Carnegie Mellon University

Master of Science in Computer Science

Student Handbook

2026–2027

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Director's Welcome

Ruben Martins, Director

As the Director of the Master of Science in Computer Science (MSCS) program, I am delighted to welcome each of you. You have been carefully selected, and we believe you have the potential to become some of the finest computer scientists in the world. Upon graduation, you will join the elite network of Carnegie Mellon computer science alums, a legacy that dates back to our first graduate program in 1965.

We have designed the MSCS curriculum to be as flexible as possible, allowing each of you to create a personalized course of study within broad guidelines, in collaboration with your advisor. You can choose between thesis and non-thesis options, as well as three-semester and four-semester tracks. Whether you are here to pivot to computer science, springboard to a Ph.D. program, or extend your expertise as a computer scientist, the MSCS curriculum can accommodate your goals. You can each forge your own path, and we hope you will be excited about the results. As Andrew Carnegie famously said, "*My heart is in the work*." We encourage you to embody this spirit throughout your journey in the MSCS program.

Our goal is to help you become a world-class technical leader. You will attend engaging lectures by top researchers and experts, and undertake projects of significant scale and complexity. Additionally, you may have the opportunity to participate in a summer internship with industry leaders or top-flight research groups on or off campus. By graduation, you will have developed a profound understanding of computer science that will serve you for the rest of your career.

Throughout the program, you won't be alone. You will be supported by academic and career advisors, engaged faculty members, dedicated teaching assistants, and your talented peers. One of the best aspects of the MSCS program is the incredible community it brings together.

If you are new to Pittsburgh, you'll find it to be a wonderful place to live. As a collection of unique neighborhoods, Pittsburgh hosts world-class industries, medical centers, and institutions of higher learning. It offers the convenience of small-town living combined with the richness and diversity of an international city.

If I can help in any way, please don't hesitate to contact me at rubenm@cmu.edu. Welcome aboard!

Program History

> "Computing at Carnegie Mellon evolved the way it should everywhere but doesn't. There was a confluence of minds, tools and problems...and an appreciation of potential and consequences that spread far..."
>
> —Alan Perlis, first department head

Led by a group of visionary enthusiasts, including Allen Newell, Herbert Simon, and Alan Perlis, the Department of Computer Science was formed in July 1965, with Alan Perlis as its head. As one of the first such departments in the United States, its creation was what now seems an inevitable step. From the very beginning, Computer Science at Carnegie Mellon was interdisciplinary and, in fact, drew its early strength from this meshing of students and faculty from the component disciplines. It was clear that an expansive approach to the field, fueled with solid science and a focus on the training of a new generation of scientists, would best serve the purpose of our campus and the industrial/academic community at large. This was a budding field, and Carnegie Mellon would be serving a critical role in populating the discipline with "trained professionals" who would be able to expand the parameters of what a computer could do and be used for.

Since its founding in 1965, the original department grew to form the School of Computer Science (SCS), which blossomed to encompass seven diverse units: the Computer Science Department (CSD), The Robotics Institute (RI), The Human-Computer Interaction Institute (HCII), The Language Technologies Institute (LTI), the Machine Learning Department (MLD), the Software and Societal Systems Department (S3D), and the Computational Biology Department (CBD).

After many years of discussion and more than a year of detailed planning, the Computer Science Department launched the M.S. program in Computer Science. The first class was admitted in the spring of 2012 and graduated in the winter of 2013.

The Carnegie Mellon Code

Students at Carnegie Mellon, because they are members of an academic community dedicated to the achievement of excellence, are expected to meet the highest standards of personal, ethical, and moral conduct possible.

These standards require personal integrity, a commitment to honesty without compromise, as well as truth without equivocation and a willingness to place the good of the community above the good of the self. Obligations once undertaken must be met, commitments kept.

As members of the Carnegie Mellon community, individuals are expected to uphold the standards of the community in addition to holding others accountable for said standards. It is rare that the life of a student in an academic community can be so private that it will not affect the community as a whole or that the above standards do not apply.

The discovery, advancement, and communication of knowledge are not possible without a commitment to these standards. Creativity cannot exist without acknowledgment of the creativity of others. New knowledge cannot be developed without credit for prior knowledge. Without the ability to trust that these principles will be observed, an academic community cannot exist.

