MECH 4382 – Senior Design Project 2

Spring 2013
ECSS 2.201, M 7:00 – 9:45 pm

Instructor Contact Information

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Course Pre-requisites, Co-requisites and/or Other Restrictions

Pre-requisite:	MECH 4381
Co-requisite:	None
Other Restrictions:	MECH 4381 and 4382 must be taken in successive semesters

Course Description

Project-based capstone course. Student groups design, build, and test a device that solves an open-ended mechanical engineering design problem. MECH 4382, focuses on prototype construction and testing. (A prior course, MECH 4381 focuses on background research and engineering analysis.) As a designated MECH Writing-Intensive Course, MECH 4382 also focuses on the refinement of students' engineering communications skills and their use of writing as a critical-thinking and learning tool.

Student Learning Objectives/Outcomes

This class will address the following learning outcomes:

- Recognize design needs, gather relevant information, formulate the problem, and conceptualize various solutions.
- Develop project management skills: work breakdown structure, manufacturing plan, cost estimation, resource allocation and scheduling.
- Carry out detailed component/system-level design, and make decisions using evaluation and analysis tools.
- Function in disciplinary or multi-disciplinary teams.
- Document, report, present project progress and final results.
- Build and test a working prototype, and perform design iterations.

Course Topics

This course is a continuation of MECH 4381 and focuses on building and testing a proof-of-concept prototype that demonstrates a solution to an engineering design problem. This course will emphasize many of the same concepts and skills introduced in MECH 4381. Most of the work in the course will be completed outside of the classroom under the direction of the industry mentor and faculty advisor. The instructor may occasionally meet with the class as a whole to cover selected topics.

Textbooks and Materials

No textbook is required for this course. In most cases, students will need to research and collect information from sources relevant to their particular project. Textbooks and notes from previous

courses will likely be useful additional resources. The following books are recommended as useful references:

1. Ulrich, K. T., & Eppinger, S. D. (2012). Product design and development. New York: McGraw-Hill/Irwin.
2. Rosenau, M. D., & Githens, G. D. (2011). Successful Project Management: A Step-by-Step Approach with Practical Examples. Hoboken: John Wiley & Sons.
3. Ruskin, A. M., & Estes, W. E. (1995). What every engineer should know about project management. New York: M. Dekker.
4. Bowen, H.K. (2002). Project Management Manual. Harvard Business Publishing.

Items 1-3 are available in the UTD library. Item 4 can be ordered online at hbsp.harvard.edu.

Grading Policy

Each student's final grade will be composed of a team and an individual score. Within each of these two categories, deliverables and other items are separately weighted to determine the overall score. Since the team score makes a larger contribution toward the final grade, effective teamwork is essential to receiving a good course grade.

The team score is based mostly on the project deliverables that are prepared as a team. All members of a team are typically assigned the same score unless there is evidence of unequal team member contributions. The individual score is derived from assessments of a student's performance by others involved in the project and some individual assignments. The contribution of each item to the overall course grade is summarized in the following two tables:

Team Deliverables & Evaluations	% of Final Grade
Test plan	5
Technical Evaluation	20
Poster & project abstract	5
Final project report & documentation	15
Presentations	5
Weekly reports	5
Industry mentor team evaluation	10
Total	**65**

Individual Performance	% of Final Grade
Peer evaluation #1	10
Peer evaluation #2	10
Individual assignments	5
Faculty advisor evaluation	10
Total	**35**

Detrimental team member behavior will result in a reduction of an individual's final course grade (including possible final grades of F or I) regardless of the team's overall performance. In these cases, a student will be notified by the course instructor that their behavior and/or actions put them at risk for a course grade reduction. Detrimental behaviors include, but are not limited to, the following:

- Lack of participation in team activities
- Insubordination toward anyone involved in the project
- Unprofessional or unethical conduct (including actions while on project-related travel)
- Misuse of sponsor provided data or equipment
- Extremely poor peer evaluations
- Actions which jeopardize the progress of the project team

At the discretion of the course instructor, team or individual grades may be reduced (including possible final grades of F or I) in situations that include, but are not limited to, the following:

- Substantially unfinished projects
- Incomplete on non-functional prototypes that resulted from a lack of effort
- Unacceptable or incomplete final documentation
- Failure to return sponsor supplied equipment

The course instructor, in consultation with the faculty and industry mentors, will have the option to award *team bonus points* equal to 0%-10% of the final grade. This bonus is intended to reward teams that produce outstanding work relative to the difficulty level and expectations of their particular project.

Course Policies

Teams

Projects will be completed by students working in groups (teams). Each team will work with an industry mentor (if applicable) and a faculty advisor. The roles of the industry mentor and faculty advisor are strictly advisory. These individuals will not lead the project effort nor will they solve technical problems. It is ultimately the team's responsibility to complete the project and provide the requested deliverables. The assignment of students to teams will remain the same as it was in MECH 4381.

