

Undergraduate Options

This section of the catalog introduces some of the options that undergraduate students can choose from to supplement their degree program, advance their career objectives, or focus on an interest that may be unrelated to their major. From IDeATe, which offers minors and courses in areas that merge technology and creativity like Game Design, to Student Defined Majors, which is designed for students whose academic goals cannot be adequately served by curricula of existing majors or minors, learn more about the additional options offered to CMU's undergraduate students.

Additional Majors/Dual Degrees

Students interested in pursuing more than one area of study are encouraged to consider an additional major or dual degree. Students who complete an additional major will earn a single degree in two areas. Generally, it is possible to fulfill the requirements of both majors in four years by taking the course requirements of the second major in the elective spaces allowed by the first major.

Some majors are offered only as additional majors:

- Students in the College of Engineering may elect to double major in Biomedical Engineering (<http://coursecatalog.web.cmu.edu/schools-colleges/collegeofengineering/departmentofbiomedicalengineering/#courserequirementsfortheaditionalmajordegreertext>) or Engineering and Public Policy (<http://coursecatalog.web.cmu.edu/schools-colleges/collegeofengineering/departmentofengineeringandpublicpolicy/#doublemajorcurriculumtext>), which are offered only as an additional major.
- Students from any college may pursue an additional major in Human-Computer Interaction (<http://coursecatalog.web.cmu.edu/schools-colleges/schoolofcomputerscience/addlmajorsminors/#hciadditionalmajorinortext>), Science, Technology and Public Policy (<http://coursecatalog.web.cmu.edu/schools-colleges/collegeofengineering/departmentofengineeringandpublicpolicy/#additionalmajorinstppcurriculumtext>), or Robotics (<http://coursecatalog.web.cmu.edu/schools-colleges/schoolofcomputerscience/addlmajorsminors/#roboticsadditionalmajorinortext>).

Dual Degree programs allow students to earn two degrees. Students who are interested in an additional major or dual degree are encouraged to review the specific possibilities with the relevant academic advisor.

Accelerated Master's Programs

Qualified undergraduates may apply to one of several programs to earn their bachelor's and master's degrees in five years. For further details about these programs, please refer to the appropriate college or departmental sections.

College of Engineering

The five-year Integrated Master's/Bachelor's programs offered by the Departments of Electrical and Computer Engineering and Civil and Environmental Engineering offers students superior technical preparation for careers in industry. The Departments of Chemical Engineering and Mechanical Engineering also offer fifth-year Accelerated Master's programs. The Department of Materials Science and Engineering offers a cooperative Industrial Internship Option in which students alternate coursework with practical experience in industry. Admission is highly competitive and leads to a Master of Science degree.

Dietrich College of Humanities and Social Sciences

The Department of Philosophy offers two bachelor's/master's degree options: the Bachelor's in Logic and Computation and Master's in Logic, Computation & Methodology degree as well as a Bachelor's/Master's degree in Philosophy. The Institute for Politics and Strategy offers an accelerated Master of Science degree in International Relations and Politics. The Master of Arts in Teaching English to Speakers of Other Languages (TOESL) is a fifth-year master's option for Modern Language students who are concentrating in English as a Second Language. Also, the Department of English offers an accelerated program for undergraduates to obtain a Master of Arts in Professional Writing.

Heinz College of Information Systems and Public Policy

Heinz College's Accelerated Master's program allows qualified undergraduate students to earn a prestigious Master of Science degree in Public Policy and Management. For students in the College of Fine Arts or

the Bachelor of Humanities and Arts degree program who are interested in careers in arts management, the program leads to a Master of Arts Management degree.

Mellon College of Science

The Honors Programs in the Departments of Chemistry and Mathematics are demanding, accelerated programs that give highly qualified students the opportunity to earn their bachelor's and master's degrees in just four years. Admission is by invitation only.

Tepper School of Business

Students who are interested in business management may wish to consider the Tepper School of Business 3-2 program. Qualified undergraduate students may earn their Master of Business Administration in addition to their bachelor's degree.

