MIDWESTERN STATE UNIVERSITY
A Member of the Texas Tech University System

MCCOY SCHOOL OF ENGINEERING
Course Syllabus: Fall 2026

EENG 4183: Senior Design I

Contact Information

Instructor: Dr. Shahed Enamul Quadir
Office: Martin Hall 110
Course Schedule: *W: 1 pm – 1:50 pm and Lab W: 2 pm – 5:50 pm*
Office hours: *M: 2:00–4:00 PM; T: 1:00–3:00 PM; Th: 3:30–4:30 PM*
Office phone: (940) 397-4589
E-mail: md.quadir@msutexas.edu

Course Description

Senior Design I is the first course in a two-semester capstone design sequence for electrical engineering students. This course focuses on engineering design methods, project planning, teamwork, concept generation, technical decision-making, and professional engineering practice.

Students will work in teams to identify, develop, and plan an electrical engineering or interdisciplinary senior design project. Projects may involve embedded systems, controls, sensing, power systems, instrumentation, robotics, interdisciplinary engineering applications, or other approved senior design topics.

During this semester, students will define project goals, develop requirements, generate concepts, evaluate alternatives, complete preliminary design work, and prepare a formal proposal for Senior Design II.

Course Pre-requisites

Completion of all required EENG 3000-level courses or permission of instructor

Textbook & Instructional Materials

Engineering Design 6th Edition by Dieter and Schmidt.

Supplemental Material

Design for Electrical and Computer Engineers 1st Edition by Ralph Ford, Chris Coulston.
Engineering Design for Electrical Engineers 1st Edition by Alan D. Wilcox.
Additional technical materials, standards, datasheets, and project-specific references will be provided as needed.

Topics Covered

• Orientation to Senior Design	• Technical Information Gathering, Problem Definition, and Requirements Development
• Engineering Design Process	• Decision Making, Concept Selection, and Preliminary System Design
• Product Development and Project Management	• Detailed Design, Cost Evaluation, and Component Selection
• Teamwork, Creativity, and Concept Generation	• Final Proposal Development, Safety, and Professional Responsibility

Additional material may be incorporated as appropriate.

Grading

Students are informed that each one of them will be graded individually. There is strictly no collective grade for any of the items listed in the table below. Course grades are based on the following items and their assigned weights, summarized in the grading table below:

Graded Items	Percentage Assigned to Items
Senior Design Written Exam	15%
Weekly Progress Report & Logbook	15%
Peer Evaluation	10%
Attitude & Absenteeism & Project Contribution & Sharing Knowledge with Teammates and Faculty Mentor & Attending Group Meetings & Ethical Behavior	20%
Public Presentation and Professional Communication	10%
Final Proposal Presentation & Oral Exam	15%
Final Proposal Report	15%
Total maximum Grade	**100%**

The below grade range scale will be used to assign the final course grade:

Value Range of X (in %)	Letter Grade
$90 \leq X \leq 100$	A
$80 \leq X < 90$	B
$70 \leq X < 80$	C
$60 \leq X < 70$	D
< 60	F

Student Handbook

Refer to: Student Handbook

Course Organization and Assessment

General Information

Senior Design I provides students with practical engineering experience through team-based project development, technical planning, and professional project management. Students will work individually or in teams on approved senior design projects while developing technical, organizational, and communication skills relevant to modern engineering practice.

Students are expected to take primary responsibility for project development, technical research, design analysis, documentation, planning, teamwork, and meeting project deadlines. Each senior design group is expected to designate key project roles such as team leader, treasurer or resource coordinator, and report coordinator to support effective organization, accountability, and project success. Team role assignments support project organization but do not independently determine final grades; all students are evaluated based on technical contribution, professionalism, teamwork, and overall project performance.

Senior design projects are typically proposed by faculty, industry partners, or approved student teams and are assigned or finalized early in the fall semester based on project availability, student preparation, faculty approval, and project fit. Faculty mentors will provide project descriptions and outline major project goals. The instructor and faculty mentors (when applicable) provide guidance, technical feedback, project oversight, and evaluation; however, students are expected to lead and complete the majority of technical and organizational work.

Lecture and Project Development

Lecture sessions will focus on engineering design methods, project planning, teamwork, technical communication, professional engineering practice, and common technical challenges related to senior design projects. Lectures may also include project updates, design discussions, proposal guidance, and technical presentations.

