

University of Alaska Anchorage - School of Engineering

ENGR A151 - Introduction to Engineering - Spring 2012

My Process to Become a "World-Class" Engineering Student

by



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Introduction

Engineering, a field of unlimited possibilities, ranging everywhere from the medical field with biomechanical engineering, and bridges with civil engineering, all the way to the oil industry with petroleum engineering, engineering is what makes everything we do possible. The cars we drive, the buildings we work at, the technology we have grown accustomed to, all made possible by engineers. That is why I want to be an engineer, I want to make a difference with what I do, and have a job that I will enjoy and be proud of. More specifically, I want to be a mechanical engineer and get my degree at the University of Alaska Anchorage. Wanting to benefit the world was why I wanted to be an engineer, but the reason I chose mechanical over all the other types of engineering was because of my childhood. I grew up with my mom and stepdad, who was a mechanic. While my mom was at work, I'd be at home helping my stepdad work on cars. Over time I gained a knowledge of mechanics and became very interested in how vehicles worked and always dreamed about being able to design something as complex as a motor. As soon as I graduated high school I got an internship through the Alaska Native Science and Engineering Program (ANSEP) at UAA working for British Petroleum, here I got an early start in my engineering career and got a look at some of the possible job opportunities that are out there for an engineer. Then I started college at UAA, which I chose because of the support and scholarships I received from ANSEP. One of the first engineering classes I was required to take was introduction to engineering, which turned out to be nothing what I expected. When I think engineering I think technical equations and problem solving; but this class was nothing technical, instead it used a book called "Studying Engineering, A Road Map to a Rewarding Career" by Raymond B. Landis [1], and taught me what a world-class engineering student is. A world-class engineering student is a student who is determined, confident, and has the tools for success mastered. It was during this class that I realized that if I wished to be successful in engineering, I was going to have to change the way I went about getting my degree, because the way I thought I was going to do it, by just going with the flow, became clear to me during the course as a bad way of getting my degree. There are certain steps and techniques that a world-class engineer uses that make it almost easy to get a degree in engineering; which is why I am writing this paper, to outline my process that I am going to take in order to become a world-class engineering student and graduate with a degree in mechanical engineering.

Setting Goals

The first thing I learned to do in my process is to set my goals. It is important for everyone, not just engineering students, to have a list of goals they wish to achieve both long and short term. One reason for this is because it gives you something to work towards; if you don't have a goal, it is hard to make the right choices along the way because you don't have an end result you are working towards. Also, it is good to have goals because the feeling of accomplishment when you finally achieve your set goal is great for self-esteem, which tends to lead to more productivity as you strive for that sense of achievement. The biggest goal I have set is to graduate in four years with my degree. Having this goal makes me work hard and stay focused, because when it comes to engineering, it is difficult to finish in only four years. A lot of engineers take five, sometimes even six years to graduate, but if I stick to my goal, I will be able to finish in four. One of my other goals is to get a job right out of college. By setting this goal, I am more persuaded to do internships, since doing so creates networks among the engineering firms in Anchorage. It will be easier to achieve my goal since there will be people who know how hard I work, and if I do a good job in the internships and impress my employers, they will want to hire me in the future. However, goals are useless if you don't stick to them. If you don't stick to your goals, even the smaller less significant ones, you will never get to where you want to be. This is because you will never get that feeling of accomplishment and will be less motivated to work towards the long term goals. There are other techniques that can be used to help stick to a goal though, such as my goal to graduate in four years, if I learn to be a world-class engineer, this particular goal will be rather easy to accomplish; but in order to do this, there are some things that I need to improve upon, all of which are within this paper. Each section is an aspect of myself that I need to improve if I wish to be a successful engineering student.

