

## **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		
Lecturer	Ahmed Hosni Ali Mohamed Elghandour	2		
Lecturer	Ahmed Hosni Ali Mohamed Elghandour	2		
Assistant Lecturer	Ahmed Essam Fahim Zahran	5		
Teaching Assistant	Samar Abdelmohaimen Mohamed Soliman			

#### **Area Of Study:**

- 1- Enrich students' knowledge of the Antenna theory, Types, Analysis and Design.
- 2- Develop students dskills in the design of dipoles, Horns, reflector antennas.
- 3- Enrich studentsaknowledge 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 . Áoop 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 Recognize the parabolic reflector antenna, the cassegrain system and the applications for the different antenna types.
- 2 Explain the construction and functions of the control ground stations (GCS) for Satellite control.
- 3 Explain the fundamental antenna terms and parameters, field patterns, Polarization Loss Factor (PLF), the antenna efficiency, and the antenna gain.
- 4 Recognize the radiation characteristics of the dipole antennas, and the aperture antennas.
- 5 Estimate the different horn types, and determination of the geometrical parameters, the Power Budget, and (C/No) ratio for a communication Channel.

#### b.Intellectual Skills::

- 1 Design of the different antenna systems calculations using different techniques.
- 2 Analyze the performance of different antenna systems.



## c.Professional and Practical Skills::

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

# d.General and Transferable Skills: :

- 1 Work in stressful environment and within constraints.
- 2 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. Infinitismal dipole, radiation fields and radiation resistance.	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.	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** 

Course Assessment :			
Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00		
Final Exam	40.00		
First Mid-Term Exam	15.00		
Lab Exam	5.00		
Quizzes	15.00		
Second Mid-Term Exam	15.00		

