ENGR 1620 Section 9
Introduction to Engineering
Fall 2014

Instructor Information

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Office hours are Wednesdays and Thursdays 1:30 – 3:30 pm in Thornton B204 and by appointment.

I will read and respond to email, for the most part, between 9 am and 9 pm during the week, and noon – 5 pm on weekends. If you need an immediate answer, please call or text my cell before 9 pm.

TA Information

Kevin Froimson (ksf5fk), Tyler Grosmick (twg8he), and Kevin Wu (kkw5cv) will hold open lab/tutorials. The schedule is MW 2 - 3:15 pm, MEC 213 and T 2 - 5 pm, Stacks. They are another source of answers regarding assignments, projects, and the final exam. Tyler has expertise in mechatronics and 3D printing, so be sure to call on his knowledge and help for the main project.

Course Materials

There is **NO TEXTBOOK TO BUY**. Instead, readings from selected texts will be posted to the course Collab site.

Common Course Description (for all sections)

The primary goal of ENGR 1620 is to **introduce students to the fun and challenge of real world engineering practice through multidisciplinary design experiences and realistic, open-ended problem solving**. Further, students will develop the following knowledge, skills, and abilities:

- an appreciation for the importance of the context (including but not limited to social, cultural, economic, environmental, organizational, and regulatory) in which the technical work of engineers is accomplished

- oral and written communication skills
- multidisciplinary teamwork skills
- creative and innovation skills
- an understanding of the role and importance of analytical skills which are the core of the undergraduate engineering student's curriculum
- an appreciation of the balance between technical and non-technical factors in design

Common Learning Objectives (for all sections)

ENGR 1620 has the following learning objectives and outcomes:

Objective #1:	**Introduce students to the real world of engineering and design**
Outcome #1:	Understand and apply the structured approach used by engineers to solve open-ended design problems
Outcome #2:	Develop a better appreciation for the contexts, such as cultural, organizational and technical, in which engineering practice occurs
Outcome #3:	Achieve greater in-depth understanding of the role of engineers in society
Outcome #4:	Become familiar with some of the differences among engineering disciplines
Objective #2:	**Provide an integrated hands-on design and modeling experience**
Outcome #1:	Gain experience with the fun and challenge of engineering
Outcome #2:	Develop a greater appreciation of the necessary balance between analytical and non-analytical skills such as effective teaming, communication, and creative thinking in the engineering design process
Outcome #3:	Gain an appreciation for the role of analysis in engineering practice, using models and tools from mathematics, physics, science, and engineering analysis

ENGR 1620 will help you understand design as the principal and pervasive activity of the engineer. We will define the concept of "design" and learn various design methods and strategies. The use of exercises focused on open-ended problems is intended to develop appreciation for the role of creativity and guided intuition in the engineering process, and to develop the proper mentality and habits needed for effective engineering problem solving and design. You can also expect to develop and sharpen problem solving skills by learning how to define a design space, including problem(s) and constraints properly; identify performance and other design objectives; subdivide the problem and distribute component responsibilities – that is, use organized teamwork to complete the project, understand the role and methods of reporting and documentation; and the role of failure in engineering. Finally, you will also learn to apply computer skills such as Excel, statistical analysis, and mathematical programming to the formulation, planning and solution of engineering design problems.

Catalog Description of ENGR 1620

Provides an overview of the engineering profession and the disciplines and functions within engineering. Introduces students to engineering design, and the role of creativity in the solution

of open-ended (design) problems. The conceptual understanding and skills needed to apply the engineering method are integrated into a significant, hands-on, case study project. This project, which is intended to be both fun and challenging, focuses on a realistic problem, requiring a balance of engineering analysis and the economic, cultural, political and other considerations needed to achieve a successful solution. In addition to the fundamental role of engineering analysis and optimization, students also develop computer skills using spreadsheet and math solver applications and apply these to engineering problem solving. Co-requisite: ENGR 1621 (Lab; 1 credit).

