

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	Baghdad University / Al Khwarizmi College of engineering
2. University Department/Centre	Information and Communication Eng. Dept
3. Course title/code	<b>Satellite Communication / ICE 444</b>
4. Program(s) to which it contributes	specialization Requirement
5. Modes of Attendance offered	Attendance is according to the university (rules in 2023-2024 (Full-Time
6. Semester/Year	1 <sup>st</sup> /2023
7. Number of hours tuition (total)	<b>3 hours/ 45hr.</b>
8. Date of production/revision of this specification	Oct.2023/2024

#### 9. Aims of the Course

The course aim to gave the student the following subjects:

History of the satellite, applications of the satellite, types of satellite, orbit equation, block diagram satellite, and Sub satellite, received signal: calculate the power transmitted from the earth station to satellite, effect of rain, snow, ice, atmosphere, ionosphere, temperature, and the noise on the power signal, noise temp, noise figure, and system noise temperature, modulation, and multiplexing, link budget , carrier to noise ratio, OBP transponder, FT transponder, Multiple access techniques, FDMA,

10. Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

At the completion of the subject items the students will be able to:

- A1. Knowledge the basics behind the development of satellite communication.
- A2. Understanding the advantages and disadvantages of satellite communication systems
- A3. Pinpoint the different stages of satellite communication system.
- A4. Analyze the specific satellite communication system requirements.
- A5. Discrimination between different orbits, antennas, operating frequency bands, uplink, downlink.
- A6 . knowledge about different communication channel effects

B. Subject-specific skills

- B1. Analyze the specific digital and analog satellite communication system requirements
- B2. Design a specific satellite communication system for a given rate, bandwidth, probability of error requirements
- B3. decision for selection of specific multiplexing technique to accommodate specific requirements.

Teaching and Learning Methods

formal lectures  
small group seminars,  
and self-study

Assessment methods

Unseen written examinations 20%  
Quizzes 10%  
Homework 10%  
Final exam 60%

C. Thinking Skills

- C1. How to use different orbits with different application requirements
- C2. Cost effective systems requirements decision
- C3. The selection of different uplink and down link frequency to combat channel effects and jamming.

D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. decision making when and where to employ satellite communication

D2. Thinking about whether effects on signal  
D3. Different uses of satellite such as DVB, GPS, remote sensing.....

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Discrimination between satellite and terrestrial communication, Introducing different elements of transponder	Advantages and disadvantages of satellite communication, why satellite	Class room lecture	Scheduled Quizzes
2	3	Description of basic earth station subsystems, Define the satellite orbits , their advantage and disadvantages	Elements of satellite communication system, Earth station, Satellite Orbits	Class room lecture	
3	3	Discuss Keplers 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , laws	Keplers laws	Class room lecture	
4	3	Define the satellite orbits , their advantage and disadvantages	LEO, MEO, GEO	Class room lecture	
5	3	Describe the different forces affect on satellite	Orbit equation	Class room lecture	
6	3	Look angle determination, subsatellite point, elevation angle, azimuth angle	Look angle determination, subsatellite point, elevation angle, azimuth angle	Class room lecture	
7	3	How to overcome different body stablization system and altitude control	Altitude and control system	Class room lecture	
8	3		Mid term exam		Mid term exam
9	3	Received power determination	Link budget analysis, determination	Class room lecture	
10	3	Effect of rain attenuation subjects to carrier signal	Rain attenuation	Class room lecture	
11	3	Different antenna with their applications,	Satellite antennas, antenna polarization, feed system, double reflector antennas	Class room lecture	

		advantages and disadvantages			
12	3	The contribution of noise on different stages	System Noise, noise temperature, G/T ratio	Class room lecture	
13	3	Performance evaluation of different satellite components ,in terms of Noise Figure	Noise figure	Class room lecture	
14	3	Carrier to noise determination due to different stages	Carrier to noise determination	Class room lecture	
15	3	Composite channel uplink and down link contribution of noise	Composite link carrier to noise ratio, OBP, FT transponder	Class room lecture	
16	3	Discuss different multiple access techniques their advantages, disadvantages, capacity	Multiple access techniques , FDMA, intermodulation, TDMA, TDMA frame structure	Class room lecture	

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Text book: Satellite Communication Systems Design Principles by M. Richharia References: satellite communication by Dennis Rody
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	Summer training, Scientific visits

## 13. Admissions

Pre-requisites	Digital communication
Minimum number of students	
Maximum number of students	30

