennas.
- 3- Enrich students knowledge about the different Satellite antennas.

Description :

The course of antenna includes the study, analysis, and design of:
Antenna types and antenna parameters, Wire antennas: small wire antenna, dipoles, monopole, folded . Loop antenna, helical antennas (normal, and axial)- travelling wave antenna (including rhombic antennas). Arrays: broadside- binomial- Chybeshev, end fire array, and phased arrays. Aperture antennas: open end waveguides (rectangular, and circular apertures). Horns: sectoral, pyramidal, and conical horns. Reflectors: single, double and corner reflectors. Lens antennas: dielectric and parallel plates. Wide band antennas (spiral- LPDA). Microstrip antennas.

Course outcomes :

a.Knowledge and Understanding: :

1 -	a1. Explain the fundamental antenna terms and parameters, field patterns, Polarization Loss Factor (PLF), the antenna efficiency, and the antenna gain.
2 -	a2. Recognize the radiation characteristics of the dipole antennas, and the aperture antennas.
3 -	a3. Estimate of the different horn types, and determination of the geometrical parameters, the Power Budget, and (C/No) ratio for a communication Channel.
4 -	a4. Recognize the parabolic reflector antenna, the cassegrain system and the applications for the different antenna types.
5 -	a5. Explain the construction and functions of the control ground stations (GCS) for Satellite control.

b.Intellectual Skills: :

1 -	b1. Apply the different techniques to the design of the different antenna systems calculations.
2 -	b2. Analyze the performance of different antenna systems.

c.Professional and Practical Skills: :

1 -	c1. Measure the antenna field pattern, to determine HPBW, FNBW and SLL.
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2 - c2. Measure of the antenna VSWR.

d.General and Transferable Skills: :

1 - d1. Work in stressful environment and within constraints.

2 - d2. Communicate effectively.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to antenna definition and types. Fundamental antenna parameters	5	3	2
Field regions, radiation power density and intensity. Directive gain, directivity, efficiency and gain	10	6	4
HPBW, FNBW, polarization of the wave and of the antenna. Polarization types, the polarization loss factor (PLF).	10	6	4
Friis transmission equation, Link budget calculations. Infinitesimal dipole , radiation fields and radiation resistance. + Mid-Term Exam 1	10	6	4
Finite length dipole, Half wave dipole. Radiation patterns and radiation resistance. Input impedance.	10	6	4
Aperture antennas, rectangular aperture , Circular aperture. Radiation patterns, antenna characteristics , For different aperture field distributions. Electromagnetic horns. E-Sectoral Horn, H-Sectoral Horn . Pyramidal Horn. Conical Horn. Corrugated Horns. + Mid-Term Exam 2.	20	12	8
Antenna Systems. Parabolic , Cassegrain, and Gregorian systems. GCS stations for Satellites	10	6	4

Teaching And Learning Methodologies :

Interactive Lecturing

Discussion

Problem Solving

Experiential Learning