

COURSE CHANGE FORM

Complete 1a – 1f & 2a – 2c. Fill out the remainder of the form as applicable for items being changed.

1. General Information.

- a. Submitted by the College of: Engineering Today's Date: 11/21/2011
- b. Department/Division: Mechanical Engineering
- c. Is there a change in "ownership" of the course? YES NO
If YES, what college/department will offer the course instead? _____
- d. What type of change is being proposed? Major Minor¹ (place cursor here for minor change[OSC1] definition)
- e. Contact Person Name: Dr. Tim Wu Email: wu@enr.uky.edu Phone: 218-0644
- f. Requested Effective Date: Semester Following Approval OR Specific Term²: _____

2. Designation and Description of Proposed Course.

- a. Current Prefix and Number: ME 411 Proposed Prefix & Number: ME 411
- b. Full Title: ME Capstone Design I Proposed Title: ME Capstone Design I
- c. Current Transcript Title (if full title is more than 40 characters): _____
Proposed Transcript Title (if full title is more than 40 characters): _____
- d. Current Cross-listing: N/A OR Currently³ Cross-listed with (Prefix & Number): _____
Proposed – ADD³ Cross-listing (Prefix & Number): _____
Proposed – REMOVE^{3,4} Cross-listing (Prefix & Number): _____

- e. Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours⁵ for each meeting pattern type.

Current: 2 Lecture 3 Laboratory⁵ _____ Recitation _____ Discussion _____ Indep. Study
_____ Clinical _____ Colloquium _____ Practicum _____ Research _____ Residency
_____ Seminar _____ Studio _____ Other – Please explain: _____

Proposed: 1 Lecture 4 Laboratory _____ Recitation _____ Discussion _____ Indep. Study
_____ Clinical _____ Colloquium _____ Practicum _____ Research _____ Residency
_____ Seminar _____ Studio _____ Other – Please explain: _____

- f. Current Grading System: Letter (A, B, C, etc.) Pass/Fail
Proposed Grading System: Letter (A, B, C, etc.) Pass/Fail

g. Current number of credit hours: 3 Proposed number of credit hours: 3

- h. Currently, is this course repeatable for additional credit? YES NO

¹ See comment description regarding minor course change. *Minor changes are sent directly from dean's office to Senate Council Chair.* If Chair deems the change as "not minor," the form will be sent to appropriate academic Council for normal processing and contact person is informed.

² Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

³ Signature of the chair of the cross-listing department is required on the Signature Routing Log.

⁴ Removing a cross-listing does not drop the other course – it merely unlinks the two courses.

⁵ Generally, undergrad courses are developed such that one semester hr of credit represents 1 hr of classroom meeting per wk for a semester, exclusive of any lab meeting. Lab meeting generally represents at least two hrs per wk for a semester for 1 credit hour. (See SR 5.2.1.)

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Proposed to be repeatable for additional credit?

YES NO

If YES: Maximum number of credit hours: _____

If YES: Will this course allow multiple registrations during the same semester?

YES NO

i. Current Course Description for Bulletin:

ME 411 ME CAPSTONE DESIGN I. (3)

The first semester of the capstone design sequence in mechanical engineering. Topics include: product design, manufacturing, considerations of economics, safety, and communication. Students will work in small groups and emphasis will be on original work.

Students will develop a project plan concerned with the design of a complex system of current interest to mechanical engineers. Lecture, 2 hours per week; laboratory, 3 hours per week. Prereq: Engineering standing. Prereq or concur: ME 310, ME 340, ME 344.

Proposed Course Description for Bulletin:

ME 411 ME CAPSTONE DESIGN I. (3)

The first semester of the capstone design sequence in mechanical engineering. Topics important in product design and manufacturing are included, including consideration of economics, safety, and communication. Students will develop a project plan concerned with the design of a complex system of current interest to mechanical engineers. Students will work in small groups and emphasis will be on original work. Lecture, two hours; laboratory/independent team work, three hours per week. prerequisite Engineering Standing; concur or prerequisite: ME 310, ME 340, ME 344.

j. Current Prerequisites, if any: Engineering standing; concurrent or prerequisite with ME 310, ME 340, ME 344

Proposed Prerequisites, if any: Engineering standing; concurrent or prerequisite with ME 310, ME 340, ME 344

k. Current Distance Learning(DL) Status: N/A Already approved for DL* Please Add⁶ Please Drop

*If already approved for DL, the Distance Learning Form must also be submitted unless the department affirms (by checking this box) that the proposed changes do not affect DL delivery.

l. Current Supplementary Teaching Component, if any: Community-Based Experience Service Learning Both

Proposed Supplementary Teaching Component: Community-Based Experience Service Learning Both

3. Currently, is this course taught off campus? YES NO

Proposed to be taught off campus? YES NO

4. Are significant changes in content/teaching objectives of the course being proposed? YES NO

If YES, explain and offer brief rationale:

5. Course Relationship to Program(s).

a. Are there other depts and/or pgms that could be affected by the proposed change? YES NO

If YES, identify the depts. and/or pgms: _____

⁶ You must *also* submit the Distance Learning Form in order for the course to be considered for DL delivery.

