



## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	Erbil Technical Engineering College	
Department	Information System Engineering	
Module Name	Data Communication	
Module Code	DC505	
Degree	Technical Diploma <input type="checkbox"/>	Bachelor <input checked="" type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	6	
Qualification	Ph.D.	
Scientific Title	Lecturer	
ECTS (Credits)	6	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
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	
E-Mail & Mobile NO.	<a href="mailto:Salar.shaikhah@epu.edu.iq">Salar.shaikhah@epu.edu.iq</a> , 07504550017	
Lecturer (Practical)	Dr. Salar Kheder Shaikhah Ms. Diana Haidar Husen	
E-Mail & Mobile NO.	<a href="mailto:Salar.shaikhah@epu.edu.iq">Salar.shaikhah@epu.edu.iq</a> , 07504550017 <a href="mailto:diana.hussein@epu.edu.iq">diana.hussein@epu.edu.iq</a> , 0750 406 2524	

## Course Book

<p><b>Course Description</b></p>	<p>This course is to provide students with following:</p> <ol style="list-style-type: none"> <li>1- Basic information of networking and physical aspects of it.</li> <li>2- Introduction computer communications over wireless and wire mediums</li> <li>3- Studying terminology and parameters for the data communication systems</li> <li>4- Studying and analysing all levels of data and voice communications</li> <li>5- Studying both digital and analog communications aspects and taking systems as examples</li> <li>6- Studying different techniques for efficiently design a data communication network</li> <li>7- Studying transmission mediums with different types of wire and wireless guides</li> </ol>
<p><b>Course objectives</b></p>	<p><b>11. Course objective:</b></p> <p>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:</p> <ol style="list-style-type: none"> <li>1- Giving a strong background and big image to network and preparation for the networking in 4<sup>th</sup> stage.</li> <li>2- Build background for students in data communication, telecommunication and all related aspects to them.</li> <li>3- Introduce students to advance subjects and preparing them to work in design field in data communication systems</li> <li>4- Giving enough information for different mediums (wire and wireless) in order, they can treat with them in work environments.</li> <li>5- Studying many telecommunication systems like; FM, AM, GSM, WCDMA, etc.</li> </ol>
<p><b>Student's obligation</b></p>	<ul style="list-style-type: none"> <li>• Lectures attendance</li> <li>• Class participation in knowledge sharing and answering questions</li> <li>• Follow up the lessons with the lecture and studying related references</li> <li>• Doing and participating in exams</li> <li>• Responding request from the lecture about seminars and surveys related to subjects.</li> </ul>

	Doing assignments				
<b>Required Learning Materials</b>					
<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>	
	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%				
<b>Specific learning outcome:</b>	<ul style="list-style-type: none"> <li>• Signals and data</li> <li>• Network basic topologies</li> <li>• Digital transmission and systems</li> <li>• Analog transmission and systems</li> <li>• Features and concepts in data communications</li> <li>• Transmission mediums</li> </ul>				
<b>Course References:</b>	<p>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</p>				
<b>Course topics (Theory)</b>	<b>Week</b>	<b>Learning Outcome</b>			
Chapter One, Introduction To Data Communication	1-2				
Chapter Two, Data and Signals	3-4-5				
Chapter Three, Digital Transmission	6-7				

Chapter Four, Analog Transmission	8-9	
Chapter Five, Bandwidth Utilization: Multiplexing and Spreading	10-12	
Chapter Six, Transmission Media	13-15	
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
Starting with MATLAB	1-2	
Creating Arrays	3-4	
Mathematical Operations with Arrays	5	
Script Files	6	
Two Dimensional Plot	7	
Functions & Function Files	8	
Programming in MATLAB	9	
Data Communication Applications using MATLAB (Data & Signals)	10	
Data Communication Applications using MATLAB (Modulations)	11	
Data Communication Applications using MATLAB (System Simulations)	12	
Data Communication Applications using MATLAB (Metric Measures1)	13	
Data Communication Applications using MATLAB (Metric Measures1)	14	
Data Communication Applications using MATLAB (Metric Measures1)	15	

## 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/**

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

**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 “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.*