

How to Succeed in Engineering School

(You can ace any and every engineering course by following these steps)

Life of an engineer in school: Earning straight A's in engineering typically requires 50 to 60 hours of study outside of class each week. Expect to work mornings, evenings, and sometimes through the night, often juggling multiple classes with overlapping assignments and projects. There isn't time to complete every example problem, so you must be strategic and disciplined in how you manage your time. This guide offers proven techniques that have consistently led to academic excellence. Use as much or as little of these strategies as fits your learning style. Above all, find what works best for you. Most important of all, keep in mind that you must ask for divine guidance through all steps in this process.

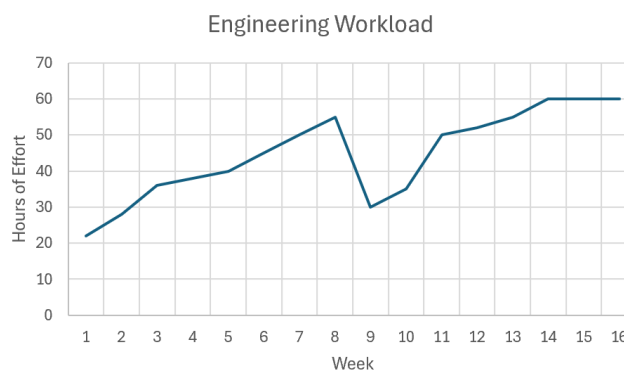
This guide has three parts: **(1) Schedule** your time, **(2) Think** like an engineer, and **(3) Study** like an engineer.

Part 1: Schedule Like an Engineer

Studying is like building muscles. You need to train to be an Olympic student. Your schedule is where that training plan lives. Build it before the semester starts, then track it every week.

Understand the semester workload

Be aware of the typical study workload for a full-time engineering student. The average number of study hours required outside of class is substantial and should be planned for in advance to ensure academic success. Here is an example of the average workload (study hours outside of class) per week for a full-time engineering student.



Effort climbs to a peak before midterms (week 8), drops at spring break (week 9), then rises to its highest at finals. Plan your schedule for the peaks, not the average.

Build up your credit load

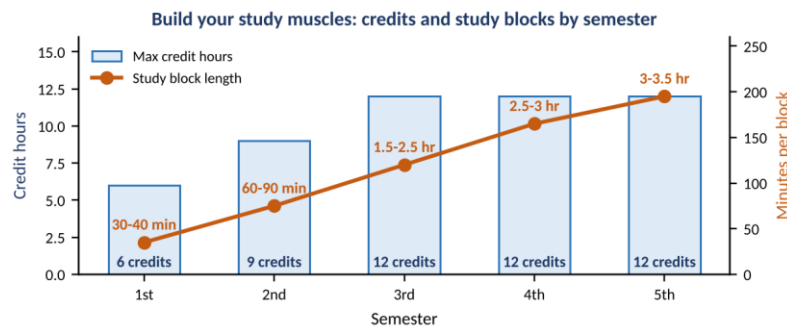
1. **Starting students:** 1st semester = 6 credit hrs max; 2nd semester = 9 credit hrs max; 3rd semester = 12 credit hrs max. Stay at 12 credit hrs. Many students have tried to take more courses to speed up their degree and ended up failing their courses.

2. **Build up your study muscles to handle science courses:** 1st semester = 1 science course and 1 math course; 2nd semester = 1 science course and 1 math course; 3rd semester = 2 science courses.
3. **Take classes in the right order.** Take Calculus I and II before taking Physics for Scientists and Engineers. Calculus will give you the knowledge to understand the physics equations.
4. **Skip the intro courses.** Don't take intro to physics or intro to chemistry courses. They eat up credits. The physics and chemistry for scientists and engineers courses cover the basics you need.

Build up your study blocks

When you first start, you may only manage 30 minutes before needing a 5 to 10 minute break. You build up from 30 minutes to 12 hours over time. It took me about eleven semesters of school to finally figure it out. Block your study time as follows:

- **1st semester:** 30 to 40 min study, then break/chores 30 min, then 30 min study
- **2nd semester:** 60 to 90 min study, then break/chores 30 min, then 90 min study
- **3rd semester:** 1.5 to 2.5 hr study, then break/chores 30 min, then 90 min study
- **4th semester:** 2.5 to 3 hr study, then break or switch study subject
- **5th semester:** 3 to 3.5 hr study, then break or switch study subject



Fill out your Master Schedule (weekly schedule)

1. **Plan:** Review your school plan and sign up for classes for the next semester. Use RateMyProfessor.com to select the best teacher for each class.
2. **Education:** In the education section of the Master Schedule, enter each class title, time, location, credit hours, and how many study hours per week each class requires (see the StudyHrsHelp doc).
3. **Schedule:** Fill out every activity you will do every hour of every day. Enter tracking keywords so the total hours of each activity are calculated.
4. **Review:** Check the hours over or (short) in each section. If there are shortages, adjust your schedule.

