The University of Jordan

School of Engineering

Computer Engineering Department

Fall 2025/2026

Course	Data Communications Systems (0907321) – 3 Credit Hours.
Catalog Description	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: a sampling of signals, quantization, line coding, and pulse shaping. Landline Telephony, Pulse Code 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 of computer networks and signals and systems
Textbook	"Data Communications and Networking", 5th Edition, by Behrouz Forouzan, published by, McGraw-Hill, 2012
Additional References	"Data and Computer Communications", 10th Edition, by William Stallings, published by, Pearson, 2021.
Schedule & Duration	16 Weeks, 45 lectures, 50 minutes each or 32 lectures, 75 minutes each (including exams and quizzes) Sun., Tue., Thu. 12:30 → 13:30 Mon. Wed. 10:00→11:30
Office Hours	Sun., Tue., 13:30 →14:30 and Mon. Wed 13:00 – 14:00
Student Material	Textbook, class handouts, lecture notes, and any additional reading assigned by the instructor
College Facilities	Classroom with whiteboard and projection display facilities, library, and computer laboratory.
Course Objectives	The objectives of this course are to help students to: 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 and Relation to ABET Program Outcomes	Upon successful completion of this course, a student should be able to: 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. Introduction: data communication components, network criteria, & topologies **(Chapter 1)**
2. Analogue and digital signals and introduction. **(Chapter 3)**
3. Data rate limits and transmission impairments. **(Chapter 3)**
4. Basics of performance analysis in data communication networks. **(Chapter 3)**
5. Digital data transmission and signal representation **(Chapter 4)**
    i. Characteristics of coding: Baseline wandering, DC component, self-synchronization, built-in error detection, and bandwidth.
    ii. Line coding: NRZ encoding, RZ encoding, Multilevel binary encodings, and Biphase encoding.
    iii. Block coding: 4B/5B, 8B/10B
    iv. Analog to digital conversion: pulse code modulation (PCM) and Delta modulation
    v. Analogue data transmission over digital signal: Digitization, Pulse Code Modulation, Non-linear encoding, and Delta modulation.
    vi. Analogue data transmission modes: Asynchronous transmission, Synchronous transmission, and Isynchronous transmission.
6. Analog Transmission: **(Chapter 5)**
    i. Digital data transmission over analogue signal: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Quadrature Amplitude Modulation (QAM).
    ii. Analog data transmission over analogue signal: Amplitude modulation (AM), Frequency modulation (FM), Phase modulation (PM)
7. Multiplexing. **(Chapter 6)**
    i. Frequency division multiplexing (FDM), Synchronous and statistical time division multiplexing (TDM), Wavelength division multiplexing (WDM).
    ii. Spread spectrum techniques: DSSS and FHSS
8. Error detection and correction: single error, burst error, linear block code, parity, hamming, cyclic code, and checksum. **(Chapter 10)**
9. Multiple access protocols.

Policies

- Attendance is required. Class attendance will be taken every class and the university's policy will be enforced in this regard
- All submitted work must be yours
- Cheating will not be tolerated
- All materials and announcements will be posted on Ms Teams Platform
- Check department announcements at: http://www.facebook.com/pages/Computer-Engineering-Department/369639656466107 for general department announcements.

Grading policy

Quizzes + assignments	20%
Midterm Exam	30%
Final Exam	50%

Instructors

Dr. Mahmoud Khasawneh
Room: 4th floor

Program Outcomes (PO)

1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	an ability to communicate effectively with a range of audiences
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.