Chapter 0: How to use this textbook

This isn't your traditional, static, boring engineering textbook. Unless you have had experience with interactive e-books in the past, the process of "reading" this book is going to feel very unfamiliar. In addition to reading you will be: journaling your thoughts, discussing concepts with your peers, practicing problems, watching videos, and more.

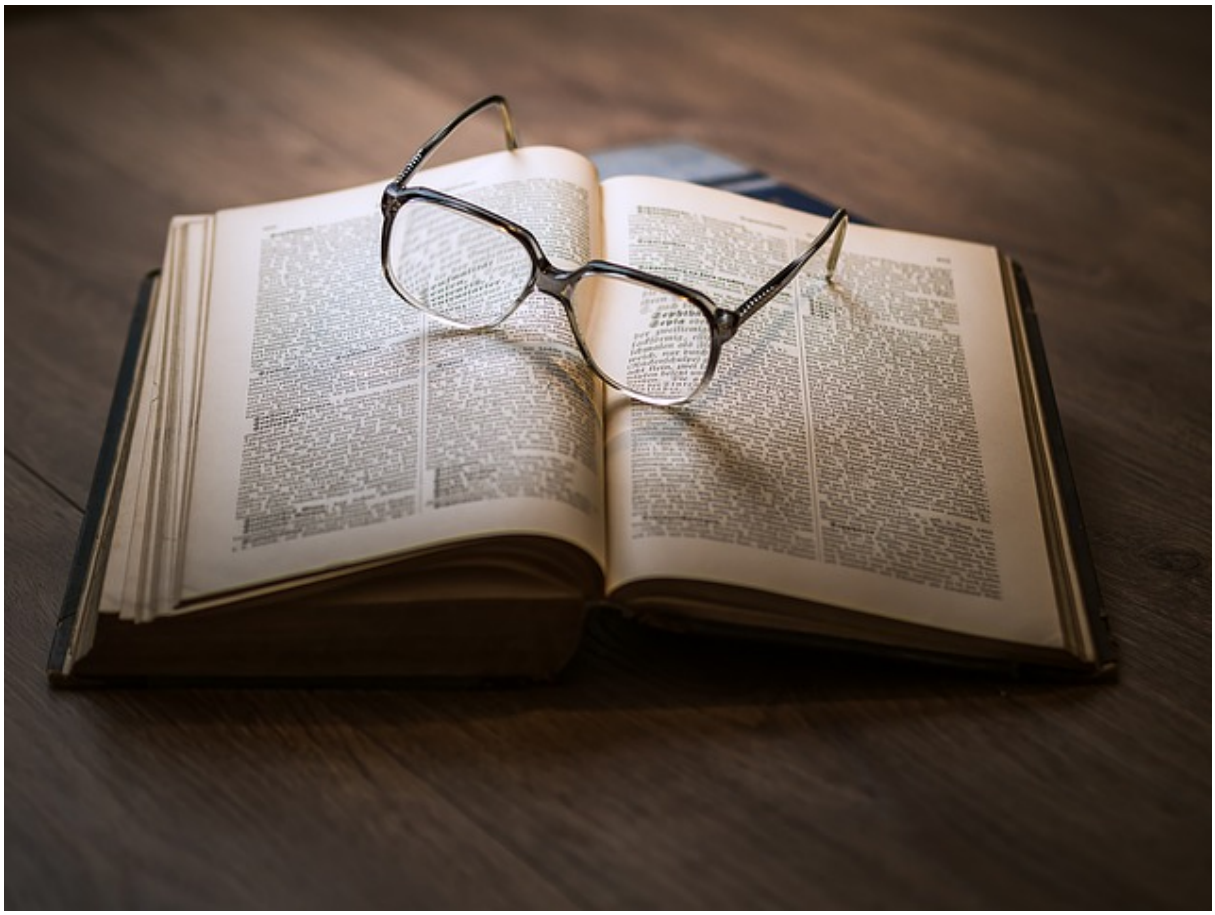

Figure 1: Begone boring textbooks of old!

To make sure we are all on the same page, I have included a descriptions of the interactive components of this textbook, how they will be graded, and who will have access to what information. I would also like to introduce you to the analogy that we will be using in this book.

Welcome to the Gym for Your Mind!

In my opinion, learning is very similar to working out. I think this is such a perfect analogy that it is used throughout this book. Let's look at the similarities between learning and working out.