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b. Will modifying this course result in a new requirement⁷ for ANY program?

YES

NO

If YES⁷, list the program(s) here: _____

6. Information to be Placed on Syllabus.

a. Check box if
changed to
400G or 500.

If changed to 400G- or 500-level course you must send in a syllabus and *you must include the differentiation* between undergraduate and graduate students by: (i) requiring additional assignments by the graduate students; and/or (ii) establishing different grading criteria in the course for graduate students. (See SR 3.1.4.)

⁷ In order to change a program, a program change form must also be submitted.

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Signature Routing Log

General Information:



Course Prefix and Number: ME 411

Proposal Contact Person Name: Dr. Tim Wu Phone: 218-0644 Email: wu@engr.uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Undergraduate Studies Committee	01/26/2011	Dr. Tim Wu / 218-0644 / wu@engr.uky.edu	
ME Faculty	02/02/2011	Dr. Tim Wu / 218-0644 / wu@engr.uky.edu	
Engineering Faculty	11/28/11	Richard J. Sweigard 7-8827 rsweigard@engr.uky.edu	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision ⁸
Undergraduate Council	2/14/2012	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

The proposal for this course change involves the version taught to students on the UK main campus in Lexington, not the classes taught to students attending West Kentucky Community and Technical College in Paducah. While those students can take ME 411, they are taught by faculty in Paducah, not by UK Lexington instructors.

⁸ Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

General Education Course Submission Form

Date of Submission: Nov 18, 2011

1. Check which area(s) this course applies to.

Inquiry - Arts & Creativity	<input checked="" type="checkbox"/>	Composition & Communications - II	<input type="checkbox"/>
Inquiry - Humanities	<input type="checkbox"/>	Quant Reasoning - Math	<input type="checkbox"/>
Inquiry - Nat/Math/Phys Sci	<input type="checkbox"/>	Quant Reasoning - Stat	<input type="checkbox"/>
Inquiry - Social Sciences	<input type="checkbox"/>	Citizenship - USA	<input type="checkbox"/>
Composition & Communications - I	<input type="checkbox"/>	Citizenship - Global	<input type="checkbox"/>

2. Provide Course and Department Information.

Department: Mechanical Engineering

Course Prefix and Number: ME 411 Credit hours: 3

Course Title: Capstone Design I

Expected Number of Students per Section: 50 Course Required for Majors in your Program? YES

Engineering Standing; concur or prerequisite: ME 310, ME 340, and ME 344

This request is for (check one): A New Course An Existing Course

Departmental Contact Information

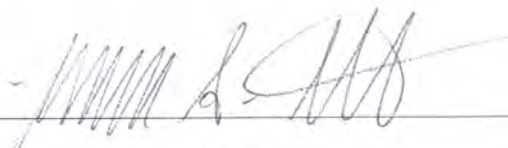
Name: Tim Wu Email: wu@engr.uky.edu

Office Address: 169 RGAN Phone: 7-6336 x 80644

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including listing of the Course Template Student Learning Outcomes.
- A narrative (2-3 pages max) that explains: 1) how the course will address the General Education and Course Template Learning outcomes; and 2) a description of the type(s) of course assignment(s) that could be used for Gen Ed assessment.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair:  Date: 11/18/2011
Dean: Richard J. Sweigard Date: 11/28/11

College Deans: Submit all approved proposals electronically to:
Sharon Gill Sharon.Gill@uky.edu
Office of Undergraduate Education

Supporting Material for Proposal to include ME 411 as contributing to GenEd Requirement

A. How the course will address the General Education and Course Template Learning Outcomes

ME 411-412 consist of a two semester sequence in conceptualization, analysis, design and prototyping of a device or system to meet a societal need. Students are required to understand the conceptualization and design process, and to apply it in a team environment through the following process elements:

- (1). Critical inquiry to define customer needs;
- (2) development of a project plan and product design specification that responds to the customer need;
- (3) finding credible information from a variety of reference sources;
- (4) through brainstorming and other techniques, development of a number of possible concepts to fulfill the product design specification;
- (5) utilizing qualitative and quantitative methods of reasoning to evaluate the design concepts;
- (6) selecting the “best” concept for implementation;
- (7) completing the final design;
- (8) developing a prototype;
- (9) communicating the design solution through written, verbal, and presentation modes.