The commitment of its faculty, staff and students to these standards contributes to the high respect in which the Carnegie Mellon degree is held. Students must not destroy that respect by their failure to meet these standards. Students who cannot meet them should voluntarily withdraw from the university.

Program Overview

The M.S. in Computer Science program offers students with a Bachelor's degree the opportunity to improve their training with advanced study in Computer Science. We cater to students with basic analytic skills and a strong aptitude for mathematics, programming, and logical reasoning. An undergraduate degree in computer science is not required.

The program is not based on a fixed set of classes. Instead, students construct their own course of study, in consultation with their advisors, within broad guidelines. Thus, a student may choose an area in which to specialize (such as networking, machine learning, or algorithms) or choose not to specialize at all. Carnegie Mellon faculty conduct research in diverse areas within the computer sciences and, when there is mutual interest, provide opportunities to Master's students to participate in research, and related activities such as publications, the preparation and defense of a Master's thesis, etc.

Most students will complete the program in three semesters. Students switching into Computer Science from another field may require additional time to fill in gaps in their undergraduate training (see "Curriculum").

The program is distinct from the Doctoral program in Computer Science: Master's students will not necessarily continue into the Doctoral program. M.S. graduates are welcome to apply to the Ph.D. program, but will not receive preferential treatment.

Program Outcomes

Because the MSCS program targets student-centered intellectual inquiry and educational diversity, the curriculum is not as prescriptive as that of other programs. However, the program is designed to achieve certain shared core outcomes.

> Graduates of the MSCS program should be able to apply the core principles and approaches of Computer Science, together with specialized knowledge of selected sub-fields, to analyze and solve current and emerging problems, and to remain engaged as the field develops. In particular, students will be able to:
>
> 1. analyze and prove the properties of algorithms, software, and/or computing systems using the theoretical underpinnings of Computer Science;
> 2. analyze, design, and construct software that contributes to large, multi-layered/multi-machine systems;

3. analyze, design, and construct software that employs intelligence and learning to solve complex, open-ended, and/or noisy real-world problems; and
4. select, implement, deploy, and/or develop viable solutions to current and emerging problems within one or more sub-fields of Computer Science.

Students completing the Applied Study degree program will be able to apply knowledge obtained via an academic setting in a professional or research environment.

Primary Contacts for the MSCS Program

If you have a question about how to accomplish a goal or procedure related to being an MSCS student, you should probably begin by contacting one of these five individuals.

Angy Malloy, Program Manager
412-268-6914, GHC 9006, angy@cmu.edu

Angy is responsible for the day-to-day administration of the Program. She is the first place you should turn for information about the Program, and can help you with most of your concerns or connect you with those who can.

David A. Eckhardt, Associate Program Director
412-268-6720, GHC 4001, de0u@andrew.cmu.edu

Prof. Eckhardt is the primary initial point of contact for any academic concerns, including academic advising and planning, class offerings, registration, research opportunities, teaching assistant opportunities, etc.

Mike Stowell & Farhana Hasan, Career Consultants
West Wing second floor, mikestow/fhasan@andrew.cmu.edu.

Mike and Farhana provide tremendous resources for students. They work alongside your Academic Advisor, and specialize in helping computer science students find job and internship opportunities, prepare for interviews, compare offers, and search for the right career path.

Ruben Martins, Program Director
GHC 7129, rubenm@cmu.edu

Prof. Martins is the Director of the Program and is ultimately responsible for the curriculum, policies, procedures, and practices. The best way to get in touch with him is to contact Angy for an appointment or to e-mail him directly.

Other Leadership Roles

The MSCS program is hosted by the School of Computer Science. Most students will not need to interact with the SCS leadership directly, but it is probably useful for you to know who is in which role.

- Jignesh Patel, Department Head, Computer Science Department
- David Garlan, Associate Dean, Master's Programs, School of Computer Science
- Martial Hebert, Dean, School of Computer Science

About This Document

This document will describe the curricular requirements of the program and will then present some academic and administrative policies that will govern your time here. It will also refer you to various sources of policy, information, and support outside the program itself. We encourage you to read it all the way through, from start to finish, and to take notes on the surprising and useful things you discover (we expect there will be some).