Procrastination

One of my biggest flaws that will affect how successful I am is my tendency to procrastinate. A perfect example of this is this paper. It was assigned in the first week of school, yet now, a few weeks until the end of the semester, is when I am starting to write it. For as long as I can remember, I have been a huge procrastinator, but until now I have been able to get away with it without any major consequences. Now that I am in college, procrastination has the ability

to cause me to not get my degree if I let it take over. There are many negative effects of procrastination, all of which are reasons that I need to fix this problem I have if I wish to succeed. The biggest effect is that it causes rushed work and sometimes assignments don't get turned in at all. This can greatly lower my grades and effect how well I can get a job in the future. Another repercussion is that it causes stress because I am so rushed. Stress has the ability to effect classes and social life, even if they don't have any relation to the assignment that I procrastinated on. In order to avoid this, I need to quit procrastination all together, not just reduce it. One of the biggest changes I'm going to make is that I am going to start assignments the day that they are assigned, not the day before they are due. This way, instead of doing it all at once, I will be able to space out the work load. Doing this will not only help me finish it on time, but it will also allow me to work on other things since I will be doing it bit by bit up until the day it is due. This will also give me time to review my work and ensure that I didn't make any mistakes. Another method I am going to try is to make and keep updated a detailed schedule (see 'Time management' section). By applying all this and reducing procrastination, I will be less stressed and will do better in my classes which will set me on my way to meeting my goals.

Making a road-map

My next step is to make a detailed road-map. A road map is a step by step plan of classes I want to take and which semester I want to take them in that outlines all the classes I need to graduate with a mechanical engineering degree. At first I didn't think I needed anything like this, I thought that it would be fairly easy to just make it through college one semester at a time. But after learning about the importance of having a map, I looked at a list of the classes I need to take, and realized how difficult it would be to just wing it, especially with all the prerequisites there are for a lot of the courses I am required to take. So I met with my adviser through ANSEP and put together a year by year schedule that I can follow that makes registering for classes each semester easy. (To see my road-map, see appendix A for a complete chart with all the classes I plan to take from here on until I graduate). Having a road map is very important for success because it is basically an instruction manual on how to graduate in the time I want to, four years. You wouldn't try to get somewhere you have never been before without the proper directions, so why try to navigate the complex college system without having a map to follow? Now that I have a schedule, I will be able to relax when it comes time to pick classes, since I already know

what I have to take. Plus, having a map can build confidence. This is because as you continue on through college, you can cross off classes from your road-map, so each semester, you can be reassured that you are on track to graduating as long as you stick to the chart. Also, it works the other way around too; if you get off track, it will be made obvious real quick by looking at your map that you have strayed off the path, and you will be able to work to get back on track before it is too late and you have fallen too far behind to be able to graduate in four years. Since graduating in four years is one of my goals, it is important that I stick to my map so I take the right amount of credits and the right classes each semester.

Avoid common mistakes students make

Now that I have the tools to set myself up to graduate on time, I need to gain the skills required to do well in my classes and get the best GPA I can. The first of these skills is that I must understand some of the common mistakes that students make in order to try and avoid them. The biggest mistake that engineering students make is to think that college is going to be just like high school, only with harder classes. The reason this is a mistake that most engineering students make is because students who tend to go into engineering usually did well in high school, and what a lot of students think is that since they did well in high school, they will automatically do well in college. The reason this is a false assumption is because college is simply nothing like high school. One of the biggest differences is that the professors do not babysit you like high school teachers do. In high school, teachers remind you of deadlines, and talk to you if you begin to fall behind. In college, professors may remind the class of deadlines, but other than that, it is up to the students themselves to keep track of when things are due and to make sure they keep up. Another mistake a lot of students make is that they think that their study habits and methods of doing homework in high school will be just as effective in college as it was in high school. College life is something that needs to be adjusted to, some students don't realize this and end up doing bad their first semester, maybe even their first year, which can have the ability to affect your GPA for the rest of your college career. I was lucky, my senior year, I did a program called the early honors program at Alaska Pacific University (APU), which is where I went to APU for my senior year of high school and got college credit as well as high school credit. By doing this program, I got a taste of what college was going to be like before I officially entered college. In my first semester, I assumed it would be just like high school, and

ended up getting a D in two of my classes. However, the next semester, I realized I had to work harder and change my methods, and ended up getting A's and B's in all my classes. I was lucky, my D's didn't transfer to UAA, so they didn't affect my GPA. Other students who make this mistake are not as lucky. As long as I continue to avoid the common mistakes, I will be free to continue through my process without problems.