Lecture material to support the design process is provided, including

(ME 411) Product Specifications, Project planning and management; Team building; Engineering economic analysis; Concept development and selection for product design; Technical communication, written and verbal; Product life-cycle design, sustainable design; Safety and ergonomics; Product liability; Patents and Intellectual property; Computational Tools; Reliability and Statistics in design; Design for manufacturing;

As such, the course sequence contributes to the following GenEd learning outcomes

“I. Students will demonstrate an understanding of and ability to employ the processes of intellectual inquiry. Process elements 1, 2, 3, 4, 8

II. Students will demonstrate competent written, oral, and visual communication skills both as producers and consumers of information. Process element 9

III. Students will demonstrate an understanding of and ability to employ methods of quantitative reasoning. Process elements 5, 6, 7

B. A description of the types of course assignments that could be used for Gen Ed assessment

The students are required to provide the following, and these are appropriate for Gen Ed assessment:

1. Prepare a written project plan including a product design specification.
2. Submit periodic written progress reports
3. Keep a notebook of individual work on the project effort.
4. Prepare a poster on their project activities
5. Provide an interim and final written report on their conceptualization and realization efforts
6. Provide a Presentation of their work using verbal and media communication.

C. How the course addresses the outcomes specific to Arts and Creativity

Using the course syllabus as reference, identify when and how the following learning outcomes are addressed in the course. Since learning outcomes will likely be addressed multiple ways within the same syllabus, please identify a representative example (or examples) for each outcome.

1. An artifact (e.g. an object, product, installation, presentation, record of a performance etc.) that demonstrates personal engagement with the creative process either as an individual or as part of a collaborative.

Example(s) from syllabus: Reports, presentations, and prototype.

Brief Description: Student teams are expected to develop a working prototype (ME 412) to fulfill design requirements, and to provide reports and presentations in support of the design.

2. Evidence that students utilize readings, lectures, presentations or other resources to define and distinguish approaches (historical, theoretical, and methodological issues) to “creativity” as appropriate to the disciplinary practices specific to the subject, medium, or approach of this course.

Example(s) from syllabus: Lectures on design process

Brief Description: The design approach and creativity in engineering are covered in lectures, and assessed during the course

3. The processes and assignments where students apply the logic, laws, and/or constraints of the area of study, (e.g, “out of the box” thinking or application of given rules or forms).

Example(s) from syllabus: Brainstorming, identification and selection of design concepts

Brief Description: Student teams are required to develop concepts and use a defined process to evaluate and select the "best" design, with a variety of quantitative and qualitative approaches.

4. Assignments or exercises that require students to demonstrate the ability to critically analyze work produced by other students in this course and in co-curricular events using appropriate tools.

Example(s) from syllabus: assessment within team and of other teams

Brief Description: students are required to evaluate work of other teams during the course, and to evaluate the performance their own team members as well.

5. The process whereby students evaluate the process and results of their own creative endeavors and, using that evaluation, reassess and refine their work.

Example(s) from syllabus: Continued assessment of design

Brief Description: Students are expected to evaluate their proposed designs, and the methods used to evaluate, throughout the course..

6. Describe how students demonstrate the use of information literacy resources:.

In order to identify prior and current designs, students are required to use all available information resources.

ME 411 Course Learning Outcomes:

Students should be able to:

1. Begin to exercise engineering judgment in the design of complete systems.
2. Work individually and as a team member in developing project specifications and planning.
3. Develop the ability to integrate varied subject knowledge in mechanical engineering and apply it to design of systems.
4. Understand the basic principles of engineering economics in product design and manufacturing.
5. Understand the basic concepts of safety and reliability in the design process.
6. Develop and evaluate design concepts in a team environment.
7. Consider aspects of environment, safety, quality, cost and contemporary issues in design.
8. Articulate the principles of teamwork.

ME 411 ME Capstone Design I
UNIVERSITY OF KENTUCKY
MECHANICAL ENGINEERING

ME 411 Course Description: The first semester of the capstone design sequence in mechanical engineering. Topics important in product design and manufacturing are included, including considerations of economics, safety, and communication. Students will develop a project plan concerned with the design of a complex system of current interest to mechanical engineers. Students will work in small groups and emphasis will be on original work. Lecture, two hours; laboratory/independent team work, three hours per week. Prerequisite Engineering Standing; concur or prerequisite: ME 310, ME 340, and ME 344.

