

Introduction to Engineering: Course Syllabus

This Syllabus applies to Rye Kennedy's Section of Engr101 Fall 2013 only

- course website: <http://cratel.wichita.edu/blogs/engr101fall2013kennedy/>
- CRN 16058: Mondays and Wednesdays from 10:30to 11:45am Engineering Bldg 211
- 3 credit hours
- Prerequisites: None

Primary Instructor: Rye Kennedy, PE

- Cell Phone: (316) 347-9886
- E-mail (preferred): ryekennedy@gmail.com
- Office: Wallace Hall 317 (I will most likely never be in this office)
- Office Hours: By Appointment

Assistance:

- Peer Mentor: Dalton Ediger: (daltonediger1234@gmail.com)
- Assistance in all applied and lab work: Tom Mcguire (atomicwire@gmail.com)

General Description

Introduction to Engineering is a three-hour course specifically designed for College of Engineering freshmen and transfer students in their first year at Wichita State University. In this course you will practice your skills as an engineering student and as a practicing engineer. After completing this class in December you will:

1. Have a good sense of the different engineering fields offered at Wichita State University. For example, you will be able to answer these questions:
 - a. what does a mechanical engineer do?
 - b. how do aerospace engineering and mechanical engineering overlap?
 - c. what is the difference between Computer Science and Computer Engineering?
 - d. in what ways might a bioengineer work with an electrical engineer?
 - e. how can I get a minor in mathematics or music at WSU while still majoring in Industrial Engineering?
2. Have a good sense of how to be a successful college student. For example, you will:
 - a. have practiced time management as well as good study techniques
 - b. understand your role and responsibility as a student and the professor's role and responsibility as a resource to you
 - c. know what resources are available to you and how you can make effective use of them
 - d. understand the common problems associated with first-year student experiences in the transition from High School, Community College, or the workforce to a four-year university.
 - e. have explored your learning process and appreciate different learning styles
 - f. started to develop your own set of essential academic survival skills.
3. Have practiced solving real-world engineering problems. For example:
 - a. you used a computed numerically controlled (CNC) machine, such a mill in the

- manufacturing lab
- b. you wrote non-trivial programs for a microcontroller
- c. you worked as an indispensable member of an engineering team, understanding your unique role and contribution

Group Work

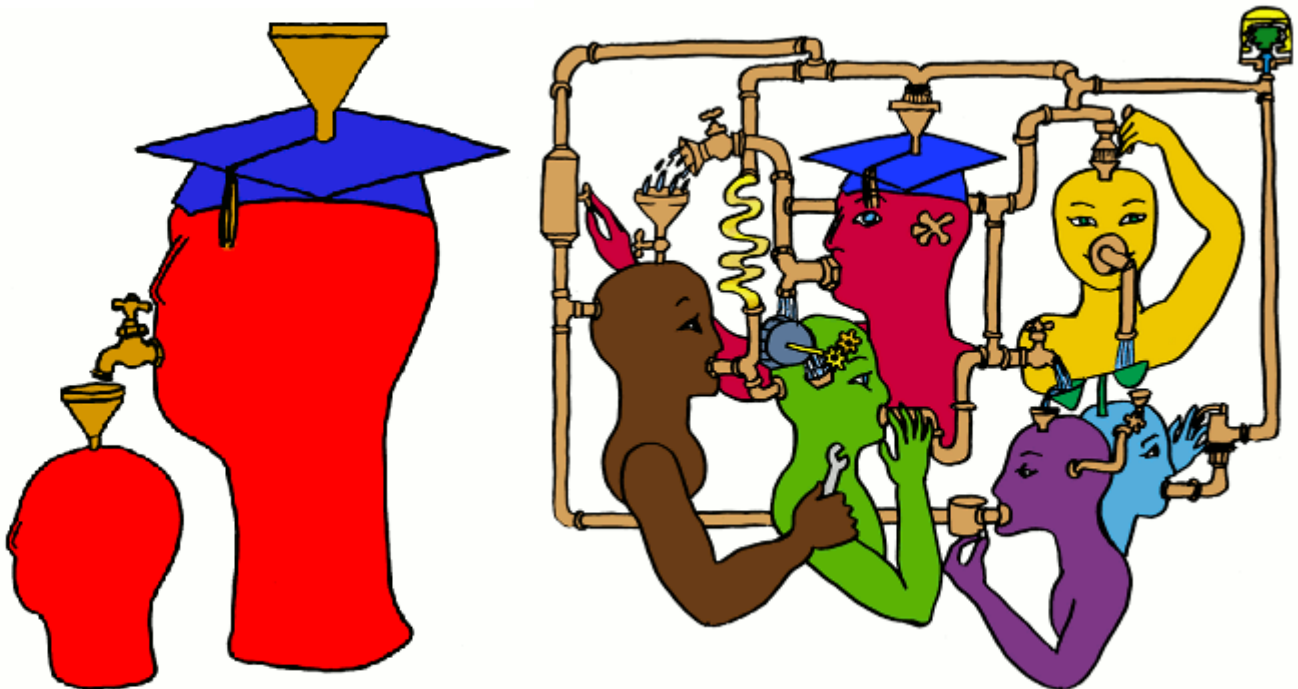
More than ever, engineers are required in their workplace to work together as a team. Also many professional engineers work in teams with non-engineers and must communicate engineering-related concepts to those outside their discipline, such as to salespeople and graphic designers who are representing their product. Related to this, most engineering students find their overall academic performance to be higher and more rewarding when they study together, rather than independently.

