MEET 4780 SENIOR DESIGN I
Fall 2025

Instructor Information:

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Office: F101N.1

Office Hours:

Tuesday: 3:00 PM to 6:00 PM
Thursday: 1:00 PM to 3:00 PM
or by appointment

NOTE:

1. ***Open Door Policy*** - If my door is open and I'm not in a meeting, feel free to stop by no appointment needed.
2. I strongly encourage you to take advantage of office hours—they're a great opportunity to ask questions, clarify concepts, seek feedback, or simply talk through ideas. Whether you're on track or feeling stuck, I'm here to help.
3. If I'm ever unavailable during scheduled office hours due to unforeseen circumstances, I'll do my best to inform you in advance and make alternate arrangements to meet.
4. Don't wait until things feel overwhelming—office hours are here for your benefit. Your growth matters, and I truly want to see you succeed.

Your success is my goal. I look forward to working with you throughout the semester.

Class Schedule:

Lecture: Thursday 4:00 PM to 5:20 PM Room NTDP K110

Course Description:

Project teams specify, plan, and design a product or process. Written documentation required. This culminating senior-level course engages student teams in specifying, planning, and designing a functional engineering product or process to address a clearly defined need. Projects are sourced from local industry partners whenever possible, providing authentic, open-ended challenges that require the application of engineering knowledge, professional skills, and ethical judgment.

Prerequisite:

Passed the following "C" or better:

1. ENGR 3450: Engineering Materials
2. MEET 3980: Digital Control of Industrial Processes

Co-requisite:

1. MEET 4050: Mechanical Design
2. MEET 4350: Heat Transfer Applications
3. MFET 4210: CAD/CAM System Operations

Course Learning Outcomes (ETAC of ABET program outcomes addressed):

Documented student outcomes must include, but are not limited to, the following elements:

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

Upon successful completion of this course, students will be able to:

1. Develop a product or process proposal. (1, 2)
2. Develop an understanding of the product development cycle from inception to a prototype as used in an industrial setting. (1, 2)
3. Develop an appreciation of a team effort in product development. (5)
4. Prepare formal technical documentation addressing design evolution. (3,5)
5. Learn the process of utilizing catalogs, specification sheets and vendor documents in the design process. (1)
6. Learn to apply the breath of the major engineering technology courses to the completion of the final design. (1)
7. Develop an appreciation for the requirements and techniques of an oral presentation covering a group effort. (3,5)
8. Develop an appreciation for the free market system. (2)

Required Text:

"***Engineering Design***", George Dieter, Linda Schmidt. McGraw Hill (ISBN: 1260113299), 2021.

Technical Skill Requirements:

MS Office Suite (Excel, Word, PowerPoint), MATLAB, Engineering Graphics, Internet usage, emails, Canvas, SolidWorks.

Tentative Course Topics:

This is a tentative course outline. The instructor will attempt to follow it closely and reserves the right to substitute any other relevant material at any point throughout the course.

S No	Topic
1	Course Introduction, Scope, Requirements
2	Project requirements & Identification
3	Product Development and Lifecycle Management
4	Teams and Team Dynamics; Communication Management
5	Project and Risk Management Methodologies
6	Requirement Analysis and Management; Stake holder analysis
7	Documentation and its importance
8	Component sourcing, vendor selection and vendor management.
9	Report writing and presentation
10	Safety, Quality and Reliability
11	Intellectual Property and its protection
12	Professional and Ethical Responsibilities
13	Design for X (Reliability, Manufacturability, Assembly, Sustainability)
14	Economic Decision Making

Course Attendance Policy:

Students are responsible for attending all scheduled class sessions. Regular attendance is required. The instructor will conduct attendance checks throughout the semester, and it is the student's responsibility to ensure their attendance is properly recorded during class.
In accordance with University Policy 06.039, absences may be excused for the following reasons:

- Observance of a religious holy day (including associated travel),
- Active military service (including associated travel),
- Participation in official university functions,
- Illness or other extenuating circumstances,
- Pregnancy and parenting as protected under Title IX,
- Official University closure.