In addition to understanding the policies specific to the MSCS program, it is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this departmental graduate student handbook, the following resources are available to assist you in understanding community expectations:

- Academic Integrity Website:
  `http://www.cmu.edu/policies/student-and-student-life/academic-integrity.html`
- Office of Graduate and Postdoctoral Affairs:
  `https://www.cmu.edu/graduate/resources/`
- The Carnegie Mellon Student Handbook:
  `https://www.cmu.edu/student-affairs/cm-student-handbook`
- University Policies Website:
  `http://www.cmu.edu/policies/`

Student records are subject to privacy protections, including those guaranteed under the Family Educational Rights and Privacy Act (FERPA). The university's student privacy policy may be found here:

`http://www.cmu.edu/policies/student-and-student-life/privacy-rights-students.html`

Information about Academic Freedom and Freedom of Expression at Carnegie Mellon is available on the web site of a university-level commission:

`https://www.cmu.edu/leadership/the-provost/academic-leadership/academic-freedom.html`

The Program incorporates the University's policy on intellectual property, which can be found here:

`http://www.cmu.edu/policies/administrative-and-governance/intellectual-property.html`

To obtain this document in a different format for accessibility reasons, please contact the Office of Disability Resources at access@andrew.cmu.edu or call 412-268-6121.

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Curriculum

The Master of Science program in Computer Science gives students advanced study in Computer Science. The program is not based on a detailed required curriculum. Instead, students create their own course of study in consultation with their advisor.

Required Units for Degree Attainment

In general, students must satisfy four (4) Requirements:

1. Total units required for degree attainment: completion of a sufficient quantity of graded coursework.
2. Breadth: At least one pre-approved 9-12 unit course in each of three areas: AI, Systems, and Theory. In each area many courses are listed as pre-approved. Others may be approved on a per-student case-by-case basis, as the Program may deem consistent with the student's academic plan.
3. "Qualifying" units: completion of a sufficient quantity of Program-approved graduate or advanced undergraduate classes.
4. "MSCS elective" units: a limited quantity of coursework may be in otherwise unapproved graduate-level courses at Carnegie Mellon or otherwise unapproved courses, at any level, within the Computer Science Department.

The program has three variants, as summarized in the table below and further discussed in "Degree Variants."

Feature	MSCS-3	MSCS-AS	MSCS-4
Degree title on diploma	Master of Science in Computer Science	Master of Science in Computer Science— Applied Study	Master of Science in Computer Science— Foundational Studies
Program length (14-week semesters)	3	3	4
Total units	108	114	144
"Qualifying" units	at least 96	at least 96	at least 108
"MSCS Elective" units	up to 12	up to 12	up to 36
Research	(optional)	(optional)	(optional)
Internship	(optional)	**required**	(optional)

Breadth Areas: AI, Systems, Theory

- Any course specifically listed by the Program as a pre-approved course in the specific breadth area (see Appendix).
- Any course pre-approved by the Program on a case-by-case basis, based upon consideration of the syllabus and/or other descriptive materials, the spirit of the requirement, and the student's individual academic plan.

Qualifying Courses

- Any graduate course offered by the Computer Science Department (15-6xx and higher), except: "courses without prescribed content" (see below), "special topics" courses, 15-9xx courses, and courses in computer science intended for other than computer scientists, e.g., 15-650. Selected "special topics" courses may count as Qualifying (including potentially fulfilling Breadth requirements) with Program approval.
- Any course specifically listed by the Program as a pre-approved Qualifying course (see Appendix).
- Any course approved by the Program for an individual student, based upon that student's proposed course of study. Such courses might, for example, include independent study or research courses, or courses offered by other departments.
- Although there is no guarantee, and permission must be obtained by each student in each instance, the Program will often approve graduate-level and 4xx-level courses offered by other programs within SCS or ECE, within the offering program's area of specialization, intended for and qualifying for the offering program's own M.S. and/or Doctoral students.

Courses Without Prescribed Content

- Examples include independent study, practicum, seminar, colloquium, and/or research courses.
- Regardless of offering department, these courses count as MSCS Electives, unless specifically pre-approved, in each instance, as Qualifying, or as satisfying a Breadth requirement.
- In general, no more than 12 units of such courses will be accepted as requirements-satisfying, even across multiple categories.
- Students completing a thesis may be an example of a special case and approved by the Program, as appropriate, to receive 12-24 Qualifying units for associated self-defined courses. In these cases, credit beyond 12 units is typically awarded only upon acceptance of the thesis.