Text: Students are responsible for material in the text by Dieter as assigned. The reference by Finkelstein is a resource for the technical writing component.

1. Engineering Design, Dieter and Schmidt, Engineering Design, 4th, McGraw Hill, ISBN 9780072837032

2. Finkelstein, Pocket Book of Technical Writing for Engineers and Scientists, McGraw-Hill 2008, ISBN 978-0-07-319159-1

ME 411 Topics:

Product Specifications
Project planning and management
Team building
Engineering economic analysis
Concept development and selection for product design
Technical communication, written and verbal
Product life-cycle design, sustainable design
Safety and ergonomics, Product liability
Patents and Intellectual property
Computational Tools
Reliability and Statistics in design
Design for manufacturing

ME 411 Learning Outcomes:

Students should be able to:

1. Begin to exercise engineering judgment in the design of complete systems.
2. Work individually and as a team member in developing project specifications and planning.
3. Develop the ability to integrate varied subject knowledge in engineering and apply it to design of systems.
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INTELLECTUAL INQUIRY-ARTS AND CREATIVITY OUTCOMES

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endeavors and, using that evaluation, reassess and refine their work.

Example(s) from syllabus: Continued assessment of design

Brief Description: Students are expected to evaluate their proposed designs, and the methods used to evaluate, throughout the course.

**6. Describe how students demonstrate the use of information literacy resources:
In order to identify prior and current designs, students are required to use all available information resources.**

BLACKBOARD ACCESS

The basic information on the course will be maintained on a BLACKBOARD course website of the university, including course assignments, lecture notes, grades, and other documents. Teams will also be able to post team-related material on the website. Information on accessing that site is located at <http://www.uky.edu/IT/Customerservice/docs/blackboard/>. The Blackboard website is located at <https://elearning.uky.edu/>, or is more directly accessible through myUK.

Your myUK login and password should allow access, and students enrolled in the course should automatically be registered, but will need to follow the procedures to obtain login. **Be sure to verify Blackboard access during the first week of the semester.**

Grading: Students must recognize that the capstone design courses require a significant level of individual and team effort outside of the classroom, with a greater degree of self-direction than a typical college course. The level of participation in the team effort will affect an individual student's grade.

ME 411 Course grading will be based on the following distribution

Team efforts:

Project report and Presentation	30%
Team Contribution	10%
Project Plan and Poster	5%
Progress Reports	5%

Individual Efforts:

Safety Courses and Career Courses	5%
Engineering Notebook (Individual)	15%
Exams, Quizzes and other work	30%
Attendance	0% (unless excessive absence)

Grading Scale: A (91-100), B (81-90), C (71-80), D (61-70), E (60 or less)

Engineer's workbook: Each student will keep a log of his/her activities related to their project in a bound notebook; which is to be submitted at the end of the semester, and evaluation included in the course grade. The workbook should document all project activities on a day-to-day basis. All entries should be legible, dated and initialed, consistent with good engineering practice. Refer to the material in the text by Dieter, page 396-397. The notebook from ME 411 will continue to be used for ME 412.

Team Notebook: EACH TEAM is to maintain a notebook of all project submittals during the fall and spring semesters, and submit it with their final report. The notebook is to be organized, with dividers for each major section:

Meeting Minutes

Project Plan

Monthly Progress Reports

Final Project Report (electronic and written form)

Project Presentation (electronic form) – indicate if there are any concerns about web-posting
(clearance from sponsor)

Resume (updated) for all team members

Prototypes: In many capstone projects, construction of a prototype is necessary or desirable to demonstrate design feasibility or to obtain information during the design process. However, students must remember that DESIGN is the emphasis of the course. Having an excellent prototype without sufficient quality design and analysis documentation is not an acceptable approach. Avoid the “cut-and-try” approach that is so tempting when schedules are tight. You have taken a number of courses in engineering – make use of this material!!!!

The project sponsor/advisor will be able to provide guidance in this aspect of the project. If you find that a physical prototype is necessary for successful completion of your project goals, make note of the following resources:

1. The personnel and tools in the ME machine shop are available at no charge, except for materials. A comprehensive capability for machining, cutting, welding and assembly is available.
2. A basic set of power tools is provided in RGAN 312 (or checkout) for student use.
3. The equipment and personnel in the Manufacturing Center may be available also. This includes the SLA machines and the machine tools.

Access to RGAN 312: Your UKID will be programmed to allow access to RGAN 312. Be sure to leave the room as you found it, during the semester and at the end of the semester.

