

Applying to Graduate School in Engineering

This handout summarizes some key information about the typical graduate school application process for Engineering disciplines. Please be aware that every institution has different requirements and deadlines, and the information provided here is only a general guide to common application processes.

OVERVIEW OF THE “TYPICAL” APPLICATION PROCESS

Summer before Senior Year

1. Identify potential schools, based on your research interests, family/personal needs, geographic preferences, and career/personal goals.
2. Study for and take the GRE (www.ets.org/gre).
3. Identify 3+ references, at least two of who are faculty members who know you well.
4. Determine application deadlines for schools where you are interested in applying.
5. Draft application statement(s).

Fall of Senior Year

1. Narrow your list of places to apply; generally 3-8 completed applications is a good goal. Ideally, you will apply to a range of schools (size, location, ranking, etc.) where you can make a strong case that you are a good investment and “fit” for their program.
2. Identify your backup plan – “safety” school, work, volunteering, travel, etc.
3. Prioritize your applications by deadline or your interest, realizing that you may get tired or run out of time and not complete all of the applications on your initial list.
4. Complete and submit your applications; have transcripts, recommendations and GRE scores sent to each school.
5. Confirm receipt of all application materials.

Spring of Senior Year

1. Faculty typically review graduate applications in January and February; a few early admissions may be sent in February, with the bulk of admissions decisions made in March. Admissions and financial aid decisions are often made separately.
2. Visit each campus you are considering, meet with faculty and current graduate students, tour the facilities, consider living options, etc.
3. Decide on a graduate program, typically in April.

OVERVIEW OF ADVANCED DEGREE OPTIONS

Engineering graduate programs are designed to provide advanced training, to allow students to specialize in a specific area or discipline, and in some cases to engage students in research. In Engineering, there are generally two types of graduate degrees available: Masters and PhDs.

Research-Based Masters Programs: Master of Science (MS) programs are widely available in the United States, while the Master of Science in Engineering (MSE) degree is offered at some US-based and many international institutions. MS and MSE programs usually offer a research-based (thesis) option, as well as a coursework-only degree program. At some institutions, there is also a project-based option where students complete a substantial design or research project that results in a report and/or presentation, but not an entire thesis. Both research-based and coursework-based MS and MSE degrees can typically be used to gain admission to doctoral programs and to work in industry. Completing a MS or MSE program is often sufficient to be hired as an instructor at both 2- and 4-year colleges. Most research-based Masters programs are designed to be completed in about two years (4-6 semesters) of full-time enrollment; part-time options are available at some institutions.

Non-Research Masters Programs: While most institutions offer a “coursework only” option for the MS and/or MSE degrees, there are also a variety of applied Masters programs that are generally designed as terminal degrees (i.e., the final degree that an individual intends to earn). Common examples include a Master of Engineering program, which generally offers advanced training with a focus on applying engineering principles to solve problems, and a Master of Engineering Management program, which is often a “split” program that combines technical coursework with business classes in order to prepare technical managers. These types of applied or terminal Masters programs are focused on preparing recipients for work, and are generally not a pathway to enrolling in a doctoral program. Many of these non-research Masters programs are designed to be completed part-time while students are working – often with the option of online coursework – although full-time programs are also widely available. The overall workload is typically the same as for a research-based program (approximately two years, or 4-5 semesters of full-time enrollment).

Doctoral Programs: PhD programs (a Doctorate in Philosophy) are the most common option in the United States for individuals wanting to pursue a terminal research-based degree in Engineering. Similar research-based degrees include the Doctor of Engineering and the Doctor of Science; these are more common outside the US. Doctoral programs require extensive research (typically 2-3 years) and the completion of a dissertation, as well as graduate-level coursework. PhD programs typically require at least 5 years of study beyond the bachelors degree, often 2-3 years focused on coursework (these requirements may be reduced or waived for students who already have a Masters degree) and 2-3+ years of full-time research. PhD programs are not usually completed on a part-time basis, although it is possible at most institutions. While 10-20% of doctoral degree recipients in Engineering pursue an academic career, the vast majority of Engineering PhDs work in industry, government research labs, non-profits, or build their own companies.

