

Discovering Your Engineering Field: A Guide for Student Engineers

Prepared By:
Jalen Joni
ENL 3030, Dr. Streit
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Overview of Content

This guide is designed to assist engineering students who are uncertain about which branch of engineering they plan to pursue. It highlights resources that provide a deeper look into mechanical engineering, software engineering, and electrical engineering, while also including broader sources that demonstrate how engineering connects to careers, industry, and global challenges. The guide incorporates scholarly journals, professional publications, and internet resources that are reliable, accessible, and relevant to students. By bringing these different types of resources together, the guide offers both technical depth and practical insight, enabling readers to compare fields and make more informed decisions about where to focus on their studies and future careers.

Audience and Purpose

The primary audience for this guide is undergraduate engineering students who are still deciding which branch of engineering they want to pursue. This includes students early in their programs as well as those closer to graduation who are interested in exploring additional fields. Most of these readers already have some technical training from their classes but may be uncertain about how each field applies in research, industry, or future careers. For instance, a student studying mechanical engineering might wonder how their skills compare to those in electrical engineering, or a software-focused student may want to see how computing connects with robotics or energy systems. The purpose of this guide is to provide reliable resources that give insight into mechanical engineering, software engineering, and electrical engineering, while also pointing to broader tools that explain career paths and professional challenges. By the end, readers should have a clearer understanding of how these different branches connect to real-world work and which areas might best fit their own interests and goals.

Assumption About the Audience

This guide assumes that readers are current undergraduate engineering students who already have some background in math, science, and introductory engineering coursework. Because of this, the guide does not explain fundamental engineering concepts but instead focuses on resources that show how different branches of engineering are practiced in research and industry. It also assumes that readers are motivated to explore multiple fields of engineering, either because they are undecided about their focus or because they are curious about related areas. For example, a student who has completed introductory circuits may want to learn how electrical engineering applies in renewable energy, while a student with programming experience might want to see how software connects to robotics. The guide does not try to convince students to study engineering but rather provides resources for those who have already chosen the discipline and want to better understand where they might fit. It is also assumed that readers may not be familiar with professional journals, organizations, or industry websites, so this guide introduces these resources and explains how they can be used effectively.

Organization of the Guide

This guide is organized in a way that allows readers to move from technical depth to broader perspectives. It begins with scholarly journals, which provide detailed research and insight into mechanical and software engineering. The next section features a professional organization publication, IEEE Spectrum, which emphasizes developments in electrical and computer engineering while also connecting across other fields. The final section highlights internet sites that offer practical tools, including career outlooks, applied industry updates, and larger societal challenges in engineering. This structure is designed to help students first understand what research in specific fields looks like, then broaden their view through professional publications, and finally connect their exploration to careers and real-world applications.

Tips for Using this Guide

To get the most out of this guide, readers should use the following strategies:

- Use the table of contents to jump directly to the type of resource you need, whether that's journals, the professional publication, or internet sites.
- Read through the abstracts before diving into a source so you know exactly how it connects to your area of interest in engineering.
- Begin with the journals if you want to see how professional research is written, then move to the internet sites for broader career and industry perspectives.
- Remember that most of the featured resources are publicly accessible, but some may still link to full articles through a university library/paywall for deeper access.
- Return to the guide at different points in your academic journey, since a resource that feels too advanced now may be more valuable later than your studies

Communications of the ACM

<https://cacm.acm.org>

Communications of the ACM is a monthly magazine published by the Association for Computing Machinery, the largest professional group in computing. It is one of the most widely read resources in computer science and software engineering, giving readers a trusted view of the field. The magazine covers topics such as programming languages, artificial intelligence, data privacy, computer security, machine learning, hardware systems, and human-computer interaction. Instead of focusing only on research papers, CACM combines news, professional opinions, and real-world examples with research advances in a way that is easy to follow. For example, readers may see an article on the challenges of ethical AI next to a feature about new tools for software development or trends in cybersecurity. This publication is useful for engineering students interested in software or other areas of computing because it shows both the technical and professional sides of the field. By reading CACM, students can see how research connects to practice and industry, and how computing issues are shaping technology today. Since it covers many branches of computing, students can also compare software engineering with other areas and get a better sense of what problems professionals are working on to solve.