Additional Course Objectives

By the end of the course, students will

- Develop or enhance an appreciation for the engineering design process, demonstrated through performance on course deliverables
- Develop appropriate language to describe and critique designs
- Develop or enhance technological literacy in design domains
- Develop or enhance knowledge of the importance of human factors in the engineering design process
- Have fun!

Course Schedule and Assignments

The Course Schedule is maintained in a separate document. The schedule lists dates, class topics, and assignments. Additional details on the assignments will be provided in the class notes. The schedule does **not** include participation exercises.

The section's main design project is designing and developing an object or a process inspired by nature (biomimicry). Think airfoils based on manta ray wings and sensors based on cat whiskers. The project will stress also "design for X," where X refers to characteristics such as commercialization (entrepreneurship), maintainability, quality, reliability, and usability.

Course Policies

Attendance

Attendance is **required**, since attending class gives you the opportunities to develop the skills needed to complete course deliverables as well as earn participation points. Please email or call me if you know about an absence in advance, or if you anticipate an absence of two or more consecutive class periods. Please factor this information into your break, holiday, and end-of-semester plans. Due date extensions will **not** be given if the absence is due to non-essential travel plans.

Please be prompt to class. Late entrances disrupt class activities.

Communication Device Use

Please have your cell on vibrate or off during class and conferences with the instructor. Please consult with the instructor if you have an emergency situation for which you need to be reached during the class. iPods may be used when you are working on your own; please turn off your device during lectures, discussions, and group work. Similarly, please use your laptop during lectures and discussions for non-trivial uses (e.g., taking notes) ONLY.

Please don't text, Internet surf, work on assignments for other classes, or IM/Google chat during class. If you do, you will be asked to leave and you will receive a zero (0) for the day's activities.

Cooperative Learning

We will be doing a good deal of work in teams. Cooperative learning gives you an opportunity to pool knowledge and talents, and learn from your peers. A team will turn in one product and share the grade. The expectation, therefore, is that team members will contribute equally to the final product. Team members will manage, with assistance from me as requested, situations when contributions are not equal. There will be individual work products due during the semester as well. The expectation in this case is that you will complete that product on your own. And you know what? The best resource/help may often come from your fellow student(s).

Lecture Notes

My goal is to have student lecture notes available by 10 pm the night before scheduled delivery. Please note that, at times, these notes will be an abbreviated version of the notes from which I'll work. There is pedagogic value in both providing a framework within which students take notes and the activity of note taking. In that case, the complete version of the class notes will be posted after class.

Miscellaneous

You will adhere to all UVa guidelines and policies with respect to cheating, plagiarism, and other forms of academic dishonesty. **Any assignment whose integrity is compromised will receive a 0. You will pledge all work.** We are proud of our honor system; it is integral to the intellectual and social development of our educational community. Please let me know immediately if you have any question that honor may have been compromised, or if you're unsure as to whether a certain action is a violation of the honor code.

You will conduct yourself in a professional, respectful manner in all interactions with the instructor, fellow students, and other faculty and staff. We pledge to do the same.

Please don't wait to address any performance issues.

Emails to me **must** have ENGR 1620-9 in the subject line. I will follow this rule for all class emails.

I will post all Office files in their 2003 versions (that is, with extensions of .doc, .xls, and .ppt) to ensure that everyone can read and use them easily. Please let me know if you have access only to iWork.
DO NOT email me your assignments.

"Outside" work will be required to complete readings and assignments, and to conduct research. The time commitment will vary, but do plan on at least five hours per week.

Use the American Psychological Association (APA) style in citing references in your assignments. Good references are http://www.apastyle.org/learn/tutorials/basics-tutorial.aspx and http://owl.english.purdue.edu/owl/resource/560/01/.

Please notify me as soon as possible if any accommodations need to be made to meet differing abilities.

Please note: the class schedule is subject to change.

Course Assessment (Grading)

ENGR 1620 is a project-based course. The contribution weights for exams, products, participation, and activities are:

15%	Participation/Attendance/In-Class Assignments
10%	Online Quizzes
15%	Final Exam
15%	Product Development Documentation
5%	Engineering Notebook
40%	Projects (Product Prototypes and Presentations)