Health Professions Program

Jason D'Antonio, PhD, *Director*
Location: Doherty Hall 1320
Phone: 412-268-8494

The Health Professions Program (<http://www.cmu.edu/hpp/>) (HPP) at Carnegie Mellon University is an advising resource for all university students and alumni who are interested in a career in the health professions. This program complements a student's curricular advising and is meant to help students explore their interests, prepare for graduate programs in the health professions, and facilitate their application process. Students can enroll in the program at any time during their academic career, but the importance of early planning is communicated to interested first-year students. Once enrolled, students meet regularly with the director to discuss course requirements, medical exposure opportunities, and other aspects of preparing to be a competitive candidate.

Students in the HPP span all colleges of the university and have many diverse career interests including medicine, dentistry, optometry, biomedical research, medical physics, biomedical engineering, public health, medical informatics, and health policy.

For students interested in medicine or dental medicine, regardless of a student's major, the basic course requirements outlined below must be completed prior to matriculation:

1. TWO courses in Biology, plus ONE lab, plus Biochemistry.

This is typically fulfilled by the following Carnegie Mellon courses:

03-121	Modern Biology	9-10
or 03-151	Honors Modern Biology	
03-135	Structure and Function of the Human Body	9
or 42-202	Physiology	
or 03-220	Genetics	
or 03-320	Cell Biology	
03-124	Modern Biology Laboratory	9-12
or 03-343	Experimental Techniques in Molecular Biology	
or 03-206	Biomedical Engineering Laboratory	
or 02-261	Quantitative Cell and Molecular Biology Laboratory	
03-231	Honors Biochemistry	9
or 03-232	Biochemistry I	

2. TWO courses in Chemistry, plus ONE lab.

This is typically fulfilled by the following Carnegie Mellon courses:

09-105	Introduction to Modern Chemistry I	10
or 09-107	Honors Chemistry: Fundamentals, Concepts and Applications	
09-106	Modern Chemistry II	10
or 09-348	Inorganic Chemistry	
09-207	Techniques in Quantitative Analysis ^(non-Chem majors)	9
or 09-221	Laboratory I: Introduction to Chemical Analysis	

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3. TWO courses in Organic Chemistry, plus ONE lab.

This is typically fulfilled by the following Carnegie Mellon courses:

09-217	Organic Chemistry I	9-10
or 09-219	Modern Organic Chemistry	
09-218	Organic Chemistry II	9-10
or 09-220	Modern Organic Chemistry II	
09-208	Techniques for Organic Synthesis and Analysis (non-Chem majors)	9
or 09-222	Laboratory II: Organic Synthesis and Analysis	

4. TWO courses in Physics, plus ONE lab.

This is typically fulfilled by the following Carnegie Mellon courses:

33-121	Physics I for Science Students	12
or 33-141	Physics I for Engineering Students	
or 33-151	Matter and Interactions I	
33-122	Physics II for Biological Sciences & Chemistry Students	9
or 33-142	Physics II for Engineering and Physics Students	
or 33-152	Matter and Interactions II	
33-100	Basic Experimental Physics	6-9
or 33-104	Experimental Physics	

5. Any TWO Math courses, including at least ONE stats course.

21-111	Differential Calculus	10
21-112	Integral Calculus	10
21-120	Differential and Integral Calculus	10
21-122	Integration and Approximation	10
or 21-124	Calculus II for Biologists and Chemists	
36-200	Reasoning with Data	9
or 36-202	Methods for Statistics & Data Science	
or 36-309	Experimental Design for Behavioral & Social Sciences	

6. TWO courses in English.

This is typically fulfilled by the following Carnegie Mellon courses:

76-101	Interpretation and Argument (or any two of 76-106/78)	9
76-xxx	English course of the student's choice, typically 200-level or higher	

In addition to these general course requirements, recommended coursework includes microbiology, developmental biology, anatomy, behavioral sciences, ethics, history, and modern languages. Interdisciplinary studies are also strongly encouraged, and many students design an undergraduate curriculum that incorporates majors and/or minors in both the natural and social sciences. For medical school admissions, completing either Introduction to Psychology or Social Psychology is strongly encouraged to help prepare for the MCAT exam.

Participating in research is a hallmark of the educational experience at Carnegie Mellon. Whether in a psychology lab studying the impact of breast cancer diagnosis on family social dynamics, in the NMR lab imaging metabolic function in the heart or brain, evaluating key signaling factors in cancer cells, or in the surgery suite testing robotic devices, our students have made significant achievements in research. Health Professions programs are interested in applicants who have experience with the scientific method and who are intellectually curious about biomedical science, social science, biomedical engineering, as well as public health, epidemiology, and the social determinants of health.

