Module (Course Syllabus) Catalogue

2021-2022

College/ Institute	**College of Erbil Technical Engineering**	
Department	**Department of Information System Engineering**	
Module Name	**Data Communication**	
Module Code	**DAC504**	
Degree	**Technical Diploma** ☐ **Bachler** ■ **High Diploma** ☐ **Master** ☐ **PhD** ☐	
Semester	**5**	
Qualification	**Ph.D.**	
Scientific Title	**Lecturer**	
ECTS (Credits)	**6**	
Module type	**Prerequisite** ☐ **Core** ■ **Assist.** ☐	
Weekly hours	**4**	**Total Workload=(162) hrs**
Weekly hours (Theory)	**(2)hr Class**	**(81)Total hrs Workload**
Weekly hours (Practical)	**(2)hr Class**	**(81)Total hrs Workload**
Number of Weeks	**12**	
Lecturer (Theory)	**Dr. Salar Kheder Shaikhah**	
E-Mail & Mobile NO.	salar.shaikhah@epu.edu.iq / **07504550017**	
Lecturer (Practical)	**Ms. Diana Hayder Hussein/ Dr. Salar Kheder Shaikhah**	
E-Mail & Mobile NO.	diana.hussein@epu.edu.iq / 07504062524	
Websites		

Course Book

Course Description	This course is to provide students with following: 1- Basic information of networking and physical aspects of it. 2- Introduction computer communications over wireless and wire mediums 3- Studying terminology and parameters for the data communication systems 4- Studying and analysing all levels of data and voice communications 5- Studying both digital and analog communications aspects and taking systems as examples 6- Studying different techniques for efficiently design a data communication network 7- Studying transmission mediums with different types of wire and wireless guides
Course objectives	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 and big image to network 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	1- Lectures that are provided by the lecturer 2- references and text books of the lesson: Data Communication and Networking by Behrouz A. Forouzan 4th Ed Wireless Communications and Networks 3G and Beyond by Iti Saha Misra

	Task		Weight (Marks)	Due Week	Relevant Learning Outcome
Evaluation	Paper Review				
	Assignments	Homework	5%		
		Class Activity	2%		
		Report	5%		
		Seminar	5%		
		Essay	NA		
		Project			
	Lab Report & Activity		10%		
	Quiz		8%		
	Lab Quiz		NA		
	Midterm Exam		10%		
	Lab Midterm Exam		15%		
	Final Exam		20%		
	Lab Final Exam		20%		
	Total		100%		

Specific learning outcome:	The course will give the fundamental, and advance knowledge and practical abilities in the following: • Signals and data • Network basic topologies • Digital transmission and systems • Analog transmission and systems • Features and concepts in data communications • Transmission mediums Mobile communications as 2G, 3G
Course References:	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, Introduction To Data Communication	1-2	Understanding background of communication
Chapter Two, Data and Signals	3-5	Understanding background of signal and data

Chapter Three, Digital Transmission	6-7	Understanding digital transmission systems
Chapter Four, Analog Transmission	8-9	Understanding analog transmission system
Chapter Five, Multiplexing and Spreading	10-12	Understanding multiplexing system
Practical Topics	**Week**	**Learning Outcome**
Starting with MATLAB	1-2	Understanding How to treat with data rate in MATLAB
Creating Arrays **Mathematical Operations with Arrays**	3-4	Understanding How to simulate channel and calculate its effect
Script Files **Two Dimensional Plot**	5-6	Understanding the modulation types and how to simulate them
Functions & Function Files **Programming in MATLAB**	7-8	Understanding simulation of QAM and simulation of a system
Data Communication Applications using MATLAB (Data & Signals) **Data Communication Applications using MATLAB (Modulations)**	9-10	Calculating BER over a system
Data Communication Applications using MATLAB (System Simulations) **Data Communication Applications using MATLAB (Metric Measures1)**	11	Understanding effect of multipath on BER
Data Communication Applications using MATLAB (Metric Measures1)	12	Understanding system modelling
Questions Example Design		

Q3/A/ Find the period and wavelength for the first channel of the FM radio system. Consider the center frequency of the channel is the frequency.

Answer Q3/A/

$f_c = 88.1MHz \qquad T = \frac{1}{F} = \frac{1}{88.1M} = \mathbf{11.3}\ ns \qquad \lambda = C * T = 3 * 10^8 * 11.3 * 10^{-9} = \mathbf{3.39m}$

Q3/B/ What is the benefit of multiplexing? What type of multiplexing is used in the 1- Radio Broad Casting, 2- GSM 3- Optical fiber.

Answer Q3/B/ To combine different users in one channel without any interference among them. The type of multiplexing for the following are:

1- Radio Broad Casting - FDM
2- GSM - TDM
3- Optical - WDM

Extra notes:

External Evaluator

I confirm that the syllabus and content of this course book is sufficient and fulfilment for the lesson 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.

Signature