Report and Presentation: A final report, prepared by each team, is required at the end of the semester. In addition, a final team presentation will be scheduled during the last regular week of each semester.

A poster presentation is to be prepared for mid-semester (date to be determined). This first poster

will summarize the project, the design specifications, and your task and schedule. If you do not wish to showcase your concepts, use the opportunity to show the problem you are solving, or show portions of your work. The final poster must be 30 inches by 40 inches. Printing of posters can be obtained through local copy shops, through Engineering Computing, or through the on-campus resource at: <http://www.uky.edu/ComputingCenter/SSTARS/>. Provide an electronic copy of the poster as well.

OTHER TOPICS

Student Conduct: University policy on student conduct, including that regarding academic honesty, plagiarism and cheating will be followed. Use of a cell phone without explicit permission during exams or quizzes is not allowed, and will result in a charge of cheating. While a team effort is expected during the semester, students should clearly understand that some work is expected to be individual, and if a team effort is involved, it should be clearly indicated in the submission (project plans, progress reports, presentations). **For a discussion of the overall issue and guidelines, refer to the document on the website of the Ombud of the University of Kentucky at <http://www.uky.edu/Ombud/Plagiarism.pdf>.**

The Ombud web site also includes a link to a Prentice Hall Companion Website "Understanding Plagiarism" http://wps.prenhall.com/hss_understand_plagiarism_1/0,6622,427064-,00.html. Be sure you understand the expectations of the university in this regard.

Classroom attendance is expected, and excessive unexcused absences will affect the final grade, consistent with the university policy. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences:

- 1) serious illness (however, in light of university concerns about spreading the flu, please consider this when making your decision on class attendance if you are ill)
- 2) illness or death of family member;
- 3) University-related trips;
- 4) major religious holidays;
- 5) other circumstances you find to be "reasonable cause for nonattendance."

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day for adding a class.

Classroom and Learning Accommodations: UK Students requiring such accommodation should provide documentation of the need prior to the first week of class. The Disability Resource Center certifies the need for and specifies the particular type of such accommodations on a student-by-student basis. (Contact Mr. Jake Karnes, 257-2754, room 2 Alumni Gym, jkarnes@uky.edu).

Safety: Each team will select a safety and housekeeping coordinator, who will be responsible for advising team members on safe operation of equipment, making sure members are properly trained, and making sure good housekeeping practices are maintained in the design lab. Prior to being assigned keys, and prior to September 30, all team members in ME 411 must complete the following courses on the website <http://ehs.uky.edu/classes.html>. Copies of all the certificates

are to be maintained by the team safety coordinator, and submitted with the first progress report. Completion of these courses will contribute to the final course grade.

- 1) Chemical Hygiene,
- 2) Hazardous Waste, and
- 3) Fire Extinguisher Training.

Career Center: Each student in ME 411 is to complete two workshops at the University of Kentucky Stuckert Career Center <http://www.uky.edu/CareerCenter/workshop.html> during the fall semester, and provide documentation to the instructor in the team notebook. Students can select the two topics of greatest interest to them. Participation in the Fall Career Fair can substitute for one of the two workshops, and other options may be allowed during the semester.

Email: It is essential that students check e-mail on a daily basis. The UK e-mail address will be used by default, so students must activate e-mail forwarding if they prefer another primary e-mail address. In any communications with the instructor or other students, be sure to follow e-mail etiquette, for example <http://office.microsoft.com/en-us/help/HA012054101033.aspx>.

Interaction with Sponsors/Advisors: A key part of the course is the team project. In addition to working with your other team members, you will need to develop and maintain a good working relationship with your sponsors and/or advisors. In some cases this will include industrial sponsors at remote locations, and in any case typically not on campus. You will typically meet with the sponsors in person at some times, but much of the interaction will be through the phone or e-mail. You will also interact with outside firms who may provide equipment or information in support of your project efforts. Take care to conduct all of these interactions in a professional manner, as representatives of UK.

The university provides web conferencing capability, through the use of Adobe Connet web conferencing and Intercall tele-conferencing (voice). With these resources, you can share applications such as Powerpoint, Excel, Word, or any PC application with others who connect to the site. Information on the use of these resources will be provided on Blackboard.

For ME 411 and 412, the web-based BASECAMP system is to be used for communication, posting of files, to-do lists, deliverables, and time-tracking. Login and passwords are to be provided to each student and advisor.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of *Student Rights and Responsibilities* (available online <http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Team Organization and Conduct

Each team consists of co-equal team members. By consensus of the team, one member of the team will agree to act as team leader. The team leader is a participating member of the team (not a manager) and must shoulder an equal share of the technical work of the project. In addition, the team leader is responsible for organizing and conducting meetings and for communicating with the project sponsor, the faculty or staff consultant, and the course instructor.