Our university mission is to train students to be first class scientists, engineers, artists, writers or whatever their intellectual interests may be. We do not train students to be "pre-med," but if they choose to use their talents in a health profession, we offer many services to help them obtain their life goals. Regular advising, application workshops, and networking are among the many resources the CMU HPP provides. The student pre-health organizations on campus: Doctors of Carnegie Society (DOCS); Student Diversity Inclusion Committee (SDIC); Alpha Epsilon Delta (AED); Global Medical Brigades; and Global Public Health Brigades, together with the HPP, provide students with opportunities to learn, explore, and prepare for their chosen area of professional interest. For pre-medical applicants, the CMU alumni have created the MSAMP (Medical School Alumni Mentor Program),

which seeks to enhance the application experience for all CMU applicants to medical school.

The HPP has been successful in helping students to define, prepare for, and obtain their professional goals. Our students are regularly accepted at top-level medical, dental and graduate programs, and our alumni continue to serve as outstanding ambassadors of Carnegie Mellon.

IDeATe

The Integrative Design, Arts and Technology (IDeATe) (<http://ideate.cmu.edu>) network offers students the opportunity to become immersed in a collaborative community of faculty and peers who share expertise, experience, and passions at the intersection of arts and technology. Students will engage in active "learning by doing" in the IDeATe labs and classrooms based in Hunt Library. The program addresses current and emerging real-world challenges that require disciplinary expertise coupled with multidisciplinary perspectives and collaborative integrative approaches.

The IDeATe undergraduate curriculum consists of ten interrelated areas, all of which can be shaped into minors that students pursue alongside their primary majors. The themes of these areas integrate knowledge in technology and arts:

- **Game Design:** Design compelling game experiences and enhance your knowledge of key components of game design such as systems and mechanics, dramatic narrative and character development, programming and engine development, user testing and iterative development. Create games for a variety of audiences, including mobile applications, virtual reality platforms and even tabletop games.
- **Animation & Special Effects** (<http://coursecatalog.web.cmu.edu/schools-colleges/schoolofcomputerscience/addlmajorsminors/#ideateminorstext>): Explore the technical and artistic aspects of 3D and 2D animation in an integrated manner and within different application contexts—from film animation and visual effects to interactive displays.
- **Media Design:** Design digitally mediated experiences across various platforms, from mobile devices to large-scale installations, and for varied applications—from media for daily living to mediated performances.
- **Design for Learning:** Explore the art and science of designing engaging learning experiences that creatively merge technology, learning sciences, and media arts know-how. Create inclusive learning media experiences ranging from mobile games to interactive museum exhibits, augmented classrooms, and adaptive ed-tech.
- **Sonic Arts:** Create experimental music and explore emerging applications and markets for sound design, music creation, and performance.
- **Innovation and Entrepreneurship:** Work collaboratively in hands-on explorations of the problems, opportunities, strategies, and circumstances that lead to innovations. You will experience integrated models of innovation that increase the likelihood of successful products and services that will bring value to society and/or the marketplace.
- **Intelligent Environments:** Design and implement interactive 3D spaces—both physical and virtual—that shape our experience of time and space.
- **Physical Computing:** Build interactive devices combining small programmable electronic controllers with physical embodiments, adding on-board processing and reactivity to nearly anything around you. Create novel games, useful devices, experimental provocations, and more.
- **Soft Technologies:** Weave together a rich set of traditions and experimental techniques to animate soft materials and matter.
- **Immersive Technologies in Arts & Culture:** Blend technological skills with creative imagination and critical humanistic practice.

Individuals who make significant contributions, academically and professionally, in these areas are solidly prepared in a related discipline. Their preparation is combined with the ability to work in multidisciplinary teams that span technology and the arts. IDeATe serves as a multidisciplinary collaborative learning addition to the education (and learning outcomes) that students receive through their disciplinary major rather than a standalone learning experience.

