

UNIVERSITY OF NORTH TEXAS

Department of Mechanical and Energy Engineering

MEEN 4150 – Mechanical and Energy Engineering Systems Design I Fall 2017

Instructor: Dr. Mark Wasikowski: mark.wasikowski@unt.edu Hours: F101L by appoint

Schedule: TR 10 – 11:20 AM, NTDP B185.

Textbook: None Requires. Course material presented through handouts / presentations.

Recommended books:

Planchard, David, “Solidworks 2016 Reference Guide”, A Comprehensive reference guide with over 250 standalone tutorials, SDC Publications, 2016.

Barr, Ronald, “Engineering & Computer Graphics Workbook Using Solidworks 2016”, SDC Publications, 2016

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: **Prerequisite(s):** must NOT be pre-engineering major and must passed:

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| • Teamwork | EENG 2405 or 2610: Circuit Analysis |
| • Engineering Design | MEEN 3100 Manufacturing (Co-requisite) |
| • Project Management | MEEN 3130 Machine Element Design |
| • Communication | MEEN 3210 Heat Transfer |
| • Public Speaking skills | MEEN 3230 System Dynamics and Control |
| • Safety and Ethics | |

Class / Lab - Class and labs share assigned lecture and lab times. Lab attendance is mandatory, but meeting times may vary from registration. Lab sections provide common group time and facilities for project completion, as well as time for field trips to sponsor and CAD work in senior design lab.

Student Learning Objectives: This class will address the following outcomes:

- Formulate a design problem, conduct relevant research, and develop feasible solutions
- Develop project management skills: task assignment, cost analysis, purchasing/budgeting, scheduling, time management
- Carry out component-level design and incorporate it into the system-level design
- Teamwork, oral and written communication of the preliminary and final results

Team Projects monitor team progress in design process. Assignments consist of written reports, group presentations and a final comprehensive written report combined with a presentation. Assignments are evaluated by instructor. In case of grade dispute, faculty advisor will be consulted and grades are averaged. It should be noted that each team member is required to participate equally in group assignments and presentations. Each student will be evaluated on participation by their team members and faculty advisors. Team based grades are generally the same for all students on the team. However, if significant evidence of non-participation occurs, team based grades may be different.

ABET Criteria:

MEEN 4150 addresses following ABET program outcomes:

- a) Apply knowledge of mathematics, engineering and science
- b) Design / conduct experiments to verify / validate their design projects. Analyze. Interpret data
- c) Develop project-based learning skills through design and implementation of a system, component or process that meets the needs within realistic constraints
- d) Function in multi-disciplinary teams
- e) Identify, formulate and solve engineering problems
- f) Have an understanding of professional and ethical responsibility
- g) Communicate effectively
- h) Achieve broad education necessary to understand the impact of mechanical and energy engineering solutions in a global and societal context
- i) Understand learning processes and need for learning
- j) Achieve knowledge of contemporary issues
- k) Use techniques, skills and computer-based tools for conducting experiments and carrying out designs
- l) Apply principles of engineering, basic science and mathematics to model, analyze, design and realize physical systems, components or processes in both thermal and mechanical systems areas.

Course Evaluation: Students work in teams. Each team selects a design project with help of faculty adviser. Our goal is to perform a project conceptual / preliminary design. Designs will be brought to completion in MEEN 4250. As this is a team-based course, each student’s final grade has a team-based and individual-based component. Team-based score components are derived from deliverables prepared as a team. All members receive same team-based score unless there is evidence of non-participation of a team member. The individual-based score components are generated from peer evaluations and other assignments. Attendance is mandatory for senior design lecture and lab since this is a team based course.

Grade Evaluation: (90/80/70/60)

Team Binder	5%	team meeting minute log	Team
CAD Design Labs	10%	weekly, late Sept, Oct, mid Nov.	Individual
Mid Term 1 – Engineering	15%	w/ Faculty Adviser NLT 20 October	Team
Mid Term 2 - CAD Proficiency	15%	w/ TA NLT 11 November	Individual
Rapid Prototyping – 3d print	10%	w/ TA’s NLT 30 November	Team
Design Day Reviews	5%	Friday, 11/17	Individual
Peer Evaluation (3 @ 5% each)	15%	due to 29 Sept, 31 Oct, and 30 Nov	Individual
Final Class Presentation	15%	late November, early December	Team
Final Report	15%	NLT 13 December to TA’s	Team
Attendance (Pass / Fail)			

Attendance: attendance is mandatory in team labs. This course is a “team based course”, as defined by UNT policy. Lack of attendance and participation by a team member can significantly affect overall team performance and moral. If non-participation occurs, per UNT policy, the MEEN department will automatically drop the student with a WF grade – even if all other evaluations support a passing grade. Document your attendance and participation in weekly labs, team meetings, and sponsor meetings.

Disability Policy: Reasonable accommodation is made to facilitate special needs. If special accommodations are required, student must meet with Office of Disability Accommodation (ODA), Union Suite 322, (940) 565-4323. After meeting, contact me to discuss accommodations. Information <http://www.unt.edu/oda>

Class Policies: Assignments turned in to TA in paper form. Emails not accepted. Late submissions, but before next class date have grade reduced by 50%. Late submissions after next class date not accepted. Excusable absences are accepted only if student informs professor before event such as illness and non-reschedulable prior appointments, or after event, such as medical or other emergencies, within a reasonable time frame. In all cases, academic honesty is expected.

Dishonesty: Any form of dishonesty during semester result in a final grade of F and recommendation for expulsion to Provost. No exceptions. Avoid cheating or any misconduct. You will very shortly become a practicing professional engineer. Appropriate behavior is expected. If you are having personal problems, come and talk to instructor.

Characteristics/Expectations of “A” Students:

- assignments, action items, deliverables are high quality, completed on time and in format requested
- Attends asks questions. participates with enthusiasm
- Team, sponsor and faculty advisor meetings are attended and prepared for
- Communicate effectively with team members, instructor, faculty and others throughout semester.
- Take initiative to learn from others outside of class utilizing their knowledge to further project
- Student values different perspectives in team members and works to create consensus/decisions
- Student is self-motivated and accomplishes tasks without prodding from others.

Tentative Schedule

1. Early September – industry presentations, team formation & project selection
2. Mid September – lock in teams, start 1/week lecture w/ 6hrs/week lab research, assign faculty advisor, keep team minutes in a binder, start learning CAD tools (Solidworks in lecture and lab), start meeting with sponsor to perform research on project, work in F102 as required.
3. October – Conceptual Design – labs focus on exploring feasible solutions and alternatives to solve the problem, with your advisor, and using engineering calculations. Lecture on 3-d printing, continued CAD tutorials during lecture – solid modeling to make part drawings, perform engineering analysis.
4. Mid Term 1 – meet with faculty advisor NLT 20 October for engineering analysis review.
5. November – Rapid prototyping - 3-d print a solution or part, attend design day reviews, prepare / give final presentation and report on research and conceptual designs.