MSCS Elective Units

In order to support intellectual exploration, students may count up to 12 units of coursework that do not fit into other categories as "MSCS Elective units," as follows:

- Any class at any level offered by the Computer Science Department (15-xxx),
- Any graduate-level class at Carnegie Mellon,
- With advisor approval, up to 3 units of student-taught coursework (98-xxx) that addresses a computer science topic. Recent examples include:
  - 98-008 (Shilling the Rust Programming Language)
  - 98-012 (Fun with Robots)
  - 98-154 (Open-Source FPGA & ASIC Chip Design)
  - 98-317 (Hype for Types)

  See: `https://www.cmu.edu/stuco/course-catalog/`

Please note that StuCo classes are the *only* pass/fail classes that can count toward the "MSCS Elective" category (see "Passing Grades").

Waivers

The above requirements are not waivable and must generally be satisfied by work completed while enrolled in the MSCS program. In limited circumstances, coursework completed while enrolled in another program may count toward requirements via transfer (see "Transferring Credit From Within Carnegie Mellon").

Degree Variants

Switching

It is important to note that students cannot freely switch among degree variants. Switching requires Program approval and may involve other logistical issues as well. Immigration changes may impact an F-1 or J-1 student's ability to change academic program even if a change would be appropriate and permissible academically. Students studying on F-1 or J-1 documents should proactively consult with OIE when considering a program change. Thus it is important for students to carefully consider their situation during the application process, and again when enrolling in MSCS. Program changes are most feasible during the first semester of full-time enrollment. *Because it may not be possible to switch, students should affirmatively plan to be committed to one degree variant before arrival at CMU.*

Applied Study Variant

In the core MSCS program, and also in the Foundational Studies variant, both research and formalized real-world application of computer science are optional. Students completing the requirements of those degree programs are free to use their

summers for industry or research internships, volunteer work, research or employment on campus, or for a vacation. However, applying classroom learning to real-world problems in an intensive fashion helps many students firm up, or change, their career plans. The Applied Study variant is designed for students who wish to formalize and recognize the augmentation of their academic coursework through a real-world application. The modified degree title provides certification that a student's educational experiences included an applied-study component.

Students in the Applied Study degree program complete the requirements of the core 108-unit MSCS program, plus an additional 6 units of applied-study coursework and a required summer applied-study experience. In a Fall or Spring semester, students complete 15-690 (MSCS Career Preparation), a 3-unit class in which a student works with the student's Advisor and staff from the Career Center to clarify objectives for the applied-study experience and to seek, develop, and select among opportunities. In a Summer semester, students satisfy the applied-study requirement by completing an industry (or government) internship. Concurrent with the applied-study experience, students complete 15-691 (Practicum). The Practicum class represents the integration of the experience into the curriculum, supervised by a faculty member, including structured career-advice interviews and a post-experience reflection. The MSCS program cannot guarantee the availability of a paid industry internship for every student. As a fallback, software development opportunities are available in SCS and elsewhere at Carnegie Mellon.

Foundational Studies Variant

Many of the required courses assume a level of competency in foundational areas similar to that typically possessed by graduates of Carnegie Mellon's B.S. programs in the School of Computer Science or Electrical and Computer Engineering. While most students complete coursework achieving the Program's educational outcomes in three semesters, for some students a four-semester timeframe is more appropriate for achieving those outcomes.

A four-semester course of study may be a good fit for students coming from other disciplines, students who have been out of school for an extended period, or students whose former education in computer science lacked rigor in a specific foundational area. Students pursuing the four-semester degree will, with their Advisor, agree on a selection of classes in the "MSCS Elective" category which provide the necessary foundational work. Depending on a student's background and aspirations, foundational work might occupy the whole first semester of residence, or might be spread across semesters so that the student can pursue advanced coursework in an area of strength immediately upon arrival.