Networking

The next way to help me do well is to understand the importance of networking. Networking means to talk to professors outside of class, introduce yourself to possible employers, form study groups (see "Study habits" section) etc. Networking is important because it builds connections that will benefit you down the line. For example, talking to professors outside of class lets them know that you are interested in learning. This is good for them to know because now, if you need extra help, that professor will be more willing to take their time to explain things to you if they know you are devoted to the class. Also, sometimes professors can provide a job during your years at college, such as research assistances and student aids. Being involved with research is a good way to build connections and to apply things that you have learned in order to solidify the knowledge. Aids get the chance to be involved in the class after having already taken it, which is another good way to ensure you know the information well. This particular aspect of networking is something that I really need to work on; I am really shy and don't like to approach professors outside of the classroom. By being this way, I am missing out on many opportunities and connections that will help me out later in my career. Regrettably, there are not very many ways to improve upon this issue, so in order to try and get over my shyness, I am planning on taking a public speaking class (see appendix A). The other aspect of networking, introducing yourself to possible employers, is equally important. By doing so, it is a way of getting your name out there. Besides doing internships, this is the best way for me to achieve my goal of getting a job right out of college. The most effective way to do this is to attend the career fairs that UAA puts on. During these fairs, people who work at various different places come and talk about what they do and hand out fliers that inform you about possible job opportunities. This is something that, with thanks to ANSEP, I already do. Every Friday, I have to go to a meeting at the ANSEP building where students present their internship experiences and employers come in and talk about internships that their company has to offer. Going to these

meetings has caused me to meet many people who are in charge of hiring at companies like BP and ConocoPhillips. Networking is a necessary thing for all students in every field of study to master and is another thing that I need to improve upon to become a world-class engineering student.

Effective learning

Effective learning is yet another thing that I must put in to place in order to be successful. Effective learning means to learn information in a way that it not only sticks, but to where you also understand the concepts. This is necessary in engineering because of prerequisites; in order to do well in classes, you have to understand the information that was taught in all the prerequisite classes. Effective learning begins on the first day of class with the syllabus. It is important to understand the pace of the class and all the projects that will be due, all of this can be learned from the syllabus. Also, the professors contact information will be on there, which is good to have for networking (see “Networking” section). The next thing to do is to read over class notes before class. Here at UAA, most professors post notes on Blackboard, a web site where you log in and it has all of your classes; professors can then post deadlines and vital information for the course. If you look over the notes before class, even if you don’t understand them, you will get an idea of the information and be able to come to class with questions. Then, during class, most of your questions will most likely be answered, but any that are left unanswered can still be asked. After class, it is then good to review the notes one more time, as well as looking over your own notes from class to make sure that you understand the information. Another method of effective learning is to begin homework the day it is assigned (see “Procrastination” section). By doing this, you are able to find out if you really understand the concepts; then, you can see if you are having any problems. By starting early, you are able to ask the professor for help, if necessary, before it is due. Understanding information is important for engineers, since we have to apply concepts in order to do our job effectively; this is why I need to be a more effective learner. Currently, the only method I use is to look over the syllabus, I rarely read material before class. Once I get to harder classes, this is going to hurt me if I don’t use some of these methods of effective learning, which is why effective learning is in my process to becoming a world-class engineer.

Priority management

Figure 1:

<p>I Urgent and Important</p> <ul style="list-style-type: none"> -start the final project for engineering 151 -study for calculus final -engineering 161 Project -join ASME 	<p>II Not Urgent, Important</p> <ul style="list-style-type: none"> -call my mom every now and again -hang out with friends a bit -shower -eat
<p>III Urgent, Not Important</p> <ul style="list-style-type: none"> -go buy toilet paper -go get gas -lose weight -clean my room 	<p>IV Not Urgent, Not Important</p> <ul style="list-style-type: none"> -relaxation -learn to play guitar -watch TV -listen to music -play video games