Innovation and advancement in the IDeATe areas, as in many complex areas of inquiry, is the result of collective inquiry and requires deep expertise in all contributing areas of knowledge (i.e., expert technologists and artists). Carnegie Mellon is the only university in the United States with highly ranked departments in key technological and artistic domains. With these resources, Carnegie Mellon is uniquely positioned to create faculty and student teams that contain all necessary, high-level expertise in tech-arts areas of inquiry.

Students who participate in IDeATe will be able to combine the unique experience of a "deep dive" in their chosen discipline while connecting to the diverse areas of knowledge and skill across the university. To help facilitate this experience, the educational objectives of the IDeATe network are:

- Students from any undergraduate major can integrate a tech-arts area of study into their curricular plan through the IDeATe minors, which enhance and synthesize the tech-arts ecosystem at CMU.
- Students in IDeATe have the opportunity to:
 - Immerse themselves in a collaborative community of faculty and peers who share expertise, experience, and passions at the intersection of arts and technology
 - Engage in active "learning by doing" in shared labs and maker spaces
 - Address current and emerging real-world challenges that require disciplinary expertise coupled with multidisciplinary perspectives and integrative approaches.

Across the ten IDeATe areas, there are over 50 multi-disciplinary technology-arts courses that a student can choose from to customize their paths. Students are assisted in their choice of courses and minor by a dedicated IDeATe advisor who works in tandem with the advisor in their home department.

The IDeATe Portal Courses introduce students to the concepts and practices of knowledge areas beyond their discipline that contribute to the subject of each minor/concentration. After completing the portal courses, students should be able to (1) interpret cross-disciplinary communication from their collaborators (and use that interpretation productively in the collaborative work), (2) translate their own disciplinary expertise to describe ideas and outcomes in a way their cross-disciplinary collaborators can understand, and (3) develop interdisciplinary tech-arts prototypes (that include perspectives from multiple disciplines and enable further interdisciplinary communication and collaboration).

The remaining courses of IDeATe deepen exploration in a given area. Each course is focused on a key aspect of the area that it is categorized under. By taking these courses, the student can become familiar with many of the technical and creative issues in the area of the minor and the collaborative processes they entail. These courses are collaborative because they promote hands-on learning through making, critique, and iterative design and they promote learning from both the instructor and the interdisciplinary peer cohort. At the conclusion of each course a student should be in a position to collaboratively plan and implement an established outcome in the area within a limited amount of time and apply skills from both technology and arts disciplines to prototype ideas and leverage the diversity of perspectives to produce innovation in the field.

A completion of a minor should provide multidisciplinary training in the area of the concentration and furthermore *enhance collaborative learning experience and skills of students*: diversify the cohorts of the student, enhance collaboration skills, promote cognitive versatility, facilitate skill transfer across technology and the arts, and produce graduates that can innovate in 21st century creative industries.

For more information, please visit the IDeATe website (<https://ideate.cmu.edu>).

Minors

In addition to a student's primary degree, they can choose a minor that is a secondary focus to the student's area of study, which can enhance a student's breadth of study and overall experience while not requiring the same amount of coursework as a second major or degree. Unless otherwise indicated, minors are generally open to all university undergraduate students.

Pre-Law Advising Program

Director: Joseph Devine, *Associate Dean for Undergraduate Studies, Dietrich College*

Location: Dietrich College Dean's Office, Baker Hall 154
www.cmu.edu/pre-law (<http://www.cmu.edu/pre-law/>)

Carnegie Mellon University's Pre-Law Program is for students and alumni who are considering or applying to law school. The program offers advising, resources and access to the Thomas M. Kerr, Jr. Student Pre-Law Society, which is a student organization for current students and alumni who are interested in law school, the legal profession or generally interested in law-related issues, events and activities.

The Pre-Law Advising Program has three focal points, each of which corresponds to the common sequence of phases for those who develop an interest in and ultimately apply to law school.

1. **Exploration:** "I have a tentative interest in law, but have not definitely decided to apply to law school."
2. **Preparation:** "I have definitely decided to apply to law school, but I don't know when I will apply." or, "I am not yet at the point when I will be applying."
3. **Application:** "I have definitely decided to apply to law school, and now is the time when I intend to apply."

The Pre-Law Program also works with CMU alumni who are law students and lawyers and offers networking and mentorship opportunities. There are also various events and activities that are sponsored or coordinated by the program on campus and in the Pittsburgh community. Examples include lectures, rotating series of undergraduate courses on legal topics and other resources that highlight current and significant legal issues. Visit www.cmu.edu/pre-law (<http://www.cmu.edu/pre-law/>) for more information.