Scheduling rules

- Take Sundays off.
- Eat lunch every day, at the same time every day.
- Include driving time and enough time between classes to make it to your next class.

- Whenever possible, work one day and go to school the next. NEVER go to school, then work, then back to school (or work, school, work). It takes about an hour to switch from work to school, and that is an hour you lose from studying or working.
- Be realistic. A first-year student who plans to study from 7 a.m. to 9 p.m. every Saturday and Sunday afternoon will not keep that schedule. Build up to it.
- Make sure your study hours meet the requirement for every class, and that the hours on your schedule match your budget.
- Plan ahead: have a job lined up between semesters and know your next step (next program, master's, or where you will be employed).

Track your time every week

1. **Weekly tracker:** List each course, the required weekly hours, actual hours, and current grade. List the week's tasks with priority, budgeted time, and due date, and mark the day you will do each one. An app (TickTick, Todoist, or similar) works too.
2. **Monthly calendar:** Enter every assignment, quiz, and exam deadline (Google Calendar works).
3. **Time sheet:** Log the hours you actually study for each course (aTimeLogger, Clockify, or similar). If your grade in a class is slipping, the time sheet usually shows why.

Part 2: Think Like an Engineer

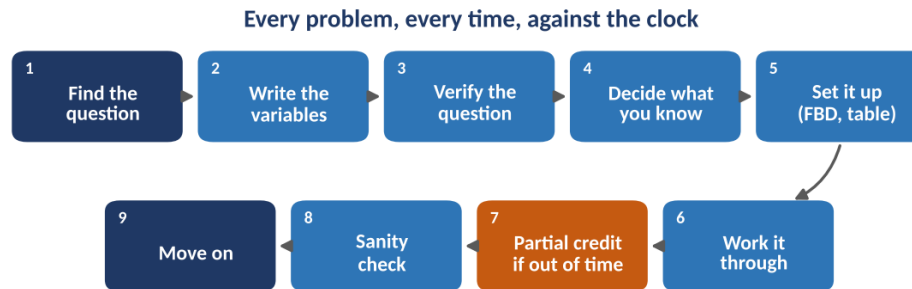
The key is not just memorizing solutions or concepts. Engineers are paid to solve problems under pressure, and every exam tests the same thing: under stress, given a problem, solve it in about two minutes or within deadline. That's what you're really being tested on: handling a stressful situation and staying focused.

Use this method on every lecture problem, homework problem, and exam problem until it feels normal.

Feel the clock

Picture it: you start the problem and realize you only have three minutes to solve it. Oh crap, what do I do now? Now you feel the adrenaline and the rush. You're concerned, the clock is in front of you, and you'd better solve that problem. That pressure is your motivation. Now it's time to go.

The method



- 1. Find the question first.** Go to the very end of the paragraph, where they say what to find ("find A," "the number of X," how many widgets should be bought). You won't have time to rewrite the whole question, so write one or two keywords and a question mark for everything they ask: "widgets?", "X?", "Y?"
- 2. Read the paragraph and write down the variables.** As you read, record every given value. If they say X is 500 units, write $X = 500$ units; $Y = 6$ units. Get through the whole story of the problem.
- 3. Verify the question again.** Go back to what they asked and double check that it is really what you're being asked. If it's still "X widgets?", you're good. Now everything you need is in front of you.
- 4. Decide what you know.** Given this information and these questions, which equations, concepts, and principles apply? For example, for a body falling through air, you know $F = ma$, and you know drag, skin friction, and other forces act on it.
- 5. Set it up with your discipline's method.** Draw the free-body diagram, flow diagram, table, or whatever method you were trained to use. Write down your assumptions (steady state, no friction, ideal gas) and the equations you need.
- 6. Work the method through to an answer.**
- 7. If time is almost gone, go for partial credit.** If you know you can solve it, finish it. If you can't, and there's partial credit, work your way through and come out with an answer. If you know steps one through four but not step five, estimate step five and still do the steps after it. That's how you pass.