Duties and decisions are made by consensus of the team members. If the team has trouble resolving an issue related to the conduct of the project, it is the responsibility of the team leader to present the issue promptly to the faculty or staff consultant who will assist the team in decision making.

Meetings

1. **The team leader is responsible** for coordinating all meetings, for preparing and distributing the meeting minutes, and for following up on action items of previous meetings
2. **Team Work Sessions.** Teams are to use RGAN 312 for all work sessions
3. **Weekly meetings.** The purpose of the weekly team meetings is to report on action items from the previous meeting, to update the team on each member's progress, and to discuss any special problems or needs that have arisen.

Meetings of the team members will be held every week. Meetings will be scheduled at times when all team members can attend, and attendance is mandatory. The time, date and place of the next weekly meeting will be decided during the current meeting. The team should also invite the faculty or staff consultant to the weekly meetings.

4. **Monthly meetings.** The purpose of the monthly meetings is to update the project sponsor (company or organizational representative) and advisor on the progress of the project and to discuss any problems with meeting deadlines or objectives. It is expected that the team will make a formal presentation to the project sponsor during every other monthly meeting. The presentation will include as a minimum the following:
 - a. Review of project objectives
 - b. Review of project tasks and schedule
 - c. Modifications to either (a) or (b)
 - d. Results and milestones achieved
 - e. Plans for the current month

Copies of all slides used in the monthly meeting will be distributed at the meeting and become part of the meeting minutes (see below).

Monthly meetings will be held during the first week of each month October to December, and February through April, and during the first week of class in January. If at all possible, meetings will be scheduled at times when all team members can attend, and attendance is mandatory. The time, date, and place of the next monthly meeting will be decided during the current meeting. The team should also invite the faculty or staff consultant and the course instructor to the monthly meetings.

4. **All meetings.** Minutes will be recorded at all meetings. The minutes will include the following information:
 - a. Time, date, and place of the meeting and those present,
 - b. Summary of items discussed.
 - c. A list of action items to be completed before the next meeting and name of person responsible,
 - d. The time, date, and place of the next meeting,
 - e. The distribution list (this list must include the team members, the project sponsor, the faculty or staff consultant, and the class instructor).

The team leader is responsible for *typing* the minutes and for distributing the minutes *within 24 hours*.

Project Results Evaluation

The following criteria will be used to evaluate project results:

1. How original and inventive is the team's approach to the project? Have non-traditional approaches been considered? Why is the approach selected the best one?
2. Has the team made the best use of resources available to it? Were engineering methods/techniques used effectively? Was critical information uncovered and used to impact the solution?
3. Has the flow of information between the team and its clients (sponsor, consultant, and instructor) been aggressively maintained? Has the team sought out the clients rather than vice versa?
4. Has sound engineering judgment been exercised? Has the team used its previous training to effect a solution? Has engineering analysis been used where appropriate?
5. Has the team been able to integrate knowledge and information to bring about a solution? Does the team understand the wider ramifications of its solution including manufacturability, cost, reliability, and safety? Has the team considered the social and environmental impact of its solution?
6. Has the team functioned as a cohesive unit? Did each member of the team make an obvious contribution? Was the whole greater than the sum of the parts?

Deliverables During the Semester

There will be a number of reports and other documents developed by each team during the semester. These are as follows, with the definition of the various items based on the attached material along with the expected due date for each deliverable.

Deliverable	In document	Date Due
Individual Resume	Basecamp	Week 1
Project/Team Preference Form		Second week of class
Confidentiality Agreement		With First Progress Report
Safety Certificates		With First Progress Report
Career Courses		
Problem Statement and Objective	Specification	First week of October
Project Plan	Project Plan(includes specification)	Third Week of October
Relevant Background/Patents/Literature	Project Plan	Third Week of October
Benchmarking	Project Plan	Third Week of October
Budget	Project Plan	Third Week of October
Concepts & Selection	Report 1	Last week of fall semester
Physical Model/CAD Model/Analytical Model	Report 1	Last week of fall semester
Written Report-semester 1	Report 1	Last week of fall semester
Poster/Display Presentation	EAB Meeting	October 26
Monthly Reports	Monthly	First week of month, October to April
Team Self-evaluations	Evaluation Form	Mid- and end-semester, fall and spring
Oral Presentation		Last week of fall Semester

TEAM SELF-EVALUATION ME 411/412

UNIVERSITY OF KENTUCKY MECHANICAL ENGINEERING

NAME: _____ TEAM number _____ NAME: _____

SECTION 1: For teams to be effective, members must work together, with each member carrying their share of the work required by the project. Each team member is required to provide this evaluation as part of course requirements, and the instructor will consider this input is assigning a portion of the course grade. Please rate members of your team (including yourself) on their contributions to team effectiveness. Use a rating scale of 1 to 5 for each item, based on these definitions.