FINDING SCHOOLS THAT “FIT”

Most students who apply to graduate programs in engineering have broad interests: they know that they like certain classes or areas within a discipline, and may have identified a few areas they'd prefer to avoid. In these cases, it is often helpful for prospective graduate students to first consider their priorities for where they want to live. Examples to consider include proximity to family and friends; access to urban/suburban/rural living; public transportation; weather; cultural attractions; faith communities; cost of living; and likelihood that you might want to remain in the area to work after completing your graduate studies (many schools have strong ties to companies located in their regions). Select regions of the US or countries in the world that match these priorities, and begin looking at graduate programs in those locations. For institutions in the US, it is often helpful to start by looking at the NCAA Division 1 schools in a region, as these tend to be large universities with broad opportunities for research and graduate study. Once you've narrowed down the options to a few cities, states, or regions of the world you can consider smaller schools in those areas as well.

University websites are usually the best place to start looking for graduate programs, and generally provide information about the types of degrees and majors/disciplines available. Departmental websites often provide more detailed information about the requirements of their graduate programs, including areas of specialization for research and coursework. It's okay to send emails to a few (2-3) faculty members at schools that seem to be strong candidates, but don't be discouraged if you don't get a response. Some faculty actively recruit new students and enjoy hearing from prospects, while other faculty prefer to wait until graduate applications have been submitted and reviewed before interviewing prospective students.

For students who happen to have very specific research interests that they hope to pursue in graduate school, often the best approach is to talk with faculty who are currently working in that field. They have the knowledge, expertise, and professional networks to help you understand what opportunities are available in the field, and which graduate programs may be good candidates.

FUNDING YOUR GRADUATE STUDIES

In the United States, most Engineering PhD programs will offer funding to admitted students. A typical funding package includes a stipend (paycheck), tuition waiver, and individual health insurance for the student. Amounts and conditions vary considerably, and are generally tied to the cost of living in the area; support is also constrained by the availability of research grants and/or the budget for teaching assistantships. In comparing offers from different schools, it is important to understand the policies for summer support, raises, annual cost of living adjustments, and the conditions that must be met in order to receive future funding.

Funding for Masters programs is generally more limited at large research institutions, but smaller institutions often rely heavily on Masters students to work as teaching or research assistants. Students who hope to be admitted to a Masters program with funding should apply to a broad range of schools, and consider institutions that offer Masters but not Doctoral programs.

ACADEMIC RESUMES

Many graduate programs request that you submit a resume with your application materials. You should tailor this resume to graduate school, and follow any specific content or layout requirements indicated by the graduate program. The following bullets cover some of the typical components of an academic resume, but please realize that **not all of these may apply to you**.

Common Elements of an Academic Resume

- **Contact information:** make sure that your name is highly visible and that there is clear contact information, including a professional email address and a phone number. It is not always necessary to include multiple phone numbers or addresses; consider how else you might be able to use that space.
- **Objective:** on an academic resume, this is typically not necessary since you will explain your objectives for pursuing a graduate degree in detail in your application statement(s).
- **Education:** include your college degree information, expected graduation term, and GPA with scale (e.g., 3.358/4.0). As appropriate, include additional majors/minors, concentrations, study abroad activities, or accomplishments (Dean's List, Honors College membership, etc.). Also list professional training activities or certifications (e.g., EIT or PE status; certification in software or equipment), training completed as part of a co-op or internship, and other professional development activities you have participated in (teamwork training, communications skills seminar, etc.).
- **Research Experience:** include both paid and volunteer experiences, as well as substantial research projects completed as part of your technical coursework. Use a descriptive position title ("Undergraduate Research Assistant", "Team Leader, Senior Design Project") and include the name of the course or the lab/faculty member you worked with. Use bullets to describe the research skills you developed, specialized software or equipment you used, and how your work contributed to a larger research project. If your project was funded externally, indicate the funding source (NSF, NIH, DOD, etc.).
- **Professional Experience:** include both paid and volunteer opportunities in engineering or other technical fields. Use a descriptive position title ("Engineering Co-Op", "Software Development Intern") and include the name of the company or organization. Use bullets to describe the technical, engineering or research skills you developed, specialized software or equipment you used, and how your work contributed to a larger effort within the organization.
- **Research and Professional Experience:** depending on your background, it may be appropriate to combine the previous two headings into one.
- **Teaching Experience:** if you have substantial experience teaching or assisting in an academic setting (as an undergraduate teaching assistant, a tutor, etc.) you should include that somewhere in your academic resume. If you don't have enough teaching experience to justify a separate section, you should include it with your professional experience.
- **Publications and Presentations:** common types include journal papers, conference proceedings/presentations, workshops, and posters; if you have substantial publications you may want to separate this section into more than one header. Include posters presented at UURAF, presentations made as part of co-op experiences or internships, and

technical papers that have been accepted, submitted or are in preparation. Indicate co-authors as appropriate.