8. **Sanity check and verify.** Every answer gets a 10-second check: Do the units work out? Is the sign right? Is the size reasonable (a car does not weigh 3 grams)? Do your assumptions still hold? If there's time, try solving it a second way and see if you reach the same solution. Sometimes you can't, but if you can, great.
9. **Move on.** Once the answer is verified, go to the next problem.

Part 3: Study Like an Engineer

Before the semester starts

1. Complete the School Success Packet and your Career Packet first.

- a. These packets will help you determine how many hours you need to study, when and where to study, and how to track your time and grades throughout the semester.
- b. They will also help you plan your course schedule and map out when to take required classes.

2. Commit to Success.

- a. Decide from the start that you will succeed, and follow through with consistent effort.

3. Get into the right classes with the right teachers.

- a. Some professors rarely give A's or fail a large percentage of students. Avoid these professors and don't take their class. Look up the professors on RateMyProfessor.com to get past student reviews on professors. Consider enrolling in extra classes and dropping the ones with the least favorable professors.
- b. Some professors don't teach. For these types of professors, you may find that most of your learning will be done from the book, online videos, online docs, TA hours, office hours, past students, etc. It is still possible to succeed even with a poor professor.

4. School is a Game: Learn to Play It Well.

- a. Approach school like a game: you are dealt a set of cards and must play by the professor's rules to succeed. If a professor requires a specific format for assignments, follow it exactly. Keep in mind that the game is not always fair. For example, in curved classes, for you to win, everyone else must lose. The students at the top of the curve get the A regardless. The rest fail. To succeed, apply and live the principles of the gospel of Jesus Christ, even in challenging and competitive environments.

5. Understand the syllabus and put important dates in your calendar.

- a. Familiarize yourself with each course syllabus and disclosure document. Add all key dates (lessons, quizzes, exams, and deadlines) to your calendar. Many professors maintain an online calendar; check it two to three times per week to stay current.

6. Check the course prerequisites.

- a. Before the semester begins, review the prerequisite material for each class. This may include redoing old exams, revisiting lecture notes, or refreshing your understanding of key

concepts. Every course builds on previous knowledge, and this review will help you start strong.

7. **Glance over the textbook or online equivalent (beginning of semester).**

- a. At first, much of the textbook may not make sense. This is normal for undergraduate engineering students. Read through the introduction and table of contents to become familiar with the structure and key sections of the book, so you know where to find relevant material when needed. If your course uses online materials, take time to explore the platform thoroughly. Know where to access lessons, supporting documents, homework, and any other essential resources.

Class Attendance and Seating

1. **Never Miss Class.**

- a. **Attend Every Class:** Consistent attendance is essential. Be present for the entire lecture. Every minute matters.
- b. **Be on Time:** Arrive at least 10 minutes early to secure a good seat and to be prepared. Some professors may allow time for quick questions before class, though many use this time to set up.

2. **Strategic Seating.**

- a. **Sit Front and Center:** Always sit in the front row, center (the “red zone”). This position offers the best view, keeps you engaged, and helps professors remember you, an advantage when seeking scholarships or recommendations.



- b. **Maximize Every Minute:** Arrive early and stay for the entire class. Even missing the first few minutes can mean losing valuable information or context critical to your success.

Before Lecture

1. I highly recommend using OneNote for all your notes because it organizes all lectures, homework, exams, and notes in a searchable manner. Paper and pencil are still ok.
2. Understand the type of Professor you have (each professor has different strategies for teaching the material).
 - a. **The closed Professor:** This teacher assigns the class reading assignments in book A, and teaches out of book B. They do this to force the students to come to class because they won't find the material in their book, regardless of whether they have read the section before class.
 - b. **The open Professor:** This teacher provides access to all the material you will learn in the course. Most of their examples in class come from the examples in the book, word for word.

3. If you can read the entire chapter and do the book problems before class, then do it. (Typically, engineering students don't have that kind of time.) Otherwise, look at the chapter to see what might be covered in class that day. See what is confusing, then pay extra attention in class to better understand it. This step should not take more than 15 min before a class. Some students find it helpful to find YouTube lectures or videos on the topic and watch them at 1.5 to 2 times the speed.