To help you explore engineering as a student and professional within a more social context, some class activities will be centered around groups. Group size may vary between 2 and 4. Moreover, just as you cannot choose who works with you in the work place, do not expect to choose who works with you in your group.

Teaching Philosophy

In one common model of teaching, the teacher imparts information to the students and then tests the students to see how well they have retained the information presented to them. This pedagogical approach, called *Instructionism*, focuses on the teacher as the giver of information.

In contrast, *Constructionism* is a learner and community-based model. As the wikipedia puts it, "Constructionist learning involves students drawing their own conclusions through creative experimentation and the making of social objects. The constructionist teacher takes on a mediational role rather than adopting an instructionist position. Front of class teaching 'at' students is replaced by assisting them to understand—and help one another to understand—problems in a hands-on way."



(photos from Karl Smith's Design and Implementation of Cooperative Learning in Engineering - March 31, 2010 available

at <http://www.ce.umn.edu/~smith/links.html>)

Introduction to Engineering will borrow from both Instructionism and Constructionism. Specifically, we will integrate some of the ideas of Constructionist educators such as Seymour Papert, Mitchel Resnick, and David Cavallo. This means that:

- you may not find your assignments completely spelled out. Intentionally, there will be room for personal exploration.
- emphasis will be placed on the class as a community which communicates and supports itself within the context of the material presented.
- discussion and conversation is emphasized on all levels between and amongst all of us, teachers and students.
- the standard hierarchical model of teacher and student is no longer appropriate:
- you can and should expect to learn from each other as much as from me
- I can and should expect to learn from you
- conversations between and among all of us are open and indeed part of the learning that occurs in the course.
- the course material is treated as continually changing, developing, and influenced by the class community, rather than as fixed facts to be presented within a formal structure.

Open Source:

On the surface, the Open Source philosophy seems like a pretty good trick to get programmers to write software for free. With a deeper look, we can also consider it as a governing principle regarding how we think and live. Open Source puts more emphasis on the product and a community process for development and less emphasis on the creators themselves. In the Open Source world it is less important that a particular individual or company created a product and more important that product has as few limitations as possible governing its sharing, its use, and its continued development.

It may seem that the Open Source movement is idealistic and altruistic, but its roots lie in the idea that by being a part of a community where we give freely, we can also take freely. Those that subscribe to the Open Source philosophy believe that, in the end, the process of sharing within the community is rewarding not only regarding the process of development but also in the resulting products that they are able to create even as individuals.