When selecting foundational coursework, the following topic areas and related courses are commonly of interest:

- Imperative or Object-Oriented Programming: Understanding of the object-oriented or imperative programming paradigms and confidence in software design and implementation in a corresponding compiled language, such as C, C++, or Java. [Mitigate with 15-122, 15-213/503/513, 17-313, and/or 17-514]
- Functional Programming: Understanding of the functional programming paradigms and confidence programming in a corresponding language, such ML, Haskell, or OCaml. [Mitigate with 15-151/21-127, 15-150, and/or 15-210]
- Fundamental Data Structures and Asymptotic Analysis: Ability to implement and efficiently use fundamental data structures and algorithms, such as lists, trees, sorts, searches, hash tables, as well as the ability to perform basic asymptotic analysis, e.g., Big-O, of their operations. [Mitigate with 15-650, 15-122, 15-150+15-210, 10-606+10-607, and/or 17-683]
- System Programming: The ability to use debuggers and read assembly to analyze programs, to use processes and threads as a tool for concurrent and/or expressive programming, to manage concurrency, and to use an understanding of system design, such as memory hierarchy, to improve program performance. [Mitigate with 15-213/503/513]
- Mathematical Theory: Exposure to elementary number theory, induction, the algebra of sets, equivalence relations, congruencies, recurrence equations, graph theory, and the methods of mathematical proof. [Mitigate with 15-151/21-127]
- Theory of Probability: Background in probability spaces, random variables, expectations, conditional probability and independence, limit theorems such as the strong law of large numbers and the central limit theorem, random walks [Mitigate with CMU OLI “Probability & Statistics,” 36-218, or 21-325]

Independent Study and the Thesis Option

If you happen to be interested in research, you'll be glad to know that Carnegie Mellon is an environment rich with world-leading researchers engaged in scholarly work across the diverse spectrum of the computer sciences.

Your Academic Advisor and your course professors are your primary points of contact to find research opportunities. By working through them, you will be able to contact interested researchers and research groups directly, without wasting your time and energy, and that of others, by contacting those who are not a good fit for you, or not likely to accept new students within a timeframe of interest to you. Unless they have solicited such requests, it is considered extremely poor form to contact researchers or research groups without getting an introduction from a professor who knows you well, your Academic Advisor, or the Program Director. In any case, keep your Academic Advisor up-to-date on your research plans, needs, and progress.

In some cases, for students with clear prior interests or prior interactions with Carnegie Mellon faculty members, the Program may initiate this process before matriculation or even admission. But, in the overwhelming majority of cases, in order to ensure students take the opportunity to focus on coursework and become oriented to Carnegie Mellon's research landscape, it is not begun until toward the end of the first semester.

The most common trajectory of research involvement is:

1. During the first semester at CMU, identify potential faculty members or research groups; discuss with your Academic Advisor; begin informal collaboration to define a specific project. This might involve joining a research group's weekly meetings in the second half of the semester, reading background materials, and/or becoming familiar with a software environment.
2. In the second semester, complete 12 units of 15-689 (Independent Study in the Computer Sciences). To enroll in 15-689, first join the wait list in SIO. Next, fill out the "MSCS independent-study form" and, with your research supervisor, develop a brief statement of the expected outcomes of the project. In general, the semester of research should result in some identifiable distinct public result or artifact. The form requires you and your advisor to discuss various outcomes and associated grades, both for mid-semester and the end of the semester. Upon Program approval you will be registered for 15-689.
3. In the third semester, or potentially in the summer after the second semester, register for and complete 12 units of 15-698 (MSCS Thesis). Join the 15-698 wait list and begin work to identify a two-person thesis committee and for all concerned to agree on a written proposal, as described in the directions for the "MSCS thesis-proposal form." Upon Program approval, you will be registered for 15-698. A student registered for 15-698 must, to the satisfaction of the thesis committee, pass a public thesis defense and submit a final writ-

ten dissertation by the deadline in order for 15-698 to count as a Qualifying course.

Other patterns are possible, e.g., it is possible to complete 24 units of 15-698 in a single semester. There is an upper limit of 24 total Qualifying units of research counted toward Program requirements. Students are not generally approved to count more than 12 units of 15-689 toward graduation requirements. It may be possible to count 24 units of 15-689 as Qualifying without a thesis, if the first 12-unit instance resulted in a public result of particularly high quality, such as primary authorship of an accepted publication.

The Program must approve faculty members supervising an independent study or serving on a thesis committee, based on subject-matter expertise and familiarity with the standards and practices of master's-student research. Generally speaking, full-time faculty members in any SCS unit will qualify, and faculty members in closely related areas (e.g., Electrical and Computer Engineering) will frequently be approved. Faculty members in related areas (e.g., Physics, Psychology) may well be approved for an interdisciplinary thesis. As appropriate, "external" (non-CMU) faculty members may serve as third members on thesis committees. That said, a thesis-committee chair will generally be an SCS faculty member.