During Lecture

1. Actively engage yourself in the lesson, stay awake, and listen for the answers to questions that came up while previewing the chapter. Don't be afraid to ask clarifying questions on the concepts you didn't fully understand or may have missed.
2. Do the lecture problems with the teacher. Write down everything that is written on the board and solve the problem with the teacher in class, using the Part 2 method.
 - a. Some teachers teach by "notes with gaps."
 - b. If your teacher teaches with slides (or notes with gaps), print them out. Those slides should be where you take your notes. Bring a notebook to write extra notes as needed.

Reading/Studying/Homework

When doing homework, some students read the entire chapter in the textbook over and over again. They do practice problems and still don't understand the material. Welcome to engineering. This scenario is not uncommon. The secret is to master one concept at a time instead of slogging through a pile of information.

Step-by-Step Homework Strategy

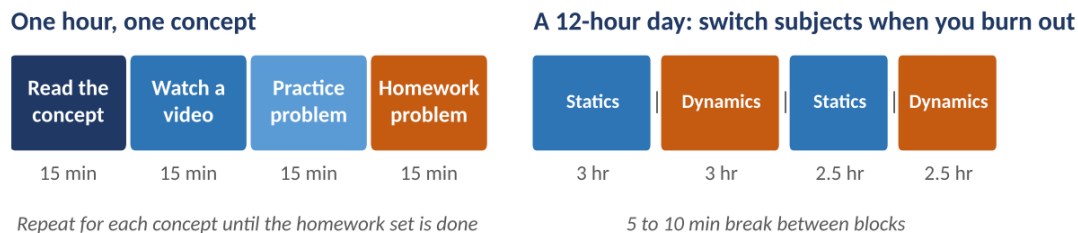
1. **Start with the Chapter Summary:** Before anything else, glance at the chapter summary to identify the key vocabulary and equations. If the chapter covers 10 concepts in 10 sections, you now know: I need to understand these ten concepts.
2. **Go Straight to the First Homework Problem:** Recognize that completing homework is the only thing standing between you and your free time. Use this as motivation.
3. **Study with Purpose:**
 - a. Look closely at the first homework problem.
 - b. Read only the textbook section that directly relates to solving that problem. If time permits, work through the example problems that only relate to that problem. Mark up your textbook and take notes directly on the relevant pages.
4. **Review Lecture Notes:** Focus on problems and examples from your lecture notes that help you solve that specific homework problem.
5. **Optional:** Watch a YouTube video or other online resources if you need additional explanations.
6. **Attempt the Homework Problem:** Solve it with the Part 2 method, and never have the answer in front of you. Always get your own answer first. If you're stuck for more than 30 minutes, get help through prayer, online tutorials, TAs, or office hours.

7. **Repeat for Each Problem:** Apply this focused approach to every homework problem until you finish the entire set.
8. **Check and Correct:** Always complete and submit your homework on time. If you get a problem wrong, figure out why, correct it, mark it, and redo it the next day without the solution in front of you.

Tips: Focus on completing homework problems based on material already covered in class. Staying caught up with lectures will make the homework process faster, easier, and less overwhelming. Complete your homework as soon as possible while the material is still fresh in your mind.

How to Study 12 Hours a Day

You stay fully aware, engaged, and motivated because you're doing one thing, not 100 concepts at once. Here is what an hour and a full day look like:



If your attention span is short, this works great: you only ever focus on one thing for a short burst, and your ability to focus extends a long time. When you burn out (say you've worked statics for two to three hours and you're sick of it), take a 5 or 10 minute break, or switch subjects: statics for 2 to 3 hours, then dynamics for 2 to 3 hours, then back again. Pick your main topics, break them into specific time windows, and pace them out in small increments.

Note taking and reading: Use the PQ4R Method

The PQ4R method is a study technique that can help students improve their comprehension and retention of information while reading. It stands for Preview, Question, Read, Reflect, and Review.

1. **Preview:** Quickly skim through the material, looking at headings, subheadings, and any visual aids, such as charts or graphs. This gives you an overview of what the material is about.
2. **Question:** Generate questions about what you are going to read. This focuses your attention and gives you a purpose for reading.
3. **Read:** Read the material actively, taking notes and looking for answers to your questions. Understanding the material is more important than simply memorizing it.
4. **Reflect:** After reading a section, reflect on what you've read for a few moments. This helps you identify what you do and don't understand, and reinforces your memory.
5. **Review:** Review the material periodically to reinforce your memory and help you remember the key concepts.

