

College of Applied Engineering
King Saud University – Muzahimiyah Campus
Academic Year 1447 (2026)
Semester 2 (472)

Academic Year	Semester	Exam period	Exam date	
1447(2026)	2nd (472)	1 st Mid-Term Exam	~ 6 th week	
		2 nd Mid-Term Exam	~ 12 th week	
Pre-request	Course Title / code/ section/ Room	Course level	Exam duration	
AEE 2410	Communication System Principles/ AEE3430 / 624/ see your time-table	8	Mid.	Final
			1- hour	3- hours
Instructor Name: Dr. Mohammed I. Al-Rayif. Office: S 101 Email: malrayif@ksu.edu.sa		TA Name: Eng. Ahmed Nafees Office: Email:		

Learning Resources

1. Required Text(s)

- Simon Haykin and Michael Moher, "An introduction to Analog and Digital Communication", John Wiley, 2007.

2. Recommended Books and Reference Material

- Carlson, P.B Crilly and J.C. Rutledge, "Communication Systems, McGraw Hill, Fourth Ed, 2002.
- Handouts and notes.

Course Contents

Title of chapter	No. of weeks	Contact hours
Introduction: History of communication systems, Elements of communication system	1	3
Signal Spectrum: Continuous time Fourier transform and its properties, Fourier Series,	1	3
Signal transmission and filtering: LTI System response, Frequency Response, Correlation, Energy Spectral density, Power Spectral Density, Signal distortion in transmission.	1	3
Amplitude Modulation: Amplitude modulation, Double Sideband Suppressed Carrier modulation (DSBSC), Single Sideband Modulation (SSB), Vestigial Sideband Modulation (VSB), Quadrature Amplitude Modulation (QAM), Coherent Detection, Envelop Detection, Frequency-Division Multiplexing, Super-heterodyne Receiver.	3	9
Angle Modulation: Phase Modulation, Frequency Modulation, Narrowband Frequency Modulation, Wide-band Frequency Modulation, Bandwidth of FM, Generation and Detection of FM signals, FM stereo Multiplexing.	3	9
Sampling and Pulse Modulation: Sampling Theory both in time domain and frequency domain, Pulse-Amplitude modulation, Pulse Width modulation, Pulse Position Modulation, Digital Pulse Modulation, Pulse Code Modulation, Quantization and Coding, PCM system detail Delta Modulation, Differential Pulse code modulation, Time-division Multiplexing.	2	6
Principle of Digital Data Transmission: Baseband Pulse Transmission, Inter-symbol Interference (ISI), Pulse Shaping, Passband Transmission, Amplitude Shift Keying, Phase Shift Keying, Frequency Shift Keying, Equalization.	3	9
Random Signals, Noise Performance of communication system: Random variables and its characterization, Random Process, Noise in Communication systems.	1	3
Total number of weeks and lectures	14	42

Objectives and Learning Outcomes

Objectives	Learning Outcomes (PLOs) linked to Program Outcomes (PLOs)
Understand the basic elements of Communication Systems.	1.1. Ability to understand the basic elements of Communication Systems 1.2. Ability to understand the principle of signal transmissions through channels. 1.3. Ability to understand the different types of Analog and Digital Modulation techniques for signal transmissions through channels
Understand the principle of signal transmissions through channels.	
Study the different types of Analog Modulation techniques such as	
AM, FM, and PM.	
Understand the different types of Pulse Modulation (PAM, PWM, PPM) and Pulse Code Modulation (DPCM, DM) techniques.	
Solve MATLAB assignments, students become familiar with modern engineering tools in this course.	

Course Policy

General Rules:

- Course materials including lecture notes, presentations, assignments, etc. will be posted regularly on the University Learning Management System (LMS) portal at <http://lms.ksu.edu.sa>
- In addition to the study material posted online and recommended textbook, the students are also required to consult the other suggested references/sources on a regular basis.
- Students are required to regularly check their university emails and the online Learning System (LMS) for course announcements and assignments.
- Use of mobile phones or other electronic devices is not allowed during class. Unless permitted by the instructor, all such electronic devices must be switched off or put on silence during class.

- Students are strongly encouraged to ask questions during lessons when prompted to do so by the instructor. If further clarification is needed, the students could consult the instructor during his assigned office hours.
- Transparency, honesty, and trustworthiness are expected to be always upheld by both staff and students.

Attendance:

- Punctual attendance of all classes is crucial for achieving the objectives and learning outcomes of this course. The correlation between attendance and performance is well established.
- Attendance is compulsory for all classes including lectures, tutorials, and laboratories.
- Attendance will be taken from week 1.
- All students are required to arrive at least 5 minutes before the start of class. Classes will start promptly on time.
- Any student who arrives after the attendance has been taken will be considered absent.
- Any student whose overall attendance on a particular course is below 75% will not be allowed to sit the final exam for that course.
- Absence from tutorials and labs will be included in the overall attendance record.
- If a student achieves 25% of absence, and hence he is recorded as a denied student, then he must provide his excuse official letter/report within 10 days after his 25% achievement. The certificate must be handed to the course instructor personally.
- Non-official reasons for absence will not be accepted unless approved by Students' Affairs.

Makeup Strategy:

- There will be no makeup for missed quizzes or unsubmitted assignments. Missed quizzes or unsubmitted assignments will receive **zero** marks.

- Makeup for missed exams will be done according to the University Examination Policy. Any evidence for excused absence must be submitted to the instructor within **one week** of the missed exam date.

Schedule of Assessment

Tutorial (Quizzes, HWs, ..)	20%	Semester overall marks 60%
Midterm Exam 1	20%	
Midterm Exam 2	20%	
Final Exam	40%	Total = 100%