The office of Graduate and Postdoctoral Affairs administers several programs that offer small research grants to graduate students. More information:

`https://www.cmu.edu/graduate/funding/`

For further detail about the process associated with undertaking an independent study or a thesis, please consult your Academic Advisor for the appropriate procedures and forms.

Internships

For many students, internships, especially summer internships, are an integral part of graduate education in computer science. Students who so choose may formally include an internship into their course of study by registering for "15-691: Practicum." As with any class, the goals and expectations may be revised from time to time. At the time of writing, the class is described as below.

> This 3-unit class is designed to both recognize and enhance the practical education of the internship experience. Students who wish to register for this class should submit to their Advisor a copy of their internship offer letter, as well as a personal statement describing their educational goals for the internship. The Advisor will confirm that the internship, the student's goals, and the program's educational goals are aligned and, once confirmed, approve the student to register for the class. Upon completion of the internship, the student must submit a reflection statement describing what they learned through the internship experience. The class grade is based upon the student's successful completion of the internship as well as the thoughtfulness and quality of expression shown in each of the two statements. Contact the Program Administrator or your Academic Advisor for guidance on writing the personal statement and reflection.

The Practicum class provides up to three units of "MSCS Elective" credit, and may be counted only once toward graduation requirements. The class is required for students pursuing the Applied Study degree. Tuition is not charged for this class.

International students must consult the Office of International Education (OIE) about eligibility *before* seeking an internship/co-op or signing an offer contract. Off-campus work authorization may require weeks or months, and international students will benefit from understanding and beginning authorization processes as soon as possible. Details may be found beginning here:

`http://www.cmu.edu/oie/`

Advising

Because MSCS students arrive from many different educational backgrounds, focus on different topics while in the MSCS program, and aim at different post-graduation goals, what each student needs is different and personalized advising is important.

Your academic advisor will collect detailed information about your preparation and initial aspirations before you arrive, and will work with you to agree on appropriate classes for your first semester.

Some strategic and tactical information will be provided during MSCS Orientation (see below). Further information about making the most of your time here, pursuing and choosing among internships, potentially pursuing research, why and how to potentially apply to Ph.D. programs, typical early-career trajectories, and selecting classes for your second semester, will be discussed in 15-604.

Procedural guidance for many topics (background checks, steps to take toward research engagement, independent study and thesis paperwork, internship paperwork, and how to file other forms) are available on Professor Eckhardt's "MSCS Advising" web page.

Please do not hesitate to contact Professor Eckhardt about academic concerns or issues that threaten to derail your academic progress. If a class is not going well, don't let that continue for more than one week before seeking advice. If you need help meeting with Professor Eckhardt quickly, please contact the MSCS Program Manager, Angy Malloy. Both have training for, and substantial experience with, with directing students toward solutions to sensitive problems.

Program Orientation

Orientation is mandatory and is held in the week before the start of classes: Wednesday, August 19, 2026. Please plan to attend the entire orientation event.

During orientation, we will do our very best to welcome you to campus and the city, and to help you feel at home here, and get to meet your colleagues and key people on campus. We will review important policies, discuss important campus and community resources, and help you to understand Carnegie Mellon's rich academic culture and traditions. We will help you get registered for classes.

Selecting and Registering for Classes

You will be contacted by an Academic Advisor prior to your arrival on campus. Your Academic Advisor will discuss your background, academic interests, career inter-

ests, and goals with you. Together with your Academic Advisor, you'll select courses for the Fall semester.

You will register for classes before the first day of classes. Orientation is a convenient opportunity. Though rare, it is possible that some of your preferred classes will have wait lists. These usually get sorted out within the first few days of classes. Your Academic Advisor can help you understand the likely impact upon your intended schedule of being waitlisted for a course.

15-604

15-604 meets weekly in Fall semesters, in the evening. This can be a convenient venue to consult your advisor on routine matters related to goals and processes. Early in the semester we will focus on understanding how to make the most of master's studies at Carnegie Mellon. As time goes by topics will broaden to include professional networking and internship searches, scholarly conduct, professional ethics, options for pursuing research, why and how to potentially apply to Ph.D. programs, typical early-career trajectories, and selecting classes for your second semester. Visitors to the class may include representatives from the Graduate Student Assembly and staff from the Career and Professional Development Center.