Project-specific technical progress will primarily be developed through independent teamwork and faculty mentor guidance. Faculty mentors may monitor detailed technical progress during project meetings, lab sessions, or scheduled reviews.

Project Development Phases

During the semester, students will progress through several major project phases including project selection, team formation, problem definition, requirement development, concept generation, feasibility analysis, concept

selection, preliminary design, system architecture, component selection, budget planning, risk and safety considerations, and final proposal preparation.

By the conclusion of Senior Design I, each team should produce an approved project concept, technical requirements, preliminary design, budget and timeline, safety considerations, and a formal proposal for Senior Design II implementation.

Significant project design changes, budget changes, or scope modifications should be communicated to the course instructor and faculty mentor (when applicable) for review and approval.

Guidelines for Students

Students are expected to behave professionally and ethically throughout the course. Regular attendance, active participation, consistent progress, effective communication, organized documentation, and meaningful technical contribution are essential to project success.

The instructor and faculty mentors serve as professional guides and evaluators, but they are not responsible for completing student project work. Students are expected to demonstrate initiative, responsibility, and technical effort throughout all phases of project development.

Project requirements or deliverables may be adjusted as needed based on project progress, technical challenges, faculty guidance, or resource availability.

Project assignments are subject to faculty mentor approval, project fit, student preparation, and available resources.

Student Performance and Deliverables

Students will complete regular progress reports, technical documentation, design assignments, peer evaluations, design reviews, proposal development, and formal presentations throughout the semester.
Major deliverables include, but are not limited to:

- Weekly progress reports and logbooks
- Technical calculations and design analysis
- Preliminary design reviews
- Budget and planning documentation
- Peer evaluations
- Final proposal report
- Final oral presentation

These deliverables are intended to support continuous technical progress and prepare students for successful implementation in Senior Design II.

Students may also be encouraged or required, depending on project scope and faculty guidance, to participate in professional development activities such as the University Undergraduate Research and Creative Activity Forum (UGRCAF, held throughout the academic year), poster presentations, design expos, IdeaMSU, technical competitions, publications, regional or national conferences such as the North Texas Area Students Conference (NTASC, typically held in spring), Council on Undergraduate Research (CUR) events, or similar professional venues, and related professional activities. These opportunities may require early preparation through poster development, technical presentations, or publication planning. Participation in such activities may contribute to the Public Presentation and Professional Communication component of the course grade, where applicable.

Students are expected to maintain regular individual progress reports, technical logbooks, and organized project documentation throughout the semester. Weekly reports should document technical progress, design work, calculations, simulations, programming, testing, meetings, challenges, and project milestones as appropriate to the project scope.

Students are responsible for maintaining accurate and professional records of their individual contributions. Documentation may include technical notes, schematics, design files, code, simulations, experimental data, reports, presentations, and related project materials.

Individual submissions are expected to reflect each student's unique contributions to the project. Late or incomplete documentation may negatively impact individual evaluations.

Final proposal reports must satisfy course requirements as well as any project-specific expectations outlined by the instructor and faculty mentor.

Attendance and Professionalism

Regular attendance in lectures, project meetings, labs, and faculty mentor sessions is expected.

Professionalism includes:

- Preparation for class by completing assigned readings
- Active participation
- Timely submission of assignments and reports
- Consistent technical progress
- Professional communication
- Respectful teamwork
- Ethical conduct
- Organized documentation
- Responsible project contribution

Poor attendance, lack of participation, missed deadlines, unprofessional conduct, or failure to meet professional, technical, or teamwork responsibilities may significantly affect individual performance evaluations.

Student Responsibilities

Senior Design I is designed to simulate professional engineering project development. Success in this course depends heavily on student initiative, technical competence, teamwork, professionalism, and consistent progress.

Students are expected to lead the majority of project work while the instructor and faculty mentors (when applicable) provide structured guidance, technical mentorship, and performance evaluation.

General Course Expectations

Senior Design I requires consistent effort both during and outside scheduled class, lab, and faculty mentor meeting times. Students are expected to manage their time effectively, maintain steady project progress, communicate regularly with faculty mentors and the course instructor, and demonstrate professionalism throughout the semester.

Students are reminded that scheduled lecture, lab, and faculty mentor meeting times alone may not be sufficient to complete all required project tasks. Successful project completion will require consistent effort outside of scheduled class time, including independent technical work, team coordination, documentation, and additional meetings as needed.

