MIDWESTERN STATE UNIVERSITY
A Member of the Texas Tech University System

MCCOY SCHOOL OF ENGINEERING
Course Syllabus: Spring 2026

EENG 3204: Digital Signal Processing

Contact Information

Instructor: Dr. Shahed Enamul Quadir
Office: Martin Hall 110
Course & Lab Schedule: *M/W/F: 9 am – 9:50 am and Lab: Th: 3:30 - 5:30 PM*
Office hours: *T/Th: 9 am – 11 am and F: 10 am – 11 am*
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Course Description

This course introduces the fundamental concepts and techniques of Digital Signal Processing (DSP), focusing on the analysis, design, and implementation of discrete-time systems. Topics include discrete-time signals and systems, sampling and quantization, z-transform, Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT), digital filter design (FIR and IIR), and applications of DSP in audio and image processing systems.

Course Pre-Requisites

EENG 2104 Electric Circuits, EENG 2212 Engineering Computation

Other Prerequisites

Basic computer skills, MATLAB

Textbook & Instructional Materials

"Digital Signal Processing Fundamentals and Applications", Li Tan, Jean Jiang, Academic Press.

Supplemental Material

Oppenheim, A. V., & Schafer, R. W. Signals and Systems.
Proakis, J. G., & Manolakis, D. G. Digital Signal Processing.

Student Handbook

Refer to: Student Handbook

List Of Topics Covered

• Definition and representations of discrete-time signals.	• Z-transform in system analysis and design.
• Operations on digital signals	• Discrete Fourier Transform (DFT)
• Classification of systems	• Applications of DFT in spectral analysis
• Sampling and Quantization	• Fast Fourier Transform (FFT) algorithms
• Forward and inverse z-transform	• Digital filter design

Additional material may be covered as time permits.

Grading

- Homework Assignments: 10%
- Quizzes: 10%
- Laboratory Assignments: 20%
- Midterm Exam: 15% each 30%
- Final Exam(cumulative): 25%
- Professionalism & Participation: 5%
- **Total: 100%**

Course Organization and Assessment

Lecture Format

This course meets three times per week for 50 minutes each session. Class time will focus on explaining key concepts, working through examples, and discussing practical problems related to digital signal processing. Not all textbook material will be covered in lecture, so students are expected to read assigned sections on their own to reinforce and deepen their understanding. Active participation in class discussions and problem-solving activities is strongly encouraged.

Homework

Homework assignments will be given regularly throughout the semester to reinforce concepts covered in lecture. Each assignment will include several problems designed to build problem-solving skills and conceptual understanding. All assigned problems should be attempted, even if only selected problems are graded. Homework due dates will be announced in advance, and assignments are typically due about one week after they are assigned. Students are encouraged to keep their homework work organized and well documented for future reference and exam preparation.

Quizzes

Short quizzes will be given periodically throughout the semester to help students stay engaged with the lecture material and monitor their understanding of key concepts. There will be approximately 3-5 quizzes, consisting of True/False and

multiple-choice questions. Quizzes will focus on recently covered topics and are intended to be low-stakes assessments that support learning. Quiz dates and formats will be announced in advance.

Exams

There will be two exams during the semester. The date and time for each exam will be announced at least one week in advance. The exams will not be cumulative; however, the final exam may include selected concepts from earlier material as appropriate. Exam format and coverage will be clearly communicated prior to each exam.

Extra Credit

Extra credit opportunities may be offered at the instructor's discretion and, if provided, will be announced in advance and made available to all students equally. Extra credit is intended to support learning and cannot replace missed major assignments or exams.

Late Work

Late work may be accepted within a reasonable time window with a modest penalty, unless prior arrangements are made or documented circumstances arise. Students are encouraged to communicate early if they anticipate difficulties meeting a deadline.

Midterm Progress Report

In order to help students keep track of their progress toward course objectives, the instructor will provide a Midterm Progress Report for at-risk students through their WebWorld account. Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students with a midterm grade below a C should talk to the professor and seek out tutoring.

General Study Guidelines

Students are expected to spend a few hours outside of class each week reviewing lecture notes, examples, and assigned material. It is strongly recommended to revisit in-class problems before starting homework assignments. Do not wait until the last day to prepare for exams or complete assignments. Students are encouraged to ask questions, attend office hours, and seek help whenever concepts are unclear. Studying with classmates is encouraged. Generative AI tools may be used to help understand concepts, but students are responsible for verifying the correctness of any information and should not rely on AI to complete homework or lab work.

Course Learning Objectives and Assessment Alignment

Table 1: Course Learning Objectives Aligned with ABET Student Outcomes (1-7).

COURSE OBJECTIVES	1	2	3	4	5	6	7
Ability to understand sampling and quantization theory (hw, quizzes, exams).	X						X
Ability to represent and manipulate discrete-time signals mathematically (hw, exam).	X						
Ability to classify systems based on properties such as linearity, time-invariance, causality, and stability (hw, quizzes, exam).	X						
Ability to compute the z-transform of a digital signal and determine its region of convergence (hw, exam).	X						
Ability to convert difference equations to system functions (hw, exam).	X						
Ability to find system output based on input and system function (hw, exam).	X						
Ability to compute the inverse z-transform to recover the time-domain signal (hw, exam).	X						
Ability to perform Discrete Fourier Transform (DFT) and interpret spectra (hw, quizzes, exams, labs).	X	X				X	X
Ability to draw flowchart of Fast Fourier Transform (hw, exam).	X						
Ability to design Finite Impulse Response filter (hw, exam, labs).	X	X				X	X

Table 2: Summary of ABET Student Outcomes.

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 meets 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 judgements, 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.

Attendance & Professionalism

Regular attendance is expected. Professionalism includes:

• Attending lectures and labs, • Active participation, • Timely submission of assignments, and • Respectful classroom behavior.

Conflict Resolution

- In the event of an issue with the course or the instructor, the student should first contact the instructor. The faculty and the student will discuss the issue. Hopefully, a resolution is reached.
- The student should notify the faculty via email again if the issue still did not get resolved after the first communication.
- If not resolved, the student could then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss the issue. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully, a resolution is reached on the issue after this step.
- The student should notify the Chair via email if the issue still did not get resolved.
- The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, he will forward the case to the Grade Appeals Committee, if necessary.

Academic Misconduct Policy & Procedures

Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct. Office of Student Conduct

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Student Wellness Center, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to Disability Support Services.

Disclaimer Statement

Information contained in this syllabus, other than grading, attendance, and late assignment policies, may be subject to change with advance notice, as deemed appropriate by the instructor.

Prepared by Dr. Shahed Enamul Quadir (Spring 2026)