UNIVERSTY OF NORTH TEXAS SYLLABUS
MEEN 4150 *Mechanical and Energy Engineering Systems Design I*
FALL 2018. 3 Credit hours

Instructor: Dr. Mark Wasikowski, or just "Dr. Was"
Office Hours: NTDP F101L. TBD, or by appointment.
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Teaching Assistants: TBD

Lectures:
1) Section 1: MW 1.00–2:20 PM, NTDP F175
2) Section 2: MW 8.30–9:50 AM, NTDP F175

Prerequisite(s): NOT be pre-engineering major and passed the following "C" or better:
1) EENG 2610 or ENGR 2405: Circuit Analysis
2) MEEN 3130: Machine Element Design
3) MEEN 3210: Heat Transfer
4) MEEN 3230: System Dynamics and Control

Co-requisite(s):
1) MEEN 4150.3XX: Senior Design Laboratory
2) MEEN 3100: Manufacturing Processes

Catalog Course Description: Advanced treatment of engineering design principles with an emphasis on product and systems design, development and manufacture. Mimics "real world" environment with students working in teams to prepare product specification, develop several concepts, perform detailed design, and construct prototypes subject to engineering, performance and economic constraints.

Course Topics:
1. Conceptual Design Process
2. Teamwork
3. Voice of the Customer
4. Product Specification
5. Mechanical Design (solid modeling using Solidworks)
6. Public Speaking Skills
7. Ethics

Labs: The laboratory component of this course is satisfied by each student team meeting outside of class to execute the specific requirements for their design project. This includes customer meetings, field trips, research, CAD work, fabrication, testing, etc. F102 Senior Design Lab is available 24x7 for all students in the course, as well as other facilities. Students meet on their own schedule. Attendance at the official lab section is not required.

ABET OUTCOMES: This course addresses following ABET program 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 meet 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 judgments, 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

ABET ACCREDITATION GUIDELINES:

Engineering design is process of devising a system, component or process to meet desired needs. It is an iterative decision-making process in which basic science, mathematics, and engineering science are applied to convert resources optimally to meet a stated objective. Among fundamental elements of design process are establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The engineering design component of a curriculum must include at the following features: development of student creativity, use of open-ended problems, development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. It is essential to include a variety of realistic constraints such as economic factors, safety, reliability, aesthetics, ethics, and social impact.

COURSE ADVISOR:
Course instructor as course advisor for all teams. Course advisor provides common consistent syllabus interpretation and common lectures.

CUSTOMER ADVISOR:
Many teams have an industry advisor (customer) to provide regular feedback on performance and decision making. It is student team responsibility to maintain effective communication with industry advisor. Instructor will ask for performance feedback with industry advisor. Customer approves team progress reports.

FACULTY ADVISOR:
A faculty advisor provides guidance related to specific design, and technical mentoring. Also serves as customer advisor if a team does not have an external customer.

DESIGN PROJECT REQUIREMENTS

1) Design projects must be related to mechanical engineering. Project should be the design of a device, machine or system that implements mechanics, thermal, fluids, energy, and control systems modeling. 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
    b. Fluid mechanics
    c. Machine design / robotics
    d. Energy Systems, HV
    e. Thermal systems / heat transfer
    f. Decision Sciences - Systems modeling and feedback controls
    g. 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 to form a team.
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 an acceptable project. 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. Preliminary Design: research and concept development
    b. Detailed Design: computer engineering analysis using solid modeling FEA
    c. Fabrication: construct using generally accepted engineering fabrication methods and materials.
    d. Test: Instrument, test, and evaluate design and compare to analysis.
    e. Drawings - create detailed part and assembly drawing of component

GRADES

Each assignment has a due date. Late submissions receive one letter grade reduction per day late. All assignments submitted, in writing, to course instructor, TA's, or CANVAS. NO emails accepted. Standard scale used: 90/80/70/60. Grade has team and individual components. All members receive same team score, unless evidence of non-participation. Individual marks can be different for both individual and team assignments.

		Due Date
Generic Mechanical Design (individual) (25%)		
CAD Assignment 1	2	9/17
CAD Assignment 2	2	9/24
CAD Assignment 3	2	10/1
CAD Assignment 4	2	10/8
CAD Assignment 5	2	10/15
CAD Assignment 6	2	10/22
CAD Assignment 7	2	10/29
SolidWorks Associate Exam	11	11/7
Project Specific Team Lab Assignments (team) (20%)		
Lab 1 - Team Contract	2	9/5
Lab 2 - Literature Search	3	9/12
Lab 3 - SWOT Analysis	2	9/19
Lab 4 - Voice of the Customer	3	9/26
Lab 5 - Brainstorming 1	2	10/3
Lab 6 - Brainstorming 2	2	10/10
Lab 7 - Brainstorming 3	2	10/7
Lab 8 - Brainstorming 4	2	10/24
Lab 8 - Brainstorming 5	2	10/31
Customer Focus (team) (15%)		
Progress Report 1	5	9/26
Progress Report 2	5	10/31
Progress Report 3	5	11/28
Deliverables (40%)		
Peer Evaluation 1	5*	10/3
Peer Evaluation 2	5*	11/21
4250 Design Day Attendance	5	11/16
Team Final Presentation	10	11/26-12/5
Team Binder / Meetings	5	12/3
Systems Specification (final report)	10	12/3
Teamwork	P/F	
	100	