Student performance will be evaluated based on technical progress, project deliverables, teamwork, professionalism, and overall contribution to project success. Students are responsible for maintaining organized documentation, meeting deadlines, and completing the majority of project work independently.

Generative AI tools may be used to support learning and research; however, students remain fully responsible for the accuracy, originality, and technical quality of all submitted work. AI tools should not replace independent engineering judgment, technical analysis, or project execution.

Laboratory, Shop, facilities, and Equipment Use

Students may be required to use laboratory spaces, fabrication tools, prototyping resources (such as electronics labs, machine shops, 3D printing resources, or related facilities) depending on project scope. Students must follow all applicable safety procedures, faculty or staff supervision requirements, and departmental policies when using university equipment or facilities.

Independent Responsibility and Project Accountability

Students are expected to maintain professional, ethical, and respectful conduct throughout all phases of Senior Design I. Faculty mentors and the course instructor provide guidance, technical feedback, and project oversight; however, students are responsible for completing the majority of project work independently.

Regular participation, professional communication, consistent contribution, and fulfillment of technical and organizational responsibilities are essential to project success. Failure to meet these expectations may negatively impact individual performance evaluations.

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

Moffett Library

Moffett Library provides resources and services to support student's studies and assignments, including books, peer-reviewed journals, databases, and multimedia materials accessible both on campus and remotely. The library offers media equipment checkout, reservable study rooms, and research assistance from librarians to help students effectively find, evaluate, and use information. Get started on this Moffett Library webpage to explore these resources and learn how to best utilize the library.

Recording Classes

Recording classes is generally prohibited without the professor's explicit permission. Such recordings, when permitted, are for personal use only and may not be uploaded to the internet or otherwise shared, transmitted, or published without the professor's prior consent. Some faculty may not permit recordings of their classes. When it is feasible and appropriate, students may record classes to accommodate disabilities under the Americans With Disabilities Act, with prior approval of Disability Support Services. Such recordings may not be uploaded to the internet or otherwise shared, transmitted, or published.

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into D2L through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

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
Apply engineering design methods to practical problems.	X	X					X
Work effectively in teams.			X		X		
Develop project requirements and design objectives.	X	X			X		
Generate and evaluate technical solutions.	X	X					X
Complete preliminary design and planning.	X	X			X		
Consider safety, cost, manufacturability, and ethics		X		X			
Develop and conduct basic technical evaluations, testing, or feasibility analysis to support design decisions						X	
Prepare professional reports and presentations			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.

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.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exists in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

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.

Emergency Aid Resources for Basic Needs

Unexpected life circumstances can affect anyone. If you are experiencing challenges meeting basic needs—such as housing, utilities, food, transportation, healthcare, technology, textbooks or other life necessities, resources may be

available to help. Visit the Student Emergency Support and Resources webpage to learn more, and explore emergency support opportunities through MSU and how to access them. For additional information, please contact the Office of Student Affairs: Clark Student Center #108, (940) 397-7500, student.affairs@mstuexas.edu.

College Policies

Campus Carry Rules/Policies

Refer to: Campus Carry Rules and Policies

Smoking/Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building owned or operated by WATC. Adult students may smoke only in the outside designated-smoking areas at each location.

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes has prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit Campus Carry.

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit MSUReady – Active Shooter. Students are encouraged to watch

the video entitled "*Run. Hide. Fight.*" which may be electronically accessed via the University police department's webpage: *"Run. Hide. Fight."*

Course Schedule:

Week	Activities / Assignments / Exams	Due Date
Week 1 (Aug. 24 – Aug. 28)	Course orientation and syllabus review; Senior Design I expectations; faculty mentors, project selection, teams, logbooks, weekly reports, proposal overview; Course orientation materials	No major assignment; Obtain textbook; Weekly Progress Report format introduced; Suggested Reading: Chapter 1
Week 2 (Aug. 31 – Sept. 4)	Chapter 1: Engineering Design; Engineering Design Process; project planning and expectations; Reference Materials: Engineering Design Process	Project preference submission; Begin Weekly Progress Reports & Logbooks; Suggested Reading: Chapter 2
Week 3 (Sept. 8 – Sept. 11) (Labor Day Sept. 7)	Chapter 2: Product Development Process; Project Management; milestones; deliverables; Gantt Chart; Reference Materials: Gantt Chart; Requirements Development (see also Coulston & Ford, Chapter 3)	Preliminary project scope and Gantt chart; Suggested Reading: Chapter 3
Week 4 (Sept. 14 – Sept. 18)	Chapter 3: Team Behavior and Tools; teamwork, leadership, communication, brainstorming, creativity; Reference Materials: Engineering Team	Team contract and member responsibilities; Suggested Reading: Chapter 4
Week 5 (Sept. 21 – Sept. 25)	Chapter 4: Gathering Information; literature review, patents, standards, datasheets, benchmarking, vendor research	Initial literature review and technical references; Suggested Reading: Chapter 5
Week 6 (Sept. 28 – Oct. 2)	Chapter 5: Problem Definition and Need Identification; engineering requirements, customer needs, constraints, specifications; Functional Decomposition and Behavioral Modeling (see also Coulston & Ford, Chapters 5–6)	Problem statement and engineering requirements; Suggested Reading: Chapter 6

