Graduate Studies

Carnegie Mellon University

Carnegie Mellon’s College of Engineering provides graduate students with exciting research and educational opportunities that address the technology-oriented challenges facing us today. M.S. and Ph.D. programs are offered across a wide range of fields, including joint degrees and interdisciplinary programs with other colleges on campus. Our graduates are highly successful in industry and academia and are prepared to assume leadership roles in organizations that demand well-trained, innovative professionals.

Our approach to graduate studies is decentralized. The departments develop and manage their own degree programs and admission processes. Most departments offer a course-based M.S. program as well as research-based M.S. options and Ph.D. programs. Our culture encourages collaboration in education and research across disciplines, departments and colleges within Carnegie Mellon.

Departments

Biomedical Engineering
Firmly rooted in traditional engineering and basic sciences, graduate studies in biomedical engineering encourage creativity to match engineering ingenuity with the growing needs of the healthcare field as represented by hospitals, universities and industry. Graduate programs balance between depth and breadth and provide clinical exposure opportunities at local medical centers. Master’s students may choose between a single-year course-based professional degree and a two-year conventional M.S. degree. The Ph.D. program emphasizes comprehensive thesis research that starts in the first year. An M.D./Ph.D. program is offered in conjunction with the University of Pittsburgh School of Medicine.

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Chemical Engineering
The graduate programs of the Department of Chemical Engineering at Carnegie Mellon provide opportunities for coursework and research that span a breadth of topics including: complex fluids engineering; environmental engineering; process systems engineering; bioengineering; catalysis and surface science; and energy science and engineering. Coursework emphasizes problem-solving techniques in chemical engineering science and process systems engineering. Computing is integrated throughout the curriculum, and software for mathematical modeling and simulation is used extensively. Along with a Ph.D. program, several master’s programs are available, giving students the option to pursue a coursework-only degree or a master’s degree that combines research with courses.

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Carnegie Mellon Silicon Valley
Silicon Valley lives and breathes entrepreneurship and innovation. With that in mind, Carnegie Mellon Silicon Valley has developed software engineering and software management programs that enable students to innovate within their companies or apply their knowledge to their own entrepreneurial dreams. Program offerings include part-time, full-time and bicoastal master’s degree programs in software engineering, software management, entrepreneurship and information technology. We also offer a bicoastal ECE Ph.D. program with a focus on mobility, security, sensors and networking.

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Civil and Environmental Engineering
Relying on its strong interdisciplinary program, the Department of Civil and Environmental Engineering enables M.S. and Ph.D. students to develop solutions to pressing infrastructure and environmental problems. Graduate programs and research cluster into the following four areas: advanced infrastructure systems; environmental engineering, science and management; green design; and mechanics, materials and computing. Cross-specialization work is common in areas such as environmental management, energy infrastructure systems, global sustainable construction and facility/infrastructure information modeling and analytics. A course-based M.S. program is offered. In addition, a joint Ph.D. degree is offered in Civil and Environmental Engineering and Engineering and Public Policy. A dual Ph.D. degree program is offered with the Middle East Technical University.

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Electrical and Computer Engineering
The Department of Electrical and Computer Engineering (ECE) at Carnegie Mellon is consistently ranked among the nation’s best. Its curriculum has significantly influenced curricula in many universities within and outside the U.S., while its research has yielded new technologies that have changed the world we live in. Graduate studies consist of a research-oriented Ph.D. program and a course-intensive professional master’s program that provides students with a thorough background in electrical or computer engineering and opportunities for in-depth specialization in a particular aspect of these fields. Ph.D. options include full-time Pittsburgh campus residency, the bicoastal program with our Silicon Valley campus, and with Portuguese partner universities through the Information and Communication Technologies Institute (ICTI).

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Engineering and Public Policy
The graduate program in Engineering and Public Policy (EPP) educates technically skilled individuals at the doctoral level to be leaders in policy-focused research. Researchers work on policy problems in which the technology matters. Policy-focused research often centers on the development of theory, analytical tools and techniques, as well as on solving specific problems. Students primarily work toward a Ph.D., but also can receive a master’s in Engineering & Public Policy, either because they leave the Ph.D. program early (but still complete the requirements for an M.S.), as part of a 5-year B.S.-M.S. program at Carnegie Mellon in Engineering & Public Policy or under special prior arrangements. EPP also offers a one-year professional M.S. program in Engineering and Technology Innovation Management that prepares students with technical backgrounds to pursue careers in the management of technical innovation.

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Information Networking Institute (INI)
The INI offers professional graduate degree programs in information networking, information security, mobility and software management, including three bicoastal programs with Carnegie Mellon Silicon Valley. Due to the interdisciplinary nature of these fields, the INI collaborates with the School of Computer Science, Tepper School of Business and the Heinz College to equip students with advanced knowledge in technology, business management and policy. INI students have the unprecedented flexibility to take courses across all of these esteemed colleges. Graduates offer a blend of leading-edge technology expertise, in-depth policy understanding and senior leadership savvy that sets them apart from their peers.