Above is the urgent versus important matrix (figure 1), which illustrates the idea of priority management. What this matrix does is it organizes activities based on two criteria: urgency and importance. Urgent activities are ones that must be done now, and important activities are ones that need to be done, but don't have to be done right at that instant. The quadrant that it is best to stay in is the second, the not urgent but important section. When activities are in this area, it means that although it is important to do them, they do not need to be done right away. When managing your priorities, you have to decide what is actually important, and sometimes give up certain activities that reduce productivity. For example, I have activities like watching TV and playing video games in the fourth quadrant, these things, although important to do in small doses, are bad when you are trying to study or get work done. This quadrant and the third quadrant are your free time sections; activities that go in the not urgent and not important area and the urgent but not important area should be relaxing and/or necessary, and should be done only after more important tasks are completed. But the worst quadrant to be in, the one that should be avoided, is the first quadrant, the urgent and important one. This quadrant is the procrastination quadrant. For an activity to be both urgent and important, it would have had to be put off to the point to where it became urgent. An example of this is studying for my calculus final. Studying is something that should not be put off until the last second (see "Studying habits" section), but since I did, it made studying for my final not only important, but urgent since the final is coming up. In order to be able to be considered a world-class engineering

student, I need to learn to keep assignments and studying in the second quadrant, because to be in the second quadrant means that I am not procrastinating. As long as I manage my priorities and follow the rest of my process, I will be on my way to achieving my goals.

Time management

A very important aspect of a world-class engineer is the ability to manage your time. With college life being so hectic and crammed, it is necessary to have a detailed schedule to follow. Everything, even free time, should be scheduled in order to maximize every day. The benefits of effective time management range from doing better in classes, all the way to freeing up your day. One of the best benefits though is that it helps to relieve stress. When everything is concisely planned out, it is easier to space things out properly so that you don't feel rushed. Plus, when making a schedule and adding in free time, it is possible to see just how much time you have that can be used for relaxing and watching TV while still accomplishing everything that you need to do. This is important because if you spend too much time relaxing and don't have a schedule, it is possible to end up not having time to do the things that are actually important like studying and doing assignments. Also, with a schedule, it is easy to tell what needs to be changed. For example, if you are doing bad in a class and feel you should be spending more time studying for that course, and you have a schedule, all you have to do is extend study time for that class by just slightly reducing everything else on the schedule. This is something that I rarely do, most of the time, all my study time and free time is determined on how motivated to work I am on that particular day. This is a bad way to operate because it causes me to procrastinate way too much. Starting this next semester I am going to make sure that I plan everything out in order to reduce procrastination and maximize efficiency.

Study habits

The last area that I need to improve upon is my study habits. Having effective study habits is crucial for success since tests and quizzes are a major part of your grade in college classes. Plus it is important to have good study habits because when you study efficiently, it saves time and helps let the information sink in. Probably the best way to study effectively is to form a study group. Studying in a group increases motivation, since when you are around people who are actively working, it is easier to work yourself. Plus, when it comes to subjects that you

don't like, you can add people to your group that do like that particular subject and can help you. It is also important to schedule study time (see "Time management" section), that way you get in to habit of going to study sessions every day, so that eventually it will become second nature to study. It is also important when studying to use appropriate techniques to make sure that your time is not wasted. For example, how long you study is not as important as how often you study. When you study for lengthy periods of time without breaks, it becomes harder to actually retain the information. A good way to avoid this is to take breaks every now and again. During these breaks, it is good to discuss problems the group is having, or to just talk in general to give your mind time to process everything. Also, what you study is very important, most people, including myself, just do example problems and call it good; but doing this only prepares you for problems that closely resemble the ones you work out. It is best when studying to try and understand the concepts, not just the problems. By doing this, it becomes easy to apply this knowledge to different problems. Understanding concepts is especially important to engineering students because that essentially is what an engineer does: applies knowledge and skills to real life problems. At the moment, I attend recitation every Sunday through ANSEP, which is a study time for all of the technical classes that Science, Technology, Engineering, and Mathematics majors take. Although I study every Sunday, I only do homework; I don't worry about the concepts. If I can make these changes, along with all the other techniques of a world-class engineer, I will be successful and reach my goals.