The Open Source philosophy has been applied most popularly to software development, perhaps because its success is dependent on diverse communities who can communicate effectively; online tools that software developers pioneered in creating and using have facilitated greatly in this type of communication. However, the philosophy can be applied to any sort of sharing of information, including the information regarding process and product for this course.

While it would not be reasonable for me to expect anybody in the course to adopt the Open Source philosophy, you should be clear that the course is structured to fully support it. This means that all course materials will be freely available on the web. This includes all of your assignments, all of your online communication, and complete documentation for your final project.

When completing course work, keep in mind that everything you offer is public. Use this to your advantage. Previous students who have participated in similarly-structured courses have pointed potential employers to the online material they generated in the course. What better way to show an employer who you are and what you can offer to them in the future than by showing the model you have already given in the past? Said another way, you can use the public nature of this course to document publicly what you know and how you express yourself.

Online Tools:

In keeping with the goals of the course and the Open Source philosophy that governs it, we will submit all course material generated in the class using an instance of the blog engine Wordpress running on a WSU server. Blackboard exists as a closed web portal, so it will be used for grades.

The wordpress site we will use:

<http://cratel.wichita.edu/blogs/engr101fall2013kennedy/>

Once you log into the site, you can set a few preferences in your profile, such as how you want your name to appear and what your password is.

Some of the structure and features to the site:

- Pages on the site comprise primarily of course logistics, such as the schedule and the syllabus.
- Posts on the site will be organized by assignment.
- You will submit assignments for the course by submitting posts on the blog, using the available post templates.
- There's a shoutbox. Yell out wassup!
- We will keep a list of useful external links on the site. These will include reference material, helpful tips, and suppliers regarding any of the course material. Feel free to edit and add to the links.
- The forum will serve in place of a more traditional email discussion list. You can subscribe to categories in the forum so you can get emails as people post. Share cool things you have found, ask questions, and seek the help you need at the forum.
- The site supports comments to posts, and I encourage you to offer comments liberally to other people's posts. Occasionally a member of the world-wide community might offer a comment to one of your posts as well.

I have configured and maintain the site. If there is a feature you are missing from the site or if the site fails you in some way, tell me and I will add/fix it.

Projects

A significant portion of the class will give you practice being a professional engineer by focusing on designing and building projects within a set of constraints.

Main Project

One of the most important skills of any engineer is the ability to describe a problem, then design and implement a solution. In your final project you will do exactly that: using a microcontroller, a sensor, and perhaps a computer you will solve a problem of your choosing. You will also demonstrate your final project at the end of the semester at Exploration Place on December 8.

Related Projects

We have many hands-on projects in store for you this semester. They include:

- **Build-a-blade:** build a simple set of wind turbine blades
- **Me Motor:** build something with a motor, a battery, and some foam
- **Us Arduino:** learn to program a microcontroller
- **They Sensor:** learn to interface a sensor to a microcontroller

- **Whoa---manufacture:** learn to use a CNC machine in the manufacturing lab
- **Analysis X:** use software to analyze a rocket, build it, measure performance, re-iterate

Materials and fees

- You or your groups may also work with an Arduino for the semester. The Arduino is an open-source electronics prototyping platform intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. In addition, various sensors, motors, and electronics will be available for you to explore and experiment with to build your projects. All materials and equipment, including the Arduino, must be returned after the course ends.
- There is no textbook for the class. All software for the class is free. There may be occasional required readings from handouts, online resources, or books on reserve at the library.
- Some projects may require materials above and beyond what can be provided for the class. In some cases, you may be required to buy these materials for your projects. ***Total expenditure could be as high as \$100.***

Software and Computers

- The Arduino Environment lets you program your Arduino. This is a free download, installable on all computing platforms (Windows, Mac, Linux). Download: <http://arduino.cc/en/Main/Software>
- Depending on time, we may also use Python(x,y), a free Windows-based scientific and engineering development software tool similar in functionality to Matlab. A similar environment can be created for non-Windows users but may not be fully supported in the class. Download: <http://www.pythonxy.com/>
- The course will be easier for you logistically if you have your own computer and install the software for the class on it. If you don't have a computer but are considering purchasing one, I would strongly recommend doing so in support of all of your college education. However, for those without a computer and the means to purchase one, we will make computers available with the appropriate software installed on at least one of the computer labs on campus.