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Materials Science and Engineering
Essentially every technology depends on materials development and innovation. To meet this need, materials research and study at Carnegie Mellon encompasses ceramics, magnetic materials, metals, polymers, semiconductors, nanomaterials and materials for energy applications. Advanced facilities for the synthesis and characterization of materials are on site. Graduate students expand their understanding of existing materials and their applications, improve them, and discover the applications of new materials, as they are developed. The doctoral program emphasizes the creation of new knowledge through extensive research. Master’s students have the option of pursuing either a coursework-oriented or a research-oriented program.

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Mechanical Engineering
Graduate study in this department involves coursework and research that cover a range of areas, including product development and innovation, computational engineering, robotics, nano-enabled technologies, and energy and the environment. The emphasis on fundamentals applied to interdisciplinary problems and current issues best defines this graduate program. Master’s students can choose between a coursework option and a project option. The Ph.D. program provides in-depth training in research for careers in academia, industry or government.

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Interdisciplinary Programs
Architecture-Engineering Construction Management
The Architecture-Engineering Construction Management program is an interdisciplinary degree administered by the School of Architecture and involves studies in both Architecture and Civil and Environmental Engineering. The program prepares building delivery professionals – civil engineers, construction planners, facility managers, developers, architects, planners, landscape architects, interior designers and other building consultants – for careers in decision making that can have a positive impact on economic, environmental and ethical concerns through the management of design, construction, maintenance and use of facilities. The program is intended for young professionals who are prepared to take a year off from their employment or for recent graduates who are looking to diversify their qualifications prior to entering the job market. Applications to the program are submitted through the School of Architecture.

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Colloids, Polymers and Surfaces (CPS)
When manufacturing chemical products, the application of colloid, polymer or surface science is often vital, yet these subjects receive minimal coverage in most engineering and science curricula. The CPS program focuses on these topics, which are relevant to many industries including coatings and paints, nanotechnology, pharmaceuticals, synthetic and biopolymer manufacture, cosmetics and personal care, environmental remediation, catalysis and surfactants. This M.S. degree is offered jointly by the College of Engineering and the Mellon College of Science.

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Energy Science, Technology and Policy (ESTP)
This interdisciplinary professional Master’s program is for students who seek a distinctive engineering degree that is aligned with new discoveries in energy science.
and technology, attuned to sustainability and the environment, and informed by economics and policy. Full-time students with an undergraduate degree in engineering or the sciences can complete the degree in one academic year.

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**Engineering and Technology Innovation Management (E&TIM)**

E&TIM is an interdisciplinary M.S. program that provides candidates with science and engineering backgrounds with an understanding of the fundamentals of innovation and value creation, while also strengthening technical insights. It is appropriate for those who aspire to lead technology development and engineering, create new technology-enabled ventures, develop business technology strategies or design policies to encourage technological innovation. The program is one calendar year, including a summer internship. A bicoastal experience with Carnegie Mellon Silicon Valley is possible. E&TIM applicants can also choose to pursue a 21-month dual degree with one of the university’s traditional engineering departments.

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**M.B.A. and Engineering Integrated 5-year Program**

This dual-degree program, offered by the College of Engineering and Tepper School of Business, allows students the chance to combine an engineering degree with an M.B.A. Engineering students incorporate business classes into their schedule, as part of their engineering undergraduate general education requirements. By adding a fifth year to the normal college schedule, qualified students will graduate with a dual degree.

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**M.S. in Civil and Environmental Engineering and M.B.A.**

The dual Master of Science in Civil and Environmental Engineering and Master of Business Administration (M.B.A.) Program is a 2.5 year (5 semester) program which starts in the fall semester each year. It is designed for students with B.S. degrees in engineering and offers the opportunity to develop technical and managerial skills in the management of civil and environmental engineering organizations, projects and systems, as well as business management. This program is offered by the College of Engineering and the Tepper School of Business.

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**Product Development**

The Master of Product Development (MPD) is a professional degree program that meets industry’s emerging need to develop engineers and industrial designers into more accomplished practitioners and managers in the product development process. The degree focuses on the creation of products and services that meet stakeholders’ value expectations. The knowledge taught in this program applies to the development of a wide range of products, services and interfaces that meet a value expectation. This degree is jointly offered by the Department of Mechanical Engineering and the School of Design, with support from the Tepper School of Business. The MPD program is consistently ranked in the top 3 Best Graduate Programs in Industrial Design by *U.S. News & World Report* and is one of the top 30 World’s Best Design Programs as reported by *Businessweek* magazine for the program’s significant integration of design, business and engineering.

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