Lets say that you are physically weak and are unable to lift heavy objects. You dream of one day being able to deadlift 500 lbs (I have no idea if that is a lot but it sounds like a lot so lets go with it). What do you need to do to get better at deadlifting? You need to workout a lot. You are going to have to put serious time and effort into getting stronger. Furthermore, you will not be able to expect miracles without putting in the time. You can't just go to a gym, stand around, watch other people workout, and then after 15 weeks expect to be able to deadlift 500 lbs! You need to get your hands dirty, pick up the weights, start small, and build your way up.

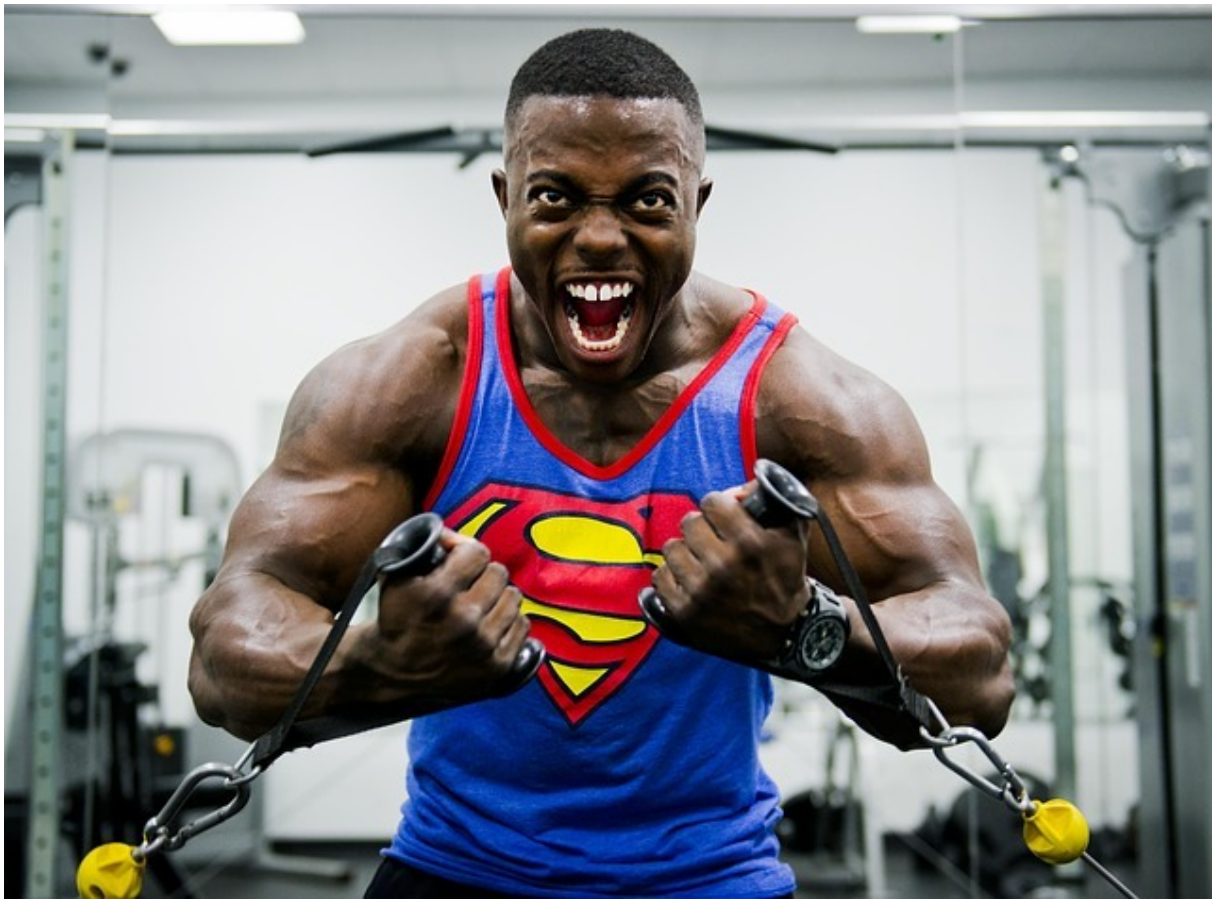

Figure 2: You will be doing this, except with your brain!

Most people intuitively know this **but** If I told you that someone wanted to deadlift 500 lbs but that they went to a gym for 15 weeks but didn't really workout that hard, they kinda did the minimum, skimped on the workouts their personal trainer gave them, and then tried to max 500 lbs on the last day, how do you think that person would perform? Of course they would fail!