Student Defined Majors

Carnegie Mellon offers the opportunity for undergraduate students to pursue a Student Defined Major. Some colleges have specific processes for Student Defined Majors within their college (see relevant college section of the catalog). For information and advice, interested students are encouraged to speak to the associate dean of their current home college or the college most relevant to the proposed course of study.

The requirements for successful completion of a Student Defined Major include a student proposal approved by an advisor, relevant college(s), the vice provost for education, and successful completion of the approved course of study. In brief:

- A student interested in pursuing a student-defined major must develop a proposal which outlines an intellectually coherent area of study (with degree title) and a plan of study (courses to be taken, pedagogical rationale, and proposed schedule). The proposal should include an explanation of why it is not appropriate or possible to pursue such a program through the curriculum of any one of the colleges. It should outline a program of study for both general education (for example, the core requirements of one of the most relevant colleges or equivalent general education plan) and major requirements. The proposal should designate one of the participating colleges as de facto "home college" for tracking and verification purposes.
- **Proposals must be approved at least one academic year prior to expected graduation.** Students should therefore submit their proposals by the end of their fifth semester, to allow ample time for approval.
- The student's proposal must be approved by a faculty advisor within a college who takes pedagogical responsibility for the program, by the de facto "home college" and by any other colleges involved in granting the degree. The signed proposal will be submitted to the Provost's Office for a final review and approval.
- Once approved by the faculty advisor, colleges, and the Provost's Office, the student's major will be administered by the advisor and their progress tracked by the dean's office of the "home college." The "home college" will be responsible for monitoring the student's progress and reminding any collateral colleges of the approval of the Student Defined Major so that these colleges may insure the student's ability to enroll in the necessary courses. Upon successful completion of the course of study, the "home college" will be responsible for contacting all the relevant colleges and verifying the completion of the degree. Upon consultation with the "home college", students may receive their diploma in the most relevant department's ceremony.

Note: To distinguish Student Defined Majors from regularly offered majors at Carnegie Mellon, the phrase "(Student Defined Major)" will be added to the end of the major name. This notation will appear on all official documents (transcripts, verification letters, diplomas, etc.).

Student-Taught Courses (StuCo)

The Student College was established in 2001 to provide Carnegie Mellon students with the opportunity to share knowledge through educational, self-designed courses. Students can teach classes on any topic of their choice. However, the course cannot be available through regular University offerings. Courses typically meet once a week (for a full semester) and follow the current Carnegie Mellon academic calendar. Instructors and students receive credit (3 elective units - pass/no pass) for their work.

NOTE: STUDENTS ON LEAVE CANNOT TEACH

- All CMU students are eligible to teach StuCo courses and to join the Executive Committee that governs StuCo.

- All currently-enrolled CMU students, staff and community members are eligible to take StuCo courses.
- StuCo classes are taught during the fall and spring semesters.

StuCo courses vary semester to semester. Current classes offered by StuCo for fall 2025 include:

		Units
98-002	Student Taught Courses (StuCo): Mastering Connect 4	3
98-007	Student Taught Courses (StuCo): Arranging for Modern A Cappella	3
98-008	Student Taught Courses (StuCo): Intro to Rust Lang	3
98-012	Student Taught Courses (StuCo): Fun with Robots	3
98-016	Student Taught Courses (StuCo): Genshin Impact - Theorycrafting 101	3
98-033	Student Taught Courses (StuCo): Sampling in Hip-Hop Music	3
98-040	Student Taught Courses (StuCo): Sew Sustainable	3
98-067	Student Taught Courses (StuCo): We Are Not Alone-Supporting Peer's Mental Health	3
98-072	Student Taught Courses (StuCo): Introduction to Singlish	3
98-081	Student Taught Courses (StuCo): Historical European Martial Arts	3
98-123	Student Taught Courses (StuCo): Introduction to Hand Lettering	3
98-128	Student Taught Courses (StuCo): Fundamentals of Improv Comedy	3
98-133	Student Taught Courses (StuCo): Romance in Video Games	3
98-179	Student Taught Courses (StuCo): Introduction to Japanese Mahjong	3
98-186	Student Taught Courses (StuCo): Roller Coasters: Background and Design	3
98-205	Student Taught Courses (StuCo): Introduction to Minecraft	3
98-226	Student Taught Courses (StuCo): Movies You Should Have Watched By Now	3
98-230	Student Taught Courses (StuCo): Avatar: The Last Airbender & The Legend of Korra	3
98-244	Student Taught Courses (StuCo): Sign Language Through Pop Music	3
98-258	Student Taught Courses (StuCo): Introduction to Competitive Pokemon	3
98-266	Student Taught Courses (StuCo): Private Pilot Ground School	3
98-288	Student Taught Courses (StuCo): Star Wars: The Course Awakens	3
98-303	Student Taught Courses (StuCo): Introduction to Freestyle Rap	3
98-341	Student Taught Courses (StuCo): Build Your Own Breadboard Computer	3
98-374	Student Taught Courses (StuCo): Steep by Steep: Investeagation into Tea Culture	3
98-501	Student Taught Courses (StuCo): The Art and Science of Origami	3
98-502	Student Taught Courses (StuCo): Introduction to Writing Dystopian Fiction	3
98-503	Student Taught Courses (StuCo): Jurassic Park: Science, Ethics, and Cinema	3
98-504	Student Taught Courses (StuCo): Introduction to Tennis Analytics	3
98-505	Student Taught Courses (StuCo): Mindful Crafting: Relaxation in the Digital Age	3
98-506	Student Taught Courses (StuCo): Introduction to Web Development	3
98-507	Student Taught Courses (StuCo): Music in Motion	3

For detailed information on the Student College, please visit the StuCo website (<http://www.cmu.edu/stuco/>).

Study Abroad Programs

Carnegie Mellon students from every major may be able to study in any part of the world for a semester, year or summer. Short-term programs during spring and winter break are also possible. A well planned study abroad program, in coordination with one's academic advisor, will allow a student to receive credit for study abroad and graduate on time. Most students study abroad during their junior year; however, a growing number of students are studying abroad during their sophomore and senior years.

The study abroad advising staff offers general information sessions as well as individual advising appointments to assist students in all stages of the study abroad process. The Office of International Education (OIE) also has useful web links to help students find the most appropriate study abroad program. In addition, OIE offers orientations to help with personal, academic and acculturation issues, before and after a study abroad experience.

Carnegie Mellon offers students a variety of payment options for study abroad to allow students to study abroad regardless of financial need. There are three categories of programs: Exchange Programs, Sponsored Programs, and External Programs. A description of each program follows.

More detailed information can be found at www.cmu.edu/studyabroad (<http://www.cmu.edu/studyabroad/>).

Exchange Programs

Students who participate in exchange programs pay Carnegie Mellon tuition and receive their regular financial aid package. Students are responsible for room, board, travel and miscellaneous expenses.

University Exchanges

Carnegie Mellon University has university-wide exchange programs with institutions located in Australia, Chile, Hong Kong, Israel, Japan, Mexico, Qatar, Singapore, and Switzerland.

Departmental Exchanges

Chemical Engineering, the College of Engineering, Design, Drama, Economics, Electrical and Computer Engineering, Heinz College, Computer Science and Business offer departmental exchange programs. Students should contact their department or the study abroad website for additional information.

Sponsored Programs

The university has designated a few study abroad programs administered by other organizations or universities as sponsored programs. To participate in these programs, students pay a university fee equivalent to current tuition, room and board, and retain their eligibility for all financial aid. Carnegie Mellon in turn pays the program costs to the study abroad program or institution. Where applicable, funds are distributed to the student for room, board, travel, and personal expenses.

Currently, Carnegie Mellon has approximately 50 sponsored programs available around the world. A full list can be found at www.cmu.edu/studyabroad (<http://www.cmu.edu/studyabroad/>) or in consultation with a study abroad advisor.

External Programs

Students may also participate in a program hosted by another university or study abroad organization if the student's home department approves the program and its course offerings. Students will pay the other organization or institution directly. Students who receive institutional aid from Carnegie Mellon will not be eligible for this aid while they are abroad. However, students with state and federal aid will still qualify. Students can learn more about external program options during study abroad advising appointments, information sessions, or on the study abroad website.