To receive an excused absence, students must provide appropriate and satisfactory documentation.

Attendance will be recorded based on the following criteria:

- Arriving on time or up to 5 minutes late: Present
- Arriving more than 5 minutes but less than 10 minutes late: Late
- Arriving 10 minutes or more after the start of class: Absent

Calculators:

The ***only calculators*** that are approved for this course are those permitted on the Fundamentals of Engineering (FE) exam for Professional Engineer (PE) licensing:

- **Casio:** All fx-115 and fx-991 models (Any Casio calculator must have "fx-115" or "fx-991" in its model name.)
- **Hewlett Packard:** The HP 33s and HP 35s models, but no others
- **Texas Instruments:** All TI-30X and TI-36X models (Any Texas Instruments calculator must have "TI-30X" or "TI-36X" in its model name.)

Assignments:

1. Assignments will be done individually.
2. Assignments will be posted on Canvas and are due on the date and time given.
3. All assignments should be done using Engineering Computation Pad or on Graph Ruled Reinforced filler paper, 8-1/2" x 11, 3-Hole Punched.
4. All assignments should be turned in Canvas. A hard copy should be maintained in your portfolio.
5. No emailed assignments will be accepted.
6. It is the student's responsibility to check and see what assignment is available and to turn them in a timely manner.
7. The solutions to the Assignment problems should be in a specific format. A separate set of instructions (Problem Solution Methodology) will be provided for this in the Introduction Module of Canvas.

Knowledge Checks:

1. Knowledge Checks will be given during each class at the discretion of the instructor and will cover material from previous / current lectures.
2. Knowledge Checks may be on Canvas. You will need to be present in class to take the knowledge check.
3. You will have between 10 to 15 minutes to take the knowledge check.
4. On occasion knowledge checks may be assigned to be completed out of the classroom setting.
5. All knowledge checks submitted as a hardcopy, once graded and returned should be scanned and uploaded to Canvas within 3 calendar days as a PDF.
6. If you miss a knowledge check, you cannot make it up unless it is a valid absence as per University Policy.
7. If you fail to upload the graded knowledge check you will not receive credit for the same. Late uploads will not receive credit.
8. A hard copy should be maintained in your portfolio.

Individual Portfolio:

1. The portfolio is a record of all the work done in the class. It should be organized and kept up to date.
2. You are required to maintain a physical record of all your work (Class Notes, Practice problems, Assignments, Project Reports, Presentations, Knowledge checks, and Exams) in this course which should be kept in a three-ring binder.
3. For the purposes of this course, we will refer to this compendium of your record as the Portfolio.
4. The Portfolio should be in a specific format.
    a. Should be organized by Modules.
    b. Should contain the class notes followed by Assignments and knowledge check in that order.
    c. The Exams should also be part of your portfolio.

5. The Portfolio will be requested for evaluation at the discretion of the instructor from time to time.
6. You can only refer to your portfolio during the Exam.
7. You can only gain credit by turning in the portfolio in which you have reworked your Assignments and amplified your lecture notes in cohesive, clearly reasoned form. Thinking through and rewriting the lecture notes, preferably on the same day as the lectures and in consultation with the text, is one of the most effective forms of study, and well worth the effort. Credit will be given only when it is apparent that thought has gone into the rewriting and reconsideration of the material.

Project Portfolio:

1. The portfolio is a record of all the work done in the project. It should be organized and kept up to date.
2. You are required to maintain a physical record of all your work (meeting minutes, interim reports, presentations) related to the project should be kept in a three-ring binder.
3. The Portfolio will be requested for evaluation at the discretion of the instructor from time to time.
4. You can only gain credit by turning in the portfolio in which you have reworked your submitted work based on comments from Instructor / TA. Credit will be given only when it is apparent that thought has gone into the rewriting and reconsideration of the material.
5. All members of the group should be present for the portfolio reviews.