Class Participation and Computer/Cell phone policy

Class participation is a critical component to your learning in any class you take. When you participate in a class you bring your full, undivided attention to the class, the teacher, and the students.

Computers and cell phones are great, but your computer or phone can be distracting to both you and those sitting near you. Take your notes the old fashioned way --- with pencil and paper. Leave the laptop in your bag so you aren't tempted to check Facebook or your email. Shut your cell phone off.

Said another way:

- laptops must be closed during class time
- cell phones must be off during class time

If you do not abide by these rules you may be dismissed from the class.

CLA

All students are required to take the CLA as part of this course. The CLA is a 90- minute open- ended

assessment that helps WSU measure how well they are teaching critical thinking, analytic reasoning, problem- solving and writing skills. A schedule for the CLA will be provided.

Course Structure

A detailed course schedule for both Engineering 101 sections is continually updated on the class blog.

Assignments

All online assignments are due for submission by the midnight before class. This is so we can look through the assignments before the class meets. Typically we will spend the beginning of class looking at people's assignments together on the day an assignment is due.

Plagiarism

It is okay to work together on projects, provided that each student develops in the collaboration a full understanding of all parts of the project and all students are credited. Moreover, it is okay for us to borrow from each other's projects as long as credit is given. Plagiarism, however, is the act of stealing somebody's work *without giving credit to that person*. **Anybody caught plagiarizing will receive an X for the course and will be penalized to the full extent allowed by University policy. No excuses for plagiarism will be accepted. There are no exceptions to this policy.**

Grading

Your grade for Engineering 101 will be determined on a point system as follows:

Item	Points
Attendance	15
Class and online participation	10
Weekly assignments and mini-projects	35
Final project	30
CLA	10
Total	100

The point system translates to a letter grade as follows:

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Points	94-100	90-93	87-89	84-86	80-83	77-79	74-76	70-73	67-69	65-66	0-64

We do not anticipate offering any extra-credit opportunities in Engineering 101.

Late assignments and extensions

Late assignments without prior approved arrangements are not accepted. If you have not completed an assignment on the day it is due, hand in your incomplete assignment for partial credit.

Attendance

You are at a university. What you put into your education will be what you will get out of your education. Attendance will be taken randomly throughout the semester. The attendance portion is an “all-or-nothing” portion of your grade. If you are going to be absent, make prior arrangements with your instructor or have an amazing killer reason why you were not in class. Having a cold with no doctor's note doesn't cut it.

Class Participation

The course will be more successful for you and others if you actively participate in the classroom, blog, and discussion list. We award up to 25 points for participation each quarter of the semester. Class participation includes but is not limited to:

- being an active listener at all times in class
- offering thoughtful responses both in person and online when you have the opportunity
- taking leadership roles in group projects
- contributing to the email discussion list and leaving meaningful comments on the class blog
- adopting a pro-active attitude toward assignments, projects, and your own learning

Class participation is, by definition, a subjective measure, and we will do our best to make a fair and accurate assessment of your class participation. While we can't be perfect at measuring class participation, we also don't consider it a reasonable area for debate with you. If you aren't sure how we are perceiving your class participation as the semester roles on, ask us. After the points are awarded, it's too late.

Feedback

We always welcome feedback about the class. You may email us at any time. In addition, a "Suggestions for next year" discussion topic will be created on the class blog for students to suggest how to improve the course.

Responsibility

- Since the course material is broad and course meeting times are limited, be self-motivated and ready to seek help from each other, as well as from us. Resources to facilitate this will be given in the class.
- You are expected to stay current *daily* with the engr101 forum. Set up your email notifications and/or RSS feeds accordingly. This will keep you informed of announcements and changes in assignments and allow you to participate in various other conversations that may be happening. Assignments may be given via these online tools with or without mention in class.
- If you miss class without receiving instructor approval beforehand, it will be your responsibility to catch up on the class material.
- Expect to average at least five hours on assignments outside of the class each week.