Similarly, if I told you a story about someone that *also* wanted to deadlift 500 lbs **but** they went to the gym for 15 weeks, worked out really hard, did everything the trainer suggested and more, and they tried to max 500 lbs on their last day, how do you think this person would perform? They would likely succeed.

In my opinion, learning works the exact same way. You could try and learn all of the material you learn at a University on your own. You likely have access to a public library that contains all of the information you will learn in college except it is free! The reason you pay for a University

education is that you get a personalized workout experience. Your professors act as personal trainers that give you tasks to accomplish that will build your mental muscles that are right for your chosen career.

Engineering is one of the most difficult workout routines, you can think of it as training for an ironman triathlon. You are going to be building mental muscles you never even knew that you had. You need to workout your math, problem solving, physics, chemistry, programming, and more mental muscles. It isn't easy but it is rewarding.

As I mentioned before, this analogy will pop up throughout the book. Sometimes I will give you a task to complete that isn't graded or checked. Sometimes I will prompt you "not to skip your brain workout". In the end it is up to you though. I encourage you to take this analogy to heart and think about your goals. If you want to get good grades (deadlift 500 lbs at the end of the semester) and succeed as an engineer you are going to have to roll up your sleeves and practice and fail and practice and fail and practice and...succeed! (In this context I mean fail as in "not get it right away" and that is ok!)

Take a minute to think about the workout analogy in the context of your learning and answer the discussion post below.

> **Discussion 0.1: What is your goal?**
>
> This is a completely anonymous submission. The professor will be able to see the responses but the responses will not be attributed to an author. Your participation is required.
> What is your goal this semester? What do you want to learn? Do you agree that this the workout is a good analogy for learning?

A Note on Your Brain

Remember that just like our bodies, everyone has a different brain at different levels of strength. Some of you will already have pretty good development on some of the brain muscles we will be working on. Others will be much weaker. That is OK! Learning is as individual as it gets in this world and the only person's learning you need to worry about is your own. Do not get discouraged if you *think* that someone else gets it before you. Do whatever it takes for **you** to succeed, even if that means that you need to work harder than some of your classmates. I believe in you!

Learning Goals

Each chapter will begin with a picture *(for fun)*, a short introductory paragraph, and then some learning goals. They will always look like this:

LEARNING GOALS

This chapter will concentrate on learning idea X. That includes learning the following:

- Something cool
- Some other fun thing

You can use these learning goals as a "study guide" and will let you know when you have achieved mastery of a subject. If you look through a chapter's learning goals and **can be absolutely certain** that you have mastered everyone of the bullet points, then you have mastered the material in that chapter. It is a good idea to refer to these learning goals frequently throughout the semester, even for chapters that have already been completed to ensure that you are up to speed with the course.

How to Learn Software

In this book you will be learning how to use two software packages, Excel and MATLAB. As such it is necessary to give you a little information *on how I expect you to approach learning this material*.