Grading Criteria:

	Item	Mode	Grade %
1	Attendance	Individual	0%
2	Knowledge Checks	Individual	10%
3	Assignments	Individual	10%
4	Project Report(s)	Teamwork	20%
5	Final Design Status (CAD files & Drawing Package)	Teamwork	15%
6	Team Presentations	Teamwork	10%
7	Individual Portfolio	Individual	5%
8	Project Portfolio	Teamwork	5%
9	Exam I (9/25/2025 – 4:00 PM to 5:20 PM)	Individual	10%
10	Final Exam (12/11/2025 – 1:30 PM to 3:30 PM)	Individual	15%

Expected Grade Distribution:

A: ≥90%, B: 80-89%, C: 70-79%, D: 60-69%, F: <60%; Your grade will not be based on a curve.

The instructor reserves the right to change this grade distribution at the end of the semester. If any changes occur, the changes will be less stringent than the distribution above.

Teamwork:

Teamwork is a central objective of this course, and every student is expected to contribute equitably to their team's success. Peer evaluations will be conducted and factored into individual grades. If a team member is not meeting expectations, it is the responsibility of the team to notify the instructor promptly.

Examples of unacceptable team behavior include but are not limited to:

- Failure to participate in team activities or contribute meaningfully to the design process
- Engaging in unethical conduct such as plagiarism or falsification of data/results
- Poor collaboration with teammates, faculty advisors, or staff
- Repeatedly missing deadlines or misusing project materials
- Any actions that hinder or compromise the team's progress

Attendance and Scheduling

Per University of North Texas policy, work or employment obligations are not valid excuses for missing team meetings or failing to support teammates. Students must proactively manage their schedules to ensure full participation in team responsibilities. Teams are expected to find mutually agreeable meeting times.

Grade Impact

The instructor reserves the right to adjust individual grades based on the quality and consistency of a student's teamwork. This may include a significant grade reduction or course failure—even if the student's individual assignments or exams would otherwise result in a passing grade.

Project Requirements:

1) Design projects must be related to mechanical engineering. Project should be the design of a device, machine or system. Project must have broad enough scope that it demonstrates a student's knowledge of mechanical fundamentals. Projects may include non-mechanical portions such as electronics and instrumentation, but they may not be primary discipline. Project solutions must involve three or more of the following mechanical engineering disciplines:
    a. Solid mechanics / Fluid mechanics
    b. Machine design
    c. Energy Systems, HV
    d. Thermal systems / heat transfer
    e. Decision Sciences - Systems modeling and feedback controls
    f. Manufacturing Processes
2) Projects and solutions must be open-ended that require an engineer to solve a problem. A problem with one obvious solution is not acceptable. Having many workable solutions allows teams to determine the "best" solution and provide reasoning behind their selection. Multiple alternatives are presented and evaluated, with a decision process which assesses how to determine final design configuration.
3) Projects and solutions are required to have specific constraints which are measurable, i.e., weight, size, cost, performance, efficiency, etc. Measurable goals and constraints are developed and documented in a system specification.

4) Projects and solutions must require background research to be done. If the solution has already been published, the project is not acceptable.
5) Projects and solutions require proof that design is feasible to manufacture, functional, and safe. Analysis helps reduce risk of failure before fabrication but is not proof. Fabrication and tests are required.
6) Projects and solutions must be able to be completed within 2 semesters.
7) Projects must be complex enough to require at least 3 students, but not more than 6
8) Projects and solutions should be complex enough to allow each team member to have responsibility for a major design element. If a team can implement a solution, buy materials and build it without any engineering analysis to reduce risk or assess capability versus safety or performance requirements - it is not acceptable. Simple solutions require additional scope to provide all students equal opportunity to accomplish degree requirements. Each student must be provided opportunity to lead design of major design element or assembly (collection of parts) that requires:
    a. Requirements Analysis: Identification and breakdown of requirements into specifications.
    b. Preliminary Design: research and concept development.
    c. Detailed Design: CAD Drawings, computer engineering analysis using solid modeling FEA .
    d. Fabrication: construct using generally accepted engineering fabrication methods and materials. 3-d printing is, in general, specifically excluded.
    e. Test: Instrument, test, and evaluate design and compare to analysis.
    f. System Acceptance: Verify & validate that system meets requirements.