Tips for Using this Magazine Efficiently:

1. **Explore the “Topics” menu:** Use this feature to jump directly to sections like software engineering, artificial intelligence, or other branches that interest you. This saves time and helps you focus only on the area’s most relevant to your studies.
2. **Read the Practice and News sections:** Start here if you want quick updates about what’s happening in the field without having to dive into long research articles. These sections are easier to follow and give a broad overview of trends.
3. **Check the Research and Advances section:** When you’re ready for more depth, go to this area to see what new problems researchers are tackling and how the field is developing.

ASME Journal of Mechanical Design

<https://asmedigitalcollection.asme.org/mechanicaldesign>

The ASME Journal of Mechanical Design is a peer-reviewed journal published by the American Society of Mechanical Engineers (ASME), one of the most established professional organizations in the engineering field. The journal is a leading source for research in mechanical design and product development, with articles written by experts in academia and industry. It covers subjects such as design theory, computer-aided design, optimization methods, manufacturing processes, robotics, and the study of mechanical systems. Unlike magazines or professional publications that focus on trends or applications, this journal emphasizes detailed technical research, including experiments, case studies, and theoretical models. This journal is particularly valuable for engineering students who want to see the academic side of mechanical engineering. By reading it, students can learn how mechanical engineers approach design challenges and develop solutions that improve performance, reliability, and innovation in real systems. For example, articles may explain how optimization methods lead to more efficient machines or how design choices affect long-term durability. For students considering mechanical engineering, it provides a deeper understanding of what research in this field looks like and how it drives progress in industry and technology.

Tips for using this journal efficiently:

1. **Browse the “Issues” section:** Use this area to access both recent and archived volumes of the journal, letting you track how research in mechanical design has developed over time.
2. **Use the keyword search:** Enter terms like “optimization,” “robotics,” or “manufacturing” to quickly locate articles that match your specific area of interest.
3. **Check the “Most Cited” and “Most Read” sections:** These highlight the studies that have been most influential or popular, giving you a shortcut to the journal’s most important contributions.

IEEE Spectrum

<https://spectrum.ieee.org>

IEEE Spectrum is a monthly magazine published by the Institute of Electrical and Electronics Engineers (IEEE), the world's largest professional association for electrical and computer engineers. With a global audience of engineers, researchers, and industry professionals, IEEE Spectrum is a trusted resource for understanding current technology and innovation. Unlike peer-reviewed research journals, this magazine is not centered on academic studies but instead reports on industry trends, new inventions, and real-world applications of engineering. It regularly covers fields such as electrical systems, robotics, artificial intelligence, biomedical engineering, computer science, and energy technologies. This publication is specially useful for engineering students who want to explore multiple branches of engineering in one place. Articles range from in-depth feature stories to short news briefs, offering clear and accessible writing that connects complex technical work to real-world challenges. For example, a student might find a feature on advances in renewable energy systems alongside an article on the use of AI in robotics. Because of this variety, IEEE Spectrum helps students compare how different branches of engineering apply their skills to real projects, giving them insight into both industry practices and future career paths.

Tips for using this resource efficiently:

1. **Use the “Topics” menu:** Navigate directly to areas like robotics, energy, computing, or biomedical engineering to see how each branch is represented.
2. **Search for specific keywords:** Enter terms such as “artificial intelligence” or “power systems” to find articles related to a particular technology or branch.
3. **Read the “In the News” section:** This part of the site offers short updates that give a quick overview of current events and innovations in the engineering world.