*** Peer Evaluations can also determine course pass/fail**

TEAMWORK

1. Teamwork is a major objective of senior design. Each team member is expected to contribute to project equally. At various points, team members will evaluate each other's participation. Evaluations play a role in final course grades. If at any time a team feels a certain member is not supporting team appropriately, instructor should be notified immediately. The following activities would be considered detrimental to teamwork aspect of this course:
    a. Lack of participation in team activities
    b. Lack of contribution to the design process
    c. Not meeting deadlines
    d. Unethical behavior such as plagiarism or fabricating test results
    e. Poor working relationships with team members, advisors, staff members
    f. Misuse of project materials
    g. Actions which jeopardize team progress
2. It should be noted that missing meetings and not assisting your teammates because of work, etc. is not excusable per UNT policy. Students should expect to spend a significant amount of time working on this project at UNT Discovery Park. Students must adjust schedules accordingly. Your team must find times to meet that are acceptable to everyone in the group.
3. Instructor reserves right to reduce student grade based on lack of team work. This includes dropping student, even if all individual grades otherwise passing.

ATTENDANCE POLICY

Responsibility for attendance rests with student. A team cannot succeed if a team member is absent. Student attendance and active participation are "essential", per UNT policy 06.039 because lack of participation affects the entire team. Instructor reserves right to reduce grades and/or drop student from course (grade "WF") upon accumulation of three unexcused absences from combined total of lectures and labs. Upon accumulating three un-excused absences, a team conference with the instructor is required.

An attendance sheet circulated at beginning of lecture (or roll called). It is student responsibility to ensure signing attendance roster during class. No roster changes are made after each class. Lecture arrival after 15 minutes may be recorded as absent. Lab attendance is recorded by signing team meeting minutes. Absence may be excused for following reasons: religious holy day, including travel for that purpose; active military service, including travel for that purpose; participation in an official university function; illness or other extenuating circumstances; pregnancy and parenting under Title IX; and when University is officially closed. Student is responsible for requesting excused absence in writing as early as possible, and personally delivering to instructor to substantiate an excused absence. Late notifications will not be accepted.

COMMUNICATING WITH INSTRUCTOR

The primary method of communication during lecture time for design questions. Periodic instructor team conferences (meetings) are also scheduled in the MEE office. Personal questions or concerns should be addressed through office hours or individual appointments. Last resort is email or office phone. Response times to email and voice mail communication can be significant and should be avoided.

ACCESS TO INFORMATION – EAGLE CONNECT

Students' access point for business and academic services at UNT is located at: my.unt.edu. All official communication will be delivered to your Eagle Connect account. For more information, please visit website that explains Eagle Connect and how to forward e-mail: eagleconnect.unt.edu/. Blackboard is used to post syllabus, homework, lecture slides, grades, etc. Instructor can only communicate through BB to your UNT eagle account

COURSE SAFETY PROCEDURES

Students enrolled in Senior Design are required to use proper safety procedures and guidelines as outlined in UNT Policy 06.038 Safety in Instructional Activities. While working in laboratory sessions, students are expected and required to identify and use proper safety guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that the UNT is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider Standard Syllabus Statements Related Policy 06.049 Course Syllabi Requirements obtaining Student Health Insurance. Brochures for student insurance are available in the UNT Student Health and Wellness Center. Students who are injured during class activities may seek medical attention at the Student Health and Wellness Center at rates that are reduced compared to other medical facilities. If students have an insurance plan other than Student Health Insurance at UNT, they should be sure that the plan covers treatment at this facility. If students choose not to go to the UNT Student Health and Wellness Center, they may be transported to an emergency room at a local hospital. Students are responsible for expenses incurred there.

ACCEPTABLE STUDENT BEHAVIOR

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any 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 student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at deanofstudents.unt.edu/conduct.

EMERGENCY NOTIFICATION & PROCEDURES

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 a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail: eagleconnect.unt.edu/

ACADEMIC INTEGRITY STANDARDS AND SANCTIONS FOR VIOLATIONS

Academic Integrity Standards and Consequences. 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. Academic dishonesty will not be tolerated and will result in score of zero on the assignment. The student will be reported to Office of Academic Integrity for appropriate disposition. No exceptions

ADA STATEMENT

UNT makes reasonable academic accommodation 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 specific course 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

STUDENT PERCEPTIONS OF TEACHING EFFECTIVENESS (SPOT)

Student feedback is important and an essential part 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 weeks 13, 14 and 15 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 http://spot.unt.edu/ or email spot@unt.edu. SPOT evaluations performed in class during last couple weeks of semester.

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. Course work completed via the CONVAS 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 record; however, information about student's 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's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

SEXUAL ASSAULT PREVENTION

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination based on sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759

SYLLABUS CHANGES

The Instructor reserves the right change the syllabus. Any changes will be announced in class and posted to CANVAS with an accompanying email to student's UNT email address.