Week	Activities / Assignments / Exams	Due Date
Week 7 (Oct. 5 – Oct. 9)	Chapter 6: Concept Generation; brainstorming, creativity, functional decomposition, alternative solutions; Reference Materials: Creativity	Alternative concepts and concept sketches; Suggested Reading: Chapter 7
Week 8 (Oct. 12 – Oct. 16)	Chapter 7: Decision Making and Concept Selection; decision matrices, feasibility analysis, concept evaluation; Midterm Exam (Tentative)	Midterm Exam (Tentative – See D2L); Selected concept; Continue Weekly Progress Reports & Logbooks; Suggested Reading: Chapter 8
Week 9 (Oct. 19 – Oct. 23)	Chapter 8: Embodiment Design; preliminary system architecture, subsystem interfaces, block diagrams, preliminary simulations	Preliminary system architecture and block diagrams; Suggested Reading: Chapter 9
Week 10 (Oct. 26 – Oct. 30)	Selected Chapter 9 Topics: Preliminary Detail Design; preliminary calculations, component selection, preliminary drawings, schematics, PCB/mechanical layout (as applicable); Reference Materials: Measurement Devices	Preliminary design package; Suggested Reading: Selected Chapter 12
Week 11 (Nov. 2 – Nov. 6)	Selected Chapter 12: Cost Evaluation; preliminary Bill of Materials (BOM), vendor quotations, purchasing process, funding request, budget planning; Reference Materials: Bill of Materials (BOM); Project Management (see also Coulston & Ford, Chapter 10)	Preliminary BOM, vendor quotes, and budget request; Suggested Reading: Selected Chapters 13 & 18
Week 12 (Nov. 9 – Nov. 13)	Selected Chapters 13 & 18: Risk, Reliability, Safety, Ethics, and Professional Responsibility; Engineering Ethics (Coulston & Ford, Chapter 11)	Safety assessment, risk analysis, and ethics discussion
Week 13 (Nov. 16 – Nov. 20)	Final Proposal Development; proposal organization, technical writing, drawings, preliminary simulations, Gantt chart, proposal requirements; Reference Materials: Proposal Requirements	Draft proposal report and draft presentation (Tentative – See D2L)

Week	Activities / Assignments / Exams	Due Date
Week 14 (Nov. 23 – Nov. 27) (Thanksgiving Holidays: Nov. 25–29; Campus open Nov. 25)	Faculty feedback, proposal revisions, purchase planning, project planning for Senior Design II	Continue proposal revisions
Week 15 (Nov. 30 – Dec. 4)	Proposal presentations, preliminary design review, purchasing discussion, transition to Senior Design II	Final proposal report (Tentative – See D2L); Submit final Weekly Progress Report & Logbook
Final Exam	Comprehensive Final Examination	According to the University Final Exam Schedule

Reading Preparation

Students are encouraged to complete the suggested textbook reading before each class. These readings are intended to prepare students for lectures, engineering design discussions, project planning, technical decision-making, and proposal development. Selected instructor-prepared materials, IEEE standards, manufacturer datasheets, technical papers, and selected topics from *Design for Electrical and Computer Engineering (Coulston & Ford)* will also be provided through D2L as appropriate.

Note: Project milestones, presentations, examinations, proposal requirements, chapter coverage, and suggested reading assignments are tentative and may be adjusted with advance notice. Students should refer to D2L for the most current schedule and assignment information.

Each student is expected to submit an individual Weekly Progress Report & Logbook throughout the semester documenting individual contributions and, where appropriate, supporting evidence (e.g., photos, videos, GitHub links, simulations, or other project documentation).

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 (Fall 2026)