Daily Review: Keep Every Chapter Fresh

Most students forget the first chapters by exam time. A few minutes a day prevents it.

1. **Write a one to two page summary sheet for each chapter** as you finish it: key equations, vocabulary, step-by-step methods, and one solved example. These sheets become your master summary for the final.
2. **Read all of your summary sheets every day.** It takes only a few minutes and keeps old material from slipping.
3. **End each day with a few mixed problems** from past chapters (cumulative review).
4. **Keep a missed-problem list.** Redo every missed problem the next day, without the solution, until you get it right on your own.

Exams: Preparation and Test-Taking Strategies

Before the Exam: How to Prepare

1. **Learn the Rules of the Exam:** What materials will you have? Can you use a calculator, and which one? Do you get an equation sheet or reference materials? The rules decide how you practice. If they give you an equation sheet, get good at using it. If not, get good at working without it. Simulate the exact environment of the real exam.
2. **Start with Your Lecture Notes:** Read through all your lecture notes and redo every example problem with a timer (use a wristwatch). Aim to solve each problem within the typical exam time (5 to 10 minutes) on your own.
3. **Redo Homework Problems:** Go back through every homework problem using the same timed approach. Ensure you can solve each problem independently and within the time limit. Spend extra time on your missed-problem list.
4. **Take Practice Exams:** Take practice exams exactly as if they were the real one. Go into a quiet room, lock the door, set the timer, and go. If you get stuck, circle the problem and don't go back until you've answered every other question. When the timer runs out, stop. Grade it the way the real grader would. To earn an A, aim for 90% or higher on practice exams. Your practice score is usually close to what you'll score on the real exam.
5. **Use All Available Practice Materials:** Complete any practice exams provided by your professor or shared by past students. These are valuable for understanding the exam style and common problem types.
6. **Clarify Unclear Concepts:** Write down anything you don't understand and ask your professor or teaching assistants for clarification well before the exam.
7. **Create a Master Summary:** Combine your chapter summary sheets into one master summary with key equations, vocabulary, step-by-step problem-solving methods, and sample solved problems with detailed explanations. This master summary is essential for quick review and for preparing for the final exam.

8. **Final 7 to 10 days: Solve problems only.** Stop reading new material. Spend your study hours solving timed, mixed problems from every chapter, broken into the same time windows, and read your master summary every day.

During the Exam: Test-Taking Tips

1. **Manage Your Time:** Wear a wristwatch and monitor your time carefully. Before you start, divide the exam time by the number of problems so you know your time budget per problem. Many engineering students run out of time. If partial credit is given, it's better to attempt every question than to leave answers blank. Aim to both answer every question and get them right.
2. **Skip and Return:** If you get stuck, make your best attempt, circle the problem, and move on. Come back after you've answered every other question.
3. **Be Prepared:** Bring extra pencils, a calculator, and spare batteries to avoid unnecessary disruptions during the test.

Major exams (FE, PE, and similar): Learn the rules, buy the exact allowed materials and calculator, schedule the exam, and buy the prep course. There's a reason prep courses exist: people have passed using them. Read only what you don't already know, work every other problem with the Part 2 method, redo your misses the next day, then take the practice exam under real conditions. These exams are pass/fail, so a practice score above 70% means you'll likely pass.

Extra credit: Always do all the extra credit in the course (even if you have the best grade).

Quick Reference Checklist (keep this on your desk)

Every Day	Every Problem	Exam Countdown
☐ Arrive 10 min early; sit front and center ☐ Preview the chapter (15 min max) ☐ Homework: one concept at a time ☐ Write the chapter summary sheet ☐ Read all summary sheets ☐ Do a few mixed review problems ☐ Redo yesterday's missed problems ☐ Log your hours on the time sheet	☐ Find the question ☐ Write down the variables ☐ Verify the question ☐ Decide what you know ☐ Set it up; write assumptions ☐ Work it through ☐ Partial credit if out of time ☐ Check units, sign, and size ☐ Move on	☐ Learn the exam rules and materials ☐ Redo lecture and homework problems, timed ☐ Combine summary sheets into a master summary ☐ Ask about unclear concepts early ☐ Final 7 to 10 days: problems only ☐ Practice exam, real conditions: 90%+ ☐ Pack pencils, calculator, batteries ☐ In the exam: time budget per problem; skip and return