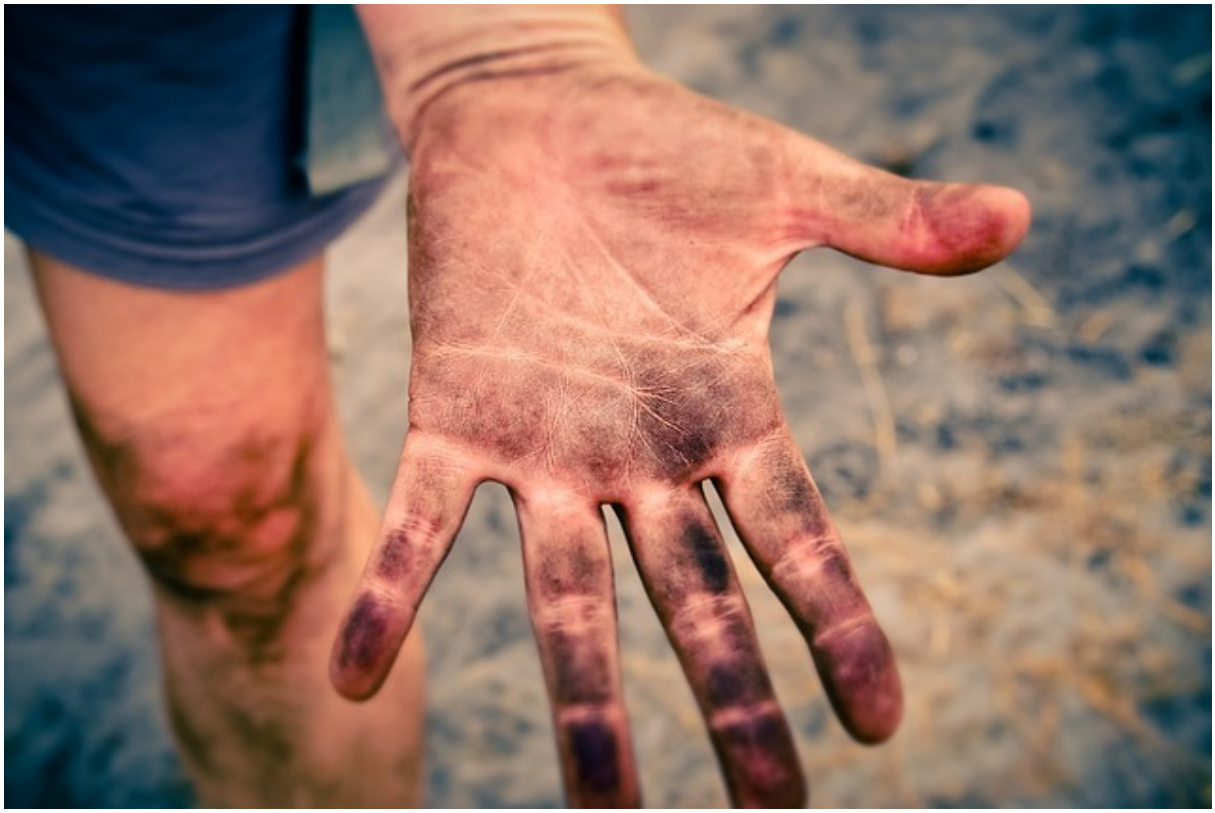

Figure 3: Roll up those sleeves and get your hands dirty!

The key to learning how to use software is to roll up your sleeves and get your hands proverbially dirty. What I am trying to say is that just *reading* about Excel (or any software package really) is insufficient to learning Excel. What you really need to do is open up Microsoft Excel, and follow along with the material as you are learning it. For example, if you are reading about how to enter data into cells in Excel, you need to take a minute to practice that (again you should be able to see the connection to the workout analogy). In my opinion, the best way to learn the material on Excel and MATLAB is to have the book opened up in your web browser of choice, and also have the software package of interest opened up beside it. That way you can read and practice simultaneously.

Make sure that when you are reading, that you are also practicing simultaneously! The book is designed to take this into consideration and will often present you with links for further reading, or suggestions for problems to practice on your own. Do not skip these!

End of Chapter Items

This book is designed to be fun and conversational. After all, a personal trainer does not speak formally to her clients so why should your trainer (this book) have to speak formally to you? However, as this book is in it's first rendition, I would appreciate any feedback that you have on the chapters. At the end of every chapter will be two discussion posts that will be completely anonymous:

1. Personal reflection
2. Request for feedback

Personal Reflections

The personal reflection is your opportunity to vent and let the professor know about the triumphs or frustrations that you are having *while learning*. Maybe something you tried really worked and helped enhance your learning experience. We would love to hear what that is! Maybe you found that a habit that you had formed was impacting your learning. We would also like to hear about that. Really, anything that you want to write or let your professor know would be appropriate in a personal reflection.

> **Personal Reflection - Chapter 0**
>
> This is a completely anonymous submission. The professor will be able to see the responses but the responses will not be attributed to an author. Your participation is required.
>
> We haven't really learned anything yet but now is a good opportunity to practice reflecting. Look back on your previous life (most of you are from high school but some of you undoubtedly will have been working, in the military, etc). What parts of your previous life will help you with being an engineering student?

Requests for Feedback

A request for feedback is your opportunity to let the author (me) know what you thought about the chapter.

Did you like the way it was written? Did you appreciate a little bit of levity that was sprinkled in? Did you find the exercises fun? *(Notice how most of these are nice things? That is because people usually only bother to give feedback when they HATE something, it is also good for authors to know when things are working so don't forget to say something nice!)*

In any case, please take a few minutes at the end of each chapter to think about how the material was presented, what worked, and what didn't.

> **Request for Feedback - Chapter 0**
>
> This is a completely anonymous submission. The professor will be able to see the responses but the responses will not be attributed to an author. Your participation is required.
>
> This chapter is pretty short and we haven't really learned any new material yet, but it does give you a feel for what the rest of the book is going to be like. Do you appreciate the tone of the author? Do you think this is going to be a fun course? Are you excited to read the book based off this chapter? Any feedback is appreciated.

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