

## **EC520- Satellite Communications**

### **CREDIT HOURS**

3 Hours

### **CONTACT HOURS (Hours/week)**

Lecture: 2; Tutorial: 2

### **COURSE COORDINATOR**

Dr. Ashraf Mamdouh

### **TEXT BOOK**

G. Maral, M. Bousquet, "Satellite Communication systems", John Wiley & sons

### **COURSE DESCRIPTION**

Orbits and Earth Coverage: Orbital parameters-circular and elliptical orbits-GEO,MEO,LEO. Link budget, atmospheric Losses- frequency bands. Satellite construction (payload, platform)- Radio system technology (Multiple Access Techniques. Antennas. Mobile satellite communication systems. Direct satellite broadcasting , VSAT) – Channel coding techniques

### **PREREQUISITE:**

EC 422

### **RELATION OF COURSE TO PROGRAM**

Elective

### **COURSE INSTRUCTION OUTCOMES**

The student will be able to:

- give an overall view on the different aspects concerning the satellite on a communication system.
- describe different types of satellite orbits, to address the limitations and capabilities of the satellite communication system and to review different types of satellite communication systems.

### **TOPICS COVERED**

- Introduction to satellite communications (historical background, comparison between terrestrial and satellite links, advantages and limitations of satellite communication, types of satellite services.
- Satellite Orbits
- Satellite Link
- Satellite Construction
- Radio System Technology
- Earth Stations
- Fixed Satellite Services
- Mobile Satellite Communications ( INMARSAT, ICO , VSAT )

- Satellite Communication (Direct satellite broadcasting)
- Channel coding techniques: Linear Block codes
- Convolutional codes

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:**

<b>Professional component Content</b>			
<b>Math and Basic Sciences</b>	<b>Engineering Topics</b>	<b>General Education</b>	<b>Other</b>
	✓		

**RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:**

<b>Student Outcomes</b>		<b>Course aspects</b>
A	An ability to apply knowledge of mathematics, science, and engineering	a <sub>1</sub> a <sub>2</sub>
B	An ability to design and conduct experiments, analyze and interpret data.	
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	
D	An ability to function on multi-disciplinary teams.	d <sub>1</sub> d <sub>2</sub> d <sub>3</sub> d <sub>4</sub>
E	An ability to identify, formulate, and solve engineering problems	e <sub>1</sub> e <sub>2</sub> e <sub>3</sub>
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 social content	h <sub>1</sub> h <sub>3</sub> h <sub>4</sub>
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	
k	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	