Summary

Overall, by taking this course, I learned what it takes to be a successful college student; not only this, but I developed a process to becoming what is known as a world-class engineering student. Devotion to my goals is the first requirement that I came to realize that is necessary for a successful college experience; as long as I stick to my goals, I will be on the right path. However, just being on the right path is not the only thing needed to do well in getting a degree; I learned that I must also travel the path effectively and without getting lost along the way. To do this, I must learn to reduce procrastination as much as possible, because procrastination leads to a rough part of the path that makes getting to my goals harder and more stressful. Having a map to follow is equally as important though; this is why I developed a road map to success (see appendix A), which descriptively lays out my four year plan of classes I need to take to graduate.

With this a part of my process, it will be easy for me to both stay on track, and make it apparent to me every time I start to veer off the path to success. These first couple steps in my process set me on the right track, but the rest of my process details how I am going to make the most out of college and ensure that I do well. In preparation for my future, networking is an essential part of my process. Talking to my professors and meeting important people who work at companies I am interested in someday working at is important because it gets my name out there and shows that I am committed to my goals. But just as important is that I avoid making common mistakes that students make. No one is perfect, but an aspect of a world-class engineer is that I learn to watch out for the flaws in my thinking that might lead to a mistake that could possibly lower my GPA, which in turn reduces how well my resume looks to an employer. The last four steps in my process describe the techniques I plan to employ that will help me get the most out of my classes and to retain the knowledge I gain in each course. Knowing how to learn effectively is very important; if I am able to master this, I will never fall behind. Since falling behind can be devastating, especially in engineering classes with how technical and sequential they are, it is necessary to understand the skills of effective learning. On top of this, priority and time management are needed to make sure that my days are planned out. As long as I have a detailed schedule and have my priorities straight, it will be easy to be successful in my classes. Lastly, proper study habits are crucial in order to truly understand the information taught in my courses well enough to be able to apply them. Now currently, I am far from being a world-class engineer, and although I am currently using some aspects of my process, there are still many I need to work on. With each step in my process relying on the others, without all of them, the process would be broken. To be successful, I must follow each step closely and apply every method detailed within this paper. If I am to do this, and continue to do this throughout all my years in college, I will graduate not just with my degree, but as a world-class engineer.

Appendix A

Year	2012, Fall(current semester)	Credits	Year	2013, Spring	Credits
	Engineering 151	1		English A111	3
	Engineering 161	3		Engineering 105 A,B, and C	3
	Economics 201	3		Physics 211	3
	Chemistry I	3		Chemistry II	3
	Calculus III	4		ODE	3
				Dance Appreciation	3
				Chemistry I lab	1
	Total Credits	14		Total Credits	19

Year	2013, Fall	Credits	Year	2014, Spring	Credits
	Physics I lab	1		Statics	3
	Technical writing	3		Basic Thermodynamics	3
	Linear Algebra	3		Elements of Electrical Engineering	3
	Data Analysis	3		Humanities GER	3
	Solid Works	3		Humanities GER	3
	Chemistry II Lab	1			
	Communications A111	3			
	Total Credits	17		Total Credits	15

Year	2014, Fall	Credits	Year	2015, Spring	Credits
	Dynamics	3		Mechanical Design	3
	Mechanics of Materials	3		Dynamics of Systems	3
	Fluid Mechanics	3		Instrumentation	3
	Fluid Lab	1		Thermodynamics	3
	Elements of Electricity	3		Material Science	4
	Total Credits	13		Total Credits	17

Year	2015, Fall	Credits	Year	2016, Spring	Credits
	Advanced Engineering Elective	3		Senior Projects	3
	Advanced Engineering Elective	3		Economic Analysis	3
	Heat and Mas Transfer	3		Advanced Engineering Elective	3
	Heat and Mass Lab	1		Advanced Engineering Elective	3
	Thermal System	3			
	Thermal Lab	1			
	Total Credits	14		Total Credits	12

References

- [1] Landis, Raymond B., "Studying Engineering: A Road Map to a Rewarding Career", 3rd Edition, Discovery Press, Los Angeles, California, 2007