The University of Jordan
School of Engineering
Department of Computer Engineering
Summer Term – A.Y. 2022-2023

Course:	Data Communications Systems (0907321) – 3 Credit Hours.
Catalog Data:	Communication System block diagram. Channel impairments: attenuation, distortion and noise. Noise sources/characteristics, AWGN noise. Modulation and demodulation techniques. Mixers, coherent detection, and frequency conversion. Multiplexing: TDM, TDMA, FDM and FDMA. Digital transmission: sampling of signals, quantization, line coding and pulse shaping. Landline Telephony, Pulse Cod Modulation (PCM), PDH and SDH standards. Basics of cellular telephony standards: GSM, 3G, and 4G. Basics of Analog and digital TV Broadcasting Standards. AM and FM Radio standards and receivers. Basics of ADSL standards.
Prerequisites by Course:	CPE 0907322.
Prerequisites by Topic:	Students are assumed to have basic general knowledge in computer networks and signals and systems.
Textbook:	"Data Communications and Networking", 5th Edition, by Behrouz Forouzan, published by, McGraw-Hill, 2012.
References:	"Data and Computer Communications", 10th Edition, by William Stallings, published by, Pearson, 2021.
Website:	MS Teams and e-Learning website.
Schedule & Duration:	8 Weeks, 40 lectures, 75 minutes each (including exams).
Minimum Student Material:	Text book, class handouts, instructor keynotes, calculator, access to a personal computer and a connection to the Internet.
Minimum College Facilities:	E-Learning platform, classroom with whiteboard and projection display facilities, library and computational facilities.

Course Objectives:

1) To understand the elements of a data communication system and how data is transmitted and received in a data communication system.

2) Provide efficient network solution for obstacles encountered during data transmission taking into account, performance, global, environmental, and economic factors.

Course Outcomes (ILOs):

1) To understand the elements of a data communication system.

2) To understand how data is transmitted and received in a data communication system.

3) To understand the obstacles encountered during data transmission.

4) Provide efficient solutions for a data communication system based on data communication concepts and taking into account performance, global, environmental, and economic factors.

Course Topics:

1) Analogue and digital signals and introduction.

2) Data rate limits and transmission impairments.

3) Basics of performance analysis in data communication networks.

4) Data encoding and transmission concepts:

* Digital data transmission over digital signal: NRZ encoding, Multilevel binary encodings, and Biphase encodings.

* Digital data transmission over analogue signal: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Quadrature Amplitude Modulation (QAM).

* Analogue data transmission over digital signal: Digitization, Pulse Code Modulation, Non-linear encoding, and Delta modulation.

* Analogue data transmission over analogue signal: Asynchronous transmission and Synchronous transmission.

5) Transmission media.

6) Multiplexing.

* Performance analysis of FDM, Synchronous TDM and Statistical TDM.

7) Modems.

8) Data link control:

* Error detection and correction.

9) Multiple access protocols.

Computer Usage:	Simulation using Python-3 programming language is required.
Assessments:	Coursework and Exams.

Grading policy:

Course Work	20%.
Midterm Exam	30%.
Final Exam	50%.

Instructors:

Dr Talal A. Edwan,
Office hours:
Sun. – Thu., 12:15 PM – 01:15 PM,
Room CE 414.

Class Time and Location:

Sun. – Thu., 09:45 AM – 11:00 AM,
CE, Computer Applications LAB.