- **Skills:** if you are applying to a graduate program where specialized skills would be desirable, it might be appropriate to list them in a separate section. Examples might include experience with laboratory equipment, testing techniques, or software tools. Remember that it may be more appropriate to integrate these skills into your research or professional experience section – it will depend on the extent of your experiences.
- **Outreach and Service:** emphasize STEM (science, technology, engineering, math) outreach programs or activities you have participated in, describing the audience (e.g., K-12 students, high school teachers) and activity. Include other leadership and volunteer activities on campus and in the community.
- **Honors and Awards:** list scholarships, honors and awards that you have received. If you need to save space, consider a brief description of related awards (e.g., “College and Departmental Scholarships for Academic Achievement, awarded 2007-09”) rather than an exhaustive list. Emphasize honors related to your research or engineering experiences, such as best paper/poster awards, academic achievements, etc.

Common Formatting Considerations for an Academic Resume

- Use a standard font style that is very easy to read – something like Times New Roman, Verdana, Arial, etc. Make sure that the font size is also readable (usually 10+ point).
- Avoid using italics or underlining. Use CAPS or **bold** to emphasize information.
- Leave some whitespace on the page; one-inch margins on all sides are typical.
- Most undergraduates have enough experience by graduation for a one-page resume. Longer resumes might be appropriate if you have extensive undergraduate experiences.
- In general, you **should not** include experiences prior to college or non-engineering/research/technical experiences. An exception would be if you had a substantial engineering or professional experience in high school (an internship, leadership in a STEM outreach program like FIRST Robotics, research experience, etc.).
- Many career service professionals suggest that you NOT use an existing Microsoft Office (or similar) resume template, as that suggests that you lack the word processing skills to format a document on your own and may limit the information you can include.

ACADEMIC STATEMENTS

Many institutions have specific criteria or guidelines for academic statements; other institutions will simply ask for an academic statement and you'll have to develop your own format. The following content and formatting guidelines are for Academic Statements submitted to **the MSU College of Engineering**; the resulting statement is fairly general and you should be able to adapt it to other purposes as needed.

Content

Your Academic Statement should be a concise statement of your plans for graduate study, your career goals, and how MSU's graduate program will help you meet your career and educational objectives. **Your Academic Statement must include the following statement:** "My intended area of specialization in the graduate program in (DEPARTMENT) at Michigan State University will be in _____." If you have already been in contact with faculty or staff at MSU regarding your application for graduate studies, please list these contacts in your Academic Statement.

When preparing your Academic Statement, please include the following information:

- Briefly describe key experiences that led you to graduate studies. Examples might include research experiences, internships, coursework or extracurricular activities.
- Share specific, relevant examples of how these experiences helped you develop skills for success as a graduate student. For instance, you might demonstrate ways that you have synthesized knowledge from the classroom, developed research skills, communicated effectively, acted as a leader, or gained skills and responsibility over time.
- Make a clear connection between your previous experiences and your current interest in graduate studies. If your intended area of specialization in graduate school differs significantly from your previous experiences, please briefly explain why you decided to change focus.
- If applicable, explain any gaps or discrepancies in your academic record and share unusual obstacles or hardships that you have overcome in pursuit of your educational objectives.
- Explain how your goals for graduate study relate to your longer-term career plans, including the pursuit of additional degrees or certifications if applicable.

Format

Your Academic Statement should be concise, and no more than 2 pages when formatted in Times New Roman 12-point font with 1-inch margins and single line spacing.

PERSONAL STATEMENTS

Many institutions have specific criteria or guidelines for personal statements; other institutions will simply ask for an academic statement and you'll have to develop your own format. The following content and formatting guidelines are for Personal Statements submitted to **the MSU College of Engineering**.

Content

Your Personal Statement should concisely describe how your background and life experiences – including social, economic, cultural, familial, educational, or other opportunities or challenges – motivated your decision to pursue a graduate degree.