Policies and Procedures

1. This syllabus is subject to change during the semester with changes to be announced in class and provided on Canvas.
2. This course provides opportunities for students to take advantage of several software packages supported by the department in the classroom or in lab experiments, in simulation studies, homeworkassignments, or in projects.
3. The classes will be held in person at the scheduled times.
4. Canvas Learning Management System, at https://canvas.unt.edu/ will be used for posting announcements, meeting invitations, course-related materials, assignments, and grades. Students are encouraged to check the course website often.
5. Grades are based in part on the student's ability to communicate. You must present your work in a well-organized and well-articulated manner with appropriate depth.
6. Requests for the review of a graded report/assignment must be made within 3 days of the grade announcement in writing to the instructor. Upon review, the report/assignment score may increase, remain the same, or decrease.
7. There will be **no** make-up knowledge checks or assignments unless you have a university-excused absence. If you know in advance that you will miss a knowledge check or assignment, you must contact the instructor before the scheduled knowledge check or assignment.
8. An "I" (incomplete) grade is given only for extenuating circumstances.
9. The instructor reserves the right to change the grade distribution at the end of the semester. If any changes occur, the changes will be less stringent than the distribution above.
10. **Technical Assistance**. art of working in the online environment involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas orother technology issues.
    UIT Help Desk: UIT Student Help Desk site (http://www.unt.edu/helpdesk/index.htm)

University of North Texas

Email: helpdesk@unt.edu; **Phone**: 940-565-2324; **In Person**: Sage Hall, Room 130

Walk-In Availability: 8am-9pm

Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

11. **Rules of Engagement**. Rules of engagement refer to the way students are expected to interact witheach other and with their instructors. Here are some general guidelines:
    - While the freedom to express yourself is a fundamental human right, any communication that utilizes cruel and derogatory language on the basis of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteranstatus, or any other characteristic protected under applicable federal or state law will not be tolerated.
    - Treat your instructor and classmates with respect in any communication online or face-to-face,even when their opinion differs from your own.
    - Ask for and use the correct name and pronouns for your instructor and classmates.
    - Speak from personal experiences. Use "I" statements to share thoughts and feelings. Try not tospeak on behalf of groups or other individual's experiences.
    - Use your critical thinking skills to challenge other people's ideas, instead of attacking individuals.
    - Avoid using all caps while communicating digitally. This may be interpreted as "YELLING!"
    - Be cautious when using humor or sarcasm in emails or discussion posts as tone can be difficult tointerpret digitally.
    - Avoid using "text-talk" unless explicitly permitted by your instructor.
    - Proofread and fact-check your sources.
    - Keep in mind that online posts can be permanent, so think first before you type.
    - All communication via email should be done using the UNT domain. Emails originating from outside this domain will not be responded to.

    See these Engagement Guidelines (https://clear.unt.edu/online-communication-tips) for moreinformation.

12. **Exam Protocol:**
    - Your cell phone, plus all books and class notes, **must be placed on the floor** (not in your pant/shirt pockets) at the side of the room, front of the room, or back of the room. It is suggested that you not bring them. **If you get caught using a cell phone during an exam, this will result in an automatic zero for the exam**!
    - A seating chart may be created or prepared for the instructor to assign you to particular seats before the exam begins.
    - Students will not be allowed to leave the room during an examination for bathroom breaks. Please use the restroom before you begin your exam. Once you leave the room, the exam will be collected as you will be done with the exam.
    - Bring your UNT IDs to be checked.
    - Arrive early to put your books, etc., away and to find your assigned seat.