- 5 Consistently exceeds expectations and fulfills assigned duties
- 4 Faithfully meets expectations; does not fail without compelling excuse
- 3 Usually meets expectations; occasionally allows failure to occur
- 2 Occasionally meets expectations; too frequently fails to perform as expected
- 1 Rarely meets expectations; consistently is unreliable or performs inadequately

Expected Action	Team Member Initials							Ratings (1-5) in each cell
	Me							
1. Attends Meetings								
2. Meets deadlines								
3. Follows through on commitments								
4. Does fair share of work								
5. Is open to ideas of others								
6. Displays a positive attitude								
7. Helps improve teamwork								

SECTION 2. Distribute 100 points among the team members, considering the relative contribution (such as amount of work performed, teamwork, leadership, etc.) of each member of the team, with more points being given to members with the stronger performance. Include yourself on the list.

	Team Member	Points	Comments
1			
2			
3			
4			
5			
6			
	TOTAL	100	(points need to add to 100)

Use the following format for the Project Plan cover page:

PROJECT TEAM ID: XX

ME 412

Capstone Design Project Plan

(project title and number)

submitted to

(company or organization) by

(list team members, with email addresses and phone numbers, and designate team leader)

**Department of Mechanical Engineering
University of Kentucky
Lexington, KY 40506-0108**

(date)

Contacts: (sponsor representative, telephone) (faculty or staff consultant, telephone)
(course instructor, telephone)

Format for Project Plan

Cover Page: see above

1. Introduction (double spaced for draft)

A brief overview of the general subject so that the reader understands what it is you are talking about.

2. Problem Description and Explanation (double spaced for draft)

Should include a "needs" statement that explains the current situation, disadvantages of current approach, why the problem is important, potential benefits of solving the problem, etc. Be objective and avoid passing the buck like "Management wants a more, etc., etc." If appropriate, include a market analysis or other documentation of the need for the project, and any benchmarking or identification of opportunities for a competitive advantage.

3. Goals, Objectives, Constraints/Product Design Specification (double spaced for draft)

A goals statement is a brief, general, ideal response to the needs statement; it should answer the question, "How are we going to satisfy this need?" The goal or goals are usually ideal, general, and difficult to measure. Ex: "Design a more economical SUV."

Objectives, in contrast to goals, are expectations of performance that can be readily measured. They identify those features of the design that are most important to the client. Ex: "Reduce the aerodynamic drag of the SUV by 25 percent." Place this in the form of a PRODUCT DESIGN SPECIFICATION, listing the design requirements. Page 110 of Dieter offers a template for this PDS – use elements as appropriate to your project.

Constraints define the permissible range of the design parameters. These may include common limits like cost, weight, etc.

Provide a "House of Quality" (in the streamlined format) for your project to provide further documentation of the PDS, including Customer Needs, Engineering Characteristics, Relationship Matrix, and Decision Characteristics (Target Value).

Figure 3.8 and Figure 3.9 in Dieter provide good examples of the "streamlined configuration" of the House of Quality that we will use.

4. Approach (double spaced for draft)

How do you propose to approach the development of a solution? Don't give the final solution, but list some possibilities with pluses and minuses. What tools and techniques will you use to evaluate the various approaches? Testing? Mathematical modeling? What resources are needed? What information is needed from the project sponsor?

5. Task Description (double spaced for draft)

Break the project into smaller steps. Each task should have some relationship to another task or to the objectives. Assign each task to a member of the team, including the team leader. Don't forget: the final report and presentation are tasks also.

6. Schedule

Estimate hours per task. Develop Gantt chart. The Gantt chart should include the following columns:

1. Task or subtask (Number and Name)
2. Resource Names
3. Planned Start date
4. Planned Completion date
5. Planned Hours
6. Percent Complete as of (Date)
7. Gantt chart timelines to complete the chart for each task

Identify milestones and dates (e.g., the solid model will be completed by November 10).

PARTICIPATION: In an appendix, each project plan and report (hard copy) must contain a statement signed by all team members verifying that every member of the team did his/her fair share to the satisfaction of the signatory, and a task assignment sheet (in the appendix) indicating which member was responsible for each report section.

