المملكة العربية السعودية
ص ب: 2454 الرياض 11451
www.ksu.edu.sa

جامعة الملك سعود
هاتف: 00966 11 4677966
فاكس: 00966 11 4698277

كلية الهندسة / فرع المزاحمية
قسم الهندسة الكهربائية

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

Academic Year	Semester	Exam period	Exam date	
1447(2025/26)	2nd (472)	1st Mid-Term Exam	~ 6th week	
		2nd Mid-Term Exam	~ 12th week	
Pre-request	**Course Title / Code/ Section/ Room**	**Course level**	**Exam duration**	
AEE2410	Digital Signal Processing/ AEE3421/ 1522 / see your time-table.	7	Mid.	Final
			1-hour	2-hours

Instructor Name: Mohammed I. Al-Rayif. **Office:** S 101 **Email:** malrayif@ksu.edu.sa	**TA Name:** **Office:** **Email:**

Learning Resources

1. Required Text(s)

- Sanjit K. Mitra, Digital Signal Processing-A Computer Based Approach, McGraw-Hill, 3rd Edition, 2006.

2. Recommended Books and Reference Material

- V. Oppenheim, R. W. Schafer, and J. R. Buck, Discrete-Time Signal Processing, Prentice-Hall, 2nd Edition, 1999.
- Handouts and notes.

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Course Contents

Title of chapter	No. of weeks	No. of hours
Review: Characterization and classification of discrete-time signals and systems; Typical signal processing operations; Discrete-time linear time-invariant (LTI) systems; Linear constant-coefficient difference equations; Frequency-domain representation of discrete-time signals and systems, The sampling theorem.	2	6
The discrete Fourier transform (DFT)	2	6
The Z-transform	2	6
LTI systems in the transform domain: linear phase systems, all pass systems, design, and analysis of basic low-order digital filters	2	6
Digital Filter Structures	1	3
Infinite-impulse response (IIR) digital filter design	2	6
Finite-impulse response (FIR) digital filter design	1	3
Fundamentals of multirate digital signal processing; Applications.	2	6
Total number of weeks and lectures	**14**	**42**

Objectives and Learning Outcomes

Objectives	Learning Outcomes (PLOs) linked to Program Outcomes (PLOs)
Characterization and classification of discrete-time signals and systems.	1.1. Ability to: apply basic discrete-time signal processing operations and determine requirements when digitizing continuous time signals using sampling theorem, perform Z and inverse Z transforms using definitions, Tables
Apply typical signal processing operations; Linear time-invariant (LTI) systems; linear constant-coefficient difference equations.	

Recognize Frequency-domain representation of discrete-time signals and systems; the discrete Fourier transform (DFT); the fast Fourier transform (FFT).	of Standard Transforms, Properties and Partial Fraction Expansion. 1.2. Ability to: perform multi-rate digital signal processing operations such as decimation and interpolation, and design FIR and IIR filters (theoretically/mathematically) to meet specific magnitude and phase requirements. 2.1. Use computers and MATLAB to create, analyze and process digital signals, and to simulate and design systems and to plot and interpret magnitude and phase of LTI system frequency responses.
Understand The z-transform; Linear phase transfer functions; digital filter structures; finite-impulse response (FIR) digital filter design; Infinite-impulse response (IIR) digital filter design; digital processing of continuous-time signals.	
Recognize fundamentals of multi-rate digital signal processing, Applications.	

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.

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Schedule of Assessment

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