Bureau of Labor Statistics – Occupational Outlook Handbook (OOH)

Main: <https://www.bls.gov/ooh/>

Engineering section: <https://www.bls.gov/ooh/architecture-and-engineering/home.htm>

The Occupational Outlook Handbook (OOH) is an online career resource published by the U.S. Bureau of Labor Statistics (BLS), the federal agency responsible for tracking employment data and labor trends. Because it is updated every two years and based on national surveys, the OOH is one of the most reliable and widely used tools for career planning. The handbook provides detailed profiles of hundreds of occupations, including engineering branches such as mechanical, electrical, computer, and civil engineering. Each profile explains job duties, education requirements, median pay, work environment, and projected job growth. For example, the OOH shows that mechanical engineers earn a median annual salary of about \$99,000 with steady job growth, while electrical engineers are projected to grow 6% over the next decade. The site also describes where these engineers typically work, such as manufacturing plants, research labs, or consulting firms, and the skills employers value most. For engineering students, this resource is especially helpful for comparing fields side by side, connecting classroom studies to the realities of the job market, and preparing for internships or graduate school. By offering government-backed data and clear occupational insights, the OOH is a guide for making informed career decisions.

Tips for Using this Resource Efficiently:

1. **Browse by category:** Use the “Architecture and Engineering” section to quickly find all engineering-related careers grouped in one place.
2. **Compare job outlooks:** Look at the projected growth rates and salaries side by side to understand which fields may have stronger opportunities in the future.
3. **Explore the “What They Do” and “How to Become One” tabs:** These sections explain the day-to-day responsibilities of engineers and the typical steps required to enter each field.

Engineering.com

<https://www.engineering.com/>

Engineering.com is a professional media platform that publishes news, articles, and resources across nearly every branch of engineering. Established in 2000, the site is run by a team of engineers, industry writers, and technology experts who focus on making engineering knowledge accessible. Its content spans civil, mechanical, electrical, software, and environmental engineering, often showing how new technologies, tools, and industry practices are shaping the profession. Unlike peer-reviewed journals, Engineering.com delivers timely coverage of industry news and practical applications, supported by features such as videos, podcasts, and case studies. For example, the site has covered the role of robotics in modern manufacturing, advances in renewable energy systems, and the rise of AI in software design. These articles are written in clear, accessible language that makes complex topics easier to understand without losing technical accuracy. For students, Engineering.com is a valuable resource for connecting classroom knowledge with real-world applications. It offers a window into current trends, professional skills, and innovations that may not yet appear in textbooks, helping students see how engineers in different fields approach problem-solving and innovation in practice.

Tips for Using this Resource Efficiently:

1. **Explore the “Industries” tab:** Use this section to see content organized by engineering field, such as civil, mechanical, or electrical.
2. **Check out media features:** Watch videos or listen to podcasts for quick takes on emerging technologies and industry issues.
3. **Follow current trends:** Read recent articles to stay updated on developments like renewable energy, robotics, or AI applications in engineering.

National Academy of Engineering (NAE)

<https://www.nae.edu/>

The National Academy of Engineering (NAE) is a non-profit professional organization founded in 1964 as part of the National Academies of Sciences, Engineering, and Medicine. It is composed of elected members who are some of the most accomplished engineers in the United States, representing leadership across academia, government, and industry. The NAE promotes engineering research, education, and practice, while also advising the nation on issues that involve technology and public policy. It publishes reports, articles, and resources on major topics such as sustainability, health, energy, and national security. One of its most well-known initiatives is the *Grand Challenges for Engineering*, which identifies critical global problems and highlights how different branches of engineering can work together to address them. For example, challenges such as providing clean water, securing cyberspace, and making solar energy more affordable illustrate how engineering research connects directly to human needs. Content produced by the NAE is written by leading experts in their fields but remains accessible to students who want to see the larger role of engineering in society. For students exploring career paths, the NAE provides insight that goes beyond technical skills by showing how engineering connects to global challenges and the public good.

Tips for Using this Resource Efficiently:

1. **Explore the “Grand Challenges” section:** Review the list of major global problems and see which engineering fields are connected to solving each one.
2. **Browse reports and publications:** Use these documents to understand how engineering research informs policy, education, and industry practices.
3. **Look at the programs and initiatives:** Learn about projects that involve collaboration across engineering disciplines, giving insight into how teamwork and new ideas are applied in practice.