PROJECT TEAM ID: XX

Use the following format for the Final Report cover page:

ME 411/412

**Capstone Design Project Final
Report**

(project title and number)

submitted to

(company or organization) by

(list team members, with email addresses and phone numbers, and designate team leader)

**Department of Mechanical Engineering
University of Kentucky
Lexington, KY 40506-0108**

(date)

Contacts: (sponsor representative, telephone) (faculty or staff consultant, telephone)
(course instructor, telephone)

Format for Final Report

Cover Page: see above

1. Executive Summary

A summary of the project citing objectives, overall approach, key results and conclusions. Put this just after the cover page. It must be single spaced and no longer than one page.

2. Introduction

A brief overview of the general subject so that the reader understands what it is you are talking about.

3. Problem Description and Explanation

Should include a "needs" statement that explains the current situation, disadvantages of current approach, why the problem is important, potential benefits of solving the problem, etc.

4. Goals, Objectives, and Constraints

A goals statement is a brief, general, ideal response to the needs statement; it should answer the question, "How are we going to satisfy this need?" The goal or goals are usually ideal, general, and difficult to measure. Objectives, in contrast to goals, are expectations of performance that can be readily measured. They identify those features of the design that are most important to the client. Constraints define the permissible range of the design parameters. These may include common limits like cost, weight, etc. Place this in the form of a PRODUCT DESIGN SPECIFICATION, listing the design requirements. Page 110 of Dieter offers a template for this PDS – use elements as appropriate to your project.

Provide a “House of Quality” (in the streamlined format) for your project to provide further documentation of the PDS, including Customer Needs, Engineering Characteristics, Relationship Matrix, and Decision Characteristics (Target Value). Figure 3.8 and Figure 3.9 in Dieter provide good examples of the “streamlined configuration” of the House of Quality that we will use.

5. Approach

How did you approach the development of a solution? What tools and techniques did you use to evaluate the various approaches? Describe testing or mathematical modeling used. What resources were used?

6. Task Description

Describe each project task (100 words or less) and which team member was *responsible* for each task.

7. Results

Present the results/status according to task. (Each team member is responsible for writing the results of his task, including plots, tables, design sketches, etc.)

8. Discussion and Conclusions

Use this section to tie the results together and explain any issues not specifically covered (e.g., environmental concerns, if appropriate), etc. Were the objectives met? Why or why not?

9. Gantt Chart

10. References

List references in alphabetical order according to the last name of the first author. In the body of the report, cite references NOT with numbers, but with the last name of the first author and the year of publication in parenthesis, for example:

The stress in a four-bar do-floppy is known to be proportional to the phase of the moon in July (Doe, 2000). We can use this information to

In the References, this reference would appear similar to the following:

Doe, J. (2000), Stress in a Four-Bar....., *Journal of This-and-That*, Vol. 001, pp. 101 -131.

11. Appendices

As required for any information that is not directly related to the flow of the report.

Mechanical Requirements for the final report:

1. Submit **two** copies of the final report to the instructor, along with an electronic version on BASECAMP. Also submit an electronic version of the project final Powerpoint presentation.
2. Use 12-point font throughout. Use 1.5 line spacing except in Executive Summary, captions (see below) and References which should be single-spaced. Number all pages consecutively with the page number located at the bottom, center of each page.
3. All equations, figures, and tables must be numbered. All figures and tables must be captioned and located within the text (i.e., not at the end of a section).
4. All plots must be made using a program such as Excel or Matlab. Concept and design sketches may be done (neatly) in free hand or with a graphics package

PARTICIPATION: In an appendix, each project plan and report (hard copy) must contain a statement **signed by all team members** verifying that every member of the team did his/her fair share to the satisfaction of the signatory, and a **task assignment sheet (in the appendix) indicating which member was responsible for each report section.**

Week No.	Lecture Topic ME 411	
Phase1. Conceptual Design Modules		
1	Overview of Course	
2	Engineering Design and the Product Realization Process	
3	Need Identification and Product Definition, Design Notebook	
4	QFD and Problem definition	
5	Team Behavior and Tools	
6	Planning and Scheduling, Gantt Charts, Progress Reports	
7	Intellectual Property, Information sources	
8	Concept Generation and Evaluation, Brainstorming	
9	Communication, Preliminary Design Review	
Engineering Economics Module		
10	Engineering Economics Basics	
11	Principles of Economic Evaluation	
Safety and Reliability Module		
12	Safety and Reliability, Ergonomics	
13	Failure Mode and Effects Analysis, Reliability of Systems	
14		
Communication Module		
15	Presentation and Reporting	
16	Critical Design Reviews	