- Cell phones cannot be used as calculators.
- The Exam is open Individual portfolio so you may have no other materials at your desk.
- You may use a calculator as stated in the syllabus.
- The instructor may quickly go over the exam at the beginning of the period. Do not expect questions to be answered about the exam while you are taking it.
- Absolutely no talking, looking at another student's exam, or passing anything between students is permitted during the exam. Such actions will be construed as cheating. Students are not permitted to leave the room during the exam. Suspicious activity will be noted on the seating chart. The exam may be videotaped.
- Anyone finishing the exam early must sit quietly until the end of the period.
- All attempts will be made to return the exam to you in the next class period.

13. **Academic Integrity Standards and Sanction for Violations**: According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. Any violation of academic honesty in an quiz, exam, project or assignment will result in a grade of zero and a report to https://facultysuccess.unt.edu/academic- integrity.

14. **Acceptable Student Behavior**: Student behavior that interferes with an instructor's ability to conduct aclass or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated inany instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for studentconduct apply to all instructional forums, including University and electronic classrooms, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at deanofstudents.unt.edu/conduct.

15. **Access to Information- Eagle Connect**: Students' access point for business and academic services at UNT is located at: my.unt.edu. All official communication from the University will be delivered to your Eagle Connect account. For more information, please visit the website that explains Eagle Connect andhow to forward e-mail: eagleconnect.unt.edu/.

16. **ADA Statement**: UNT makes reasonable academic accommodations for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specificcourse needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

17. **Emergency Notification & Procedures**: UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

18. **Retention of Student Records**: Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion on Canvas. Course work completed via the online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual records; however, information about students' records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University'spolicy.

19. **Student Perceptions of Teaching Effectiveness (SPOT)**: Student feedback is important and an essentialpart of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during the last weeks of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the spot website at www.spot.unt.edu or email spot@unt.edu.

Academic Support & Student Services

Mental Health

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- UNT Care Team (https://studentaffairs.unt.edu/care)
- UNT Psychiatric Services (https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry)
- Individual Counseling (https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling)

Chosen Names

A chosen name is a name that a person goes by that may or may not match their legal name. If you have a chosen name that is different from your legal name and would like that to be used in class, please let the instructor know. Below is a list of resources for updating your chosen name at UNT.

- UNT Records

- UNT ID Card
- UNT Email Address
- Legal Name

**UNT euIDs cannot be changed at this time. The collaborating offices are working on a process to make this option accessible to UNT community members.*

Pronouns

Pronouns (she/her, they/them, he/him, etc.) are a public way for people to address you, much like your name, and can be shared with a name when making an introduction, both virtually and in-person. Just as we ask and don't assume someone's name, we should also ask and not assume someone's pronouns.
You can add your pronouns to your Canvas account so that they follow your name when posting to discussion boards, submitting assignments, etc.
Below is a list of additional resources regarding pronouns and their usage:

- What are pronouns and why are they important?
- How do I use pronouns?
- How do I share my pronouns?
- How do I ask for another person's pronouns?
- How do I correct myself or others when the wrong pronoun is used?

Additional Student Support Services

- Registrar (https://registrar.unt.edu/registration)
- Financial Aid (https://financialaid.unt.edu/)
- Student Legal Services (https://studentaffairs.unt.edu/student-legal-services)
- Career Center (https://studentaffairs.unt.edu/career-center)
- Multicultural Center (https://edo.unt.edu/multicultural-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services)
- Pride Alliance (https://edo.unt.edu/pridealliance)
- UNT Food Pantry (https://deanofstudents.unt.edu/resources/food-pantry)

Academic Support Services

- Academic Resource Center (https://clear.unt.edu/canvas/student-resources)
- Academic Success Center (https://success.unt.edu/asc)
- UNT Libraries (https://library.unt.edu/)
- Writing Lab (http://writingcenter.unt.edu/)