When preparing your Personal Statement, please address the following questions:

- How well do your personal goals for education and research fit with the interests of our faculty and the research activities within our department? Briefly describe research areas or questions that you find interesting and identify any specific faculty, labs or research projects at MSU that are of particular interest to you.
- How have you demonstrated your leadership skills, or your potential as a leader? For example, you might share specific examples of how you made contributions as an officer in a student organization or how you assumed a leadership role within a team or during a professional internship. You could also discuss your potential for leadership in graduate school and afterwards by sharing your career goals and discussing your capacity to make a distinctive professional or scholarly contribution in your field.
- How have you contributed to a diverse educational community, or how will you do so as a graduate student? How have you promoted understanding among persons of different backgrounds and ideas, or how will you do so as a graduate student? Examples might include service activities, leadership roles, study abroad, language study, etc.
- If applicable, please describe any barriers or obstacles that you have overcome in pursuit of your educational or personal goals. Examples might include economic, social or health challenges, being the first in your family to attend college, family obligations, etc.
- If applicable, please describe aspects of your personal background that will enhance the diversity of MSU's graduate student body, such as being multi-lingual, participating in a McNair or TRIO program, attending a minority-serving institution, etc.
- If applicable, please describe anything else in your personal history, experience, or aspirations that distinguishes you from other applicants to our graduate programs.

Format

Your Personal Statement should be concise, and no more than 2 pages when formatted in Times New Roman 12-point font with 1-inch margins and single line spacing.

“COMBINED” APPLICATION STATEMENTS

Some institutions ask for a single application statement, which may combine elements of “typical” academic and personal statements. If the institution you are applying to does not have specific criteria or guidelines for your application statement, you may find the following general outline helpful in drafting a single / combined application statement.

Introduction: what makes you unique? Start an interesting story that engages the reader.

Experiences that led you to graduate school: continue the story by sharing specific, relevant experiences that helped you develop skills for success as a graduate student. Demonstrate ways that you have synthesized knowledge from the classroom, developed research skills, communicated effectively, and acted as a leader. Show that you have gained skills and responsibility over time. If applicable, explain any gaps or discrepancies in your academic record and share unusual obstacles or hardships that you have overcome.

Reasons for graduate study: make a clear connection between your previous experiences and your current desire to go to graduate school. Describe the research areas and questions that interest you, and identify 2-3 faculty members or research labs/projects of interest at the specific school. Describe how your background and experiences have prepared you to do research in that area, and if necessary explain your decision to pursue research that differs significantly from your previous experience.

Conclusion: Share how your goals for graduate study relate to your longer-term career plans, including pursuit of additional degrees if applicable. Express enthusiasm for graduate study and highlight aspects of this school’s graduate program that will allow you to gain the experience and skills that you desire.

ADDITIONAL RESOURCES

MSU Resources

- College of Engineering Graduate Programs: <http://www.egr.msu.edu/academics/graduate/>
- MSU Engineering Graduate Recruiting: gradrecruit@msu.edu
- MSU Graduate School: <http://grad.msu.edu/>
- MSU Writing Center: <http://writing.msu.edu>

Graduate School Information

- ASEE (American Society of Engineering Education) Profiles of Engineering programs; includes graduate admissions information, size, expenses and financial aid, etc. Searchable online profiles: <http://profiles.asee.org/>
- US News & World Reports 2011 Rankings of Engineering Schools: <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-engineering-schools/eng-rankings>

Academic Resumes

- The MSU Career Passport (<http://careernetwork.msu.edu/pdf/CP10.pdf>) has extensive descriptions of resume-building and samples of good resumes.
- The MSU Career Services Network offers additional examples and resources for creating resumes (<http://careernetwork.msu.edu/finding-an-internship/resumes-letters-1>).
- The Purdue OWL (Online Writing Lab) offers a variety of information about resumes and vitas, including samples (<http://owl.english.purdue.edu/owl/section/6/23/>).
- The Resume Resource has some examples of CVs (aka “academic resumes”) that you may find interesting (<http://www.resume-resource.com/examples-cv.html>)

Application Statements

- The Committee on Institutional Cooperation (CIC) offers a general resource for those considering graduate studies in any area called “Applying to Graduate School: Tips, Timeline, and Tools of the Trade.” <http://www.cic.net/libraries/diversity/gradschoolguide.sflb>
- The Purdue OWL (Online Writing Lab) has compiled resources for developing statements for graduate school applications, including example statements, advice from admissions officers, and top 10 lists of things to do (or not to do) in your application. <http://owl.english.purdue.edu/owl/resource/642/01/>
- Peterson’s EssayEdge offers multiple “lessons” on how to write graduate application statements, including structure, style, and tone, as well as many sample essays and concrete “before” and “after” examples. <http://www.essayedge.com/graduate/essayadvice/course/>
- The University of Missouri has compiled detailed information on preparing an application for the NSF Graduate Research Fellowship program; much of this advice is also applicable to other graduate application statements. <http://gradschool.missouri.edu/financial/assistantships-fellowships/fellowships/external/nsf-research-fellowship/>