Senior Design Day

Near the end of the spring semester, a day will be scheduled for the public presentation of projects. All team members are required to attend and participate in all the events scheduled during this day. The exact date of Senior Design Day will be announced well in advance, and students should expect to be present for the entire duration of the event (approximately 8 hours).

Communication

You must use your official UTD email account for all email related to this course. Email will also be used by those involved in the course to communicate with you. It is expected that messages sent to the email address on record with the university will be received and read. You should check this email account at least daily so that information from sponsors and the course instructor are received and acted upon in a timely manner.

All key course documents and other materials will be available on the UTD course management system (eLearning) website. Most assignments will also be submitted through this system as well.

Confidentiality & Intellectual Property
Non-disclosure agreements (NDA) and intellectual property (IP) agreements with sponsoring companies signed during MECH 4381 remain in effect for MECH 4382.

Confidentiality is a key requirement in most of the projects in this course. Students must always make confidentiality requirements a priority when using computer resources (email, file storage, social media, etc.). Additionally, publically presented materials (presentations, posters, etc.) must be cleared by the sponsor first. Students should always treat sponsor information with care, regardless of the existence of an NDA. In particular, students should make confidentiality requirements a priority when using computer resources (email, file storage, social media, etc.). If you have any doubts, consult the faculty advisor or course instructor first.

Each team will be assigned a dedicated directory (i.e., folder) on a UTD file server for storage of electronic documents and files related to this course. Because of project confidentiality requirements, all project related materials must be stored in the assigned directory. Do not store documents on personal computers, flash drives, and do not use on-line sharing services such as Google Drive or Dropbox.

Course Assignments & Deliverables
The graded work in this course includes both team deliverables and individual assignments. In addition, there will be evaluations of team and individual performance conducted by the faculty advisor, industry mentor, and your fellow team members (i.e., peer evaluation). There will be no formal examinations in this course.

The course assignments along with their requirements and due dates will be discussed in class or publicized via email well in advance of the submission deadline. Individual assignments (as identified in the table above in the Grading Policy section) must be completed independently by each student. **No late assignments will be accepted without prior agreement of the course instructor.**

Due to diversity of projects and activities in this course, students are expected to communicate to their faculty advisor any issues which they feel may affect their performance in this course. Examples of such issues include difficulties with team members, unresponsiveness of industry mentors, lack of needed resources, etc. If your team feels that circumstances beyond your control will affect your ability to meet a deliverable date, you should consult with your faculty mentor and the course instructor well in advance of the submission deadline to discuss the situation. Extensions will only be considered in rare circumstances and with proper justification.

Workload
This course will require students to work on realistic and challenging engineering design projects. Consequently, students should expect to spend a considerable amount of time outside of class working on the project. Students should be aware of this requirement and should plan their schedules accordingly. Students with significant extra-curricular obligations (especially jobs) should be aware that they will need to be available to fully participate in all course activities.

Computers, Cell Phones, , etc.
Laptop computers, tablets, cell phones, and similar devices may not be used during class. These devices should be turned off or silenced and stored out of view. Any student observed violating this policy will be asked to leave the classroom.

Attendance

Attendance at all scheduled class meetings is mandatory. Classroom attendance will be randomly checked. Additionally, you are expected to attend and participate in all meetings with your industry mentor, faculty advisor, and project team. Poor attendance will impact your individual performance evaluation.

Off-campus Course Activities

Projects in this course will likely involve an occasional need to travel to a sponsor's office or other location for meetings, presentations, site visits, etc. Students are expected to comply with all university policies related to off-campus travel. A link to these policies can be found in the following section. In general, travel reimbursements will not be provided.

Students are expected to conduct themselves with professionalism and comply with all university regulations when traveling or participating in activities at a sponsor's site. Additionally, students are expected to comply with all standard visitor policies and procedures when visiting a sponsor's site. Prior to a visit, students should discuss any special requirements with their company mentor. In particular, students will need to determine if they will be required to provide personal protective equipment (PPE) for the visit.

Under no circumstances is a student obligated to participate in any off-campus activity which, in their judgment, is unsafe or violates their moral or ethical beliefs. In such circumstances, the student should politely state their preference to not participate. Additionally, sponsors are expected to treat all students equally and respectfully. Students should feel free to report any concerns to the faculty advisor or course instructor.

University Policies

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to http://go.utdallas.edu/syllabus-policies for these policies. These policies and procedures are incorporated in this syllabus by reference. These topics address by these policies include the following:

- Technical Support
- Field Trips and Off-Campus Instruction and Course Activities
- Student Conduct and Discipline
- Academic Integrity
- Copyright Information
- Email Use
- Class Attendance
- Withdrawal from Class
- Student Grievance Procedures
- Incomplete Grade Policy
- Disability Services
- Religious Holy Days
- Avoiding Plagiarism
- Resources for Success

The descriptions and timelines contained in this document are subject to change at the discretion of the instructor.