Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	**Erbil Technical Engineering College**	
Department	**Information System Engineering**	
Module Name	**Applications of Data Communication**	
Module Code	**ADC605**	
Degree	**Technical Diploma** ☐ **Bachelor** ☒ **High Diploma** ☐ **Master** ☐ **PhD** ☐	
Semester	**6**	
Qualification	**Ph.D.**	
Scientific Title	**Lecturer**	
ECTS (Credits)	**6**	
Module type	**Prerequisite** ☐ **Core** ■ **Assist.** ☐	
Weekly hours		
Weekly hours (Theory)	**(2)hr Class**	**(90)Total hrs Workload**
Weekly hours (Practical)	**(2)hr Class**	**(72)Total hrs Workload**
Number of Weeks	**15**	
Lecturer (Theory)	**Dr. Salar Kheder Shaikhah**	
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Lecturer (Practical)	**Dr. Salar Kheder Shaikhah** **Ms. Diana Haidar Husen**	
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Websites	

Course Book

Course Description	This course provides following: 1- Bandwidth utilization methodologies and technics such as TDM, FDM, CDM, WDM 2- Transmission Media ways including wire and wireless 3- Wireless and mobile communication concepts and backgrounds 4- GSM System 5- WCDMA System 6- LTE System
Course objectives	**11. Course objective:** The course makes students to be ready in most of the fields of Data communication, Telecommunication, and Mobile communication. Giving them enough information to be ready for working in the companies of; Internet providing, Telecom, Networking, with helping them to be understand their nature works as IT Engineer by: 1- Giving a strong background to telecommunication networks and preparation for the networking in 4th stage. 2- Build background for students in data communication, telecommunication and all related aspects to them. 3- Introduce students to advance subjects and preparing them to work in design field in data communication systems 4- Giving enough information for different mediums (wire and wireless) in order, they can treat with them in work environments. 5- Studying many telecommunication systems like; FM, AM, GSM, WCDMA, etc.
Student's obligation	• Lectures attendance • Class participation in knowledge sharing and answering questions • Follow up the lessons with the lecture and studying related references • Doing and participating in exams • Responding request from the lecture about seminars and surveys related to subjects. Doing assignments
Required Learning Materials	

Evaluation	**Task**		**Weight (Marks)**	**Due Week**	**Relevant Learning Outcome**
	Paper Review				
	Assignments	Homework	5%		
		Class Activity	2%		
		Report	5%		
		Seminar			
		Essay	5%		
		Project			
	Quiz		8%		
	Lab. Report		10%		
	Midterm Exam		25%		
	Final Exam		40%		
	Total		100%		

Specific learning outcome:	The course will give the fundamental, and advance knowledge and practical abilities in the following: 1- Bandwidth utilization methodologies and technics such as TDM, FDM, CDM, WDM 2- Transmission Media ways including wire and wireless 3- Wireless and mobile communication concepts and backgrounds 4- GSM System 5- WCDMA System 6- LTE System
Course References:	Course Reading List and References: Text Book: Data Communication and Networking by Behrouz A. Forouzan 4th Ed Wireless Communications and Networks 3G and Beyond by Iti Saha Misra

Course topics (Theory)	**Week**	**Learning Outcome**
Chapter One, Bandwidth utilization	1-2	Understand bandwidth utilization
Chapter Two, Transmission media	3-4	Understand types of cables and channels

Chapter Three, Introduction to wireless and mobile communication	5-7	Strong background on wireless communication
Chapter Four, GSM System	8-10	Strong background on GSM
Chapter Five, WCDMA System	11-13	Strong background on 3G
Chapter Six, LTE System	14-15	STRONG BACKGROUND ON 4G
Practical Topics	**Week**	**Learning Outcome**
Programing and testing Data rate **Programing and testing effect of noise on a signal** **Programing and testing ASK Modulation, building Transmitter** **Programing and testing QAM Modulation, building Transmitter** **Programing and testing Tx, channel and Rx with BER Calculating** **Programing and testing effect of multipath channel on BER** **Programing and testing complete modeling for a communication sys.**	1-2 3-4 5-6 7-8 9-10 11-12 13-14-15	

Questions Example Design

Q1/ Five channels, each with 150 kHz bandwidth are multiplexed together. Calculate the minimum bandwidth of the link for the following cases:

a. No guard band among sub-bands.
b. Guard band between each two sub-bands is 15 kHz

Specify, transmission over which link, guard band or without guard band is better? Explain briefly.

Q2/ Answer the following:

A. Which one is better; high sampling rate or low sampling rate? Explain briefly.
B. What is the best shape for the cell coverage representation? Explain briefly.
C. What is the root cause of using TMSI instead of IMSI after call setup?

Q1/ Write a MATLAB program to show sampling theorem conditions as shown in the following figure. All the figure detail should be considered. Consider signal frequency is 4 Hz.

Extra notes:

External Evaluator

I confirm that the syllabus and content of this course book is sufficient and fulfilment for the lesson of "Applications of Data Communication" for the third stage of department "Information System Engineering" students, and it covers the requirements of students to have enough knowledge in this field.