Academic Policies

Classes

Satisfying Prerequisites

Some students may need to take additional courses that do not satisfy any program requirement, in order to satisfy pre-requisites for other courses. This is especially true for students with educational backgrounds other than traditional computer science degrees.

Based on our experience, we expect and encourage students to take 15-503/513 or 15-213 (Introduction to Computer Systems) prior to taking required or elective systems classes, and, if possible, prior to arrival on campus in the fall. The Summer offering of 15-513, 15-503, has been especially designed to offer a low-unit, low-cost option for Master's students. It can be taken over the Internet prior to your first semester on campus.

Course Load

The standard course load is 36 units of regular classes, typically three 12-unit classes. Sometimes, depending on circumstances, a special-purpose class may be suggested or required (e.g., 15-604, 15-690, 15-691). Some students take four regular classes in one or more semesters (this does not result in extra tuition charges). One's first semester at CMU may not be the best time to take a heavy course load. In some circumstances a student may be able to register for fewer than 36 units, but you must first discuss this with your Academic Advisor. International students should consult your Academic Advisor before registering for more than 48 units in one semester.

Because courses at Carnegie Mellon are very demanding, the program defines a maximum course load, which may be different for incoming and returning students. Academic Advisors can increase the maximum course load for an individual student, based upon that student's academic plan and achievement. Your Academic Advisor will increase your maximum course load, if needed, to allow you to register for an appropriate schedule. Please seek your Academic Advisor's guidance prior to registering for, dropping, or adding classes.

Registration; Adding and Dropping/Withdrawing From Courses

Newly admitted students will receive information about course registration. The timetable for course registration, as well as for adding, dropping, and withdrawing

from courses, is set by the University as published in the official academic calendar, which can be found here:

`http://www.cmu.edu/hub/calendar`

Students are required to review their academic plans and proposed schedules with their assigned Academic Advisor prior to registering for classes and prior to adding or dropping any courses intended to be used to satisfy Requirements.

Especially after the end of the Add period, you should consult your Academic Advisor before dropping or withdrawing from a class. Frequently you should discuss the situation with your course instructor(s) as well. It is generally quite unwise to drop a class without appropriate consultation. The procedures for withdrawing from a class are complicated and dependent on timing and other circumstances, including non-academic considerations, so the first step for course withdrawal is contacting your Academic Advisor.

Special alert about drop deadlines

Students should be aware that, beginning with the Fall 2018 semester, the traditional course-drop and course-withdrawal deadlines have changed. Previously it was possible to drop a class without leaving a trace on your transcript until *after* mid-semester grades had been issued. For example, during the Fall 2017 semester the course-drop deadline was November 6th. The course-drop deadline for the Fall 2026 semester is *October 5th*, which is *before* mid-semester grades will be available to you (on October 21st). Master's students can drop *one course in each 12-month academic year* after the drop deadline without leaving a trace on your transcript, with the exception of "doctoral-level courses," which have a different schedule.

Further information is available at:

`https://www.cmu.edu/hub/registrar/course-changes/`

`https://web.archive.org/web/20221119061849/https://www.cmu.edu/cmuexp-taskforce/academics/`

Overlapping Courses

As attendance is expected in all courses, students are not permitted to enroll in courses that overlap in time. Please schedule only courses that you are able to attend.

Restricted Enrollment

Not all classes at Carnegie Mellon are open to all students. Some classes are restricted by program, by year, or by prerequisites. A few require permission of the instructor, portfolio reviews, auditions, etc. Some courses may have reservations governing how many students may enroll from particular programs or seniority levels. If you are encountering difficulty registering for a desired class, please see your Academic Advisor, who may (or may not) be able to help you register for certain

courses within the School of Computer Science, and can often offer advice about similar or alternative courses, the likelihood of getting registered, etc.

Duplicative Coursework

The Program may decline to approve coursework that is excessively duplicative. For example, as of 2026, the Machine Learning Department deems both 42-656 and 18-461/661 to be excessively duplicative with 10-601, so the Program would not count two or more of those classes toward graduation requirements.

Students can't count an unlimited number of Qualifying classes in certain sets that contain substantial overlap.

- 10-714, 11-868, 15-642: no more than two
- 10-617, 10-703, 10-707: no more than two
- 10-601, 11-637, 11-663/05-834, 11-695/17-645: no more than two

In the other direction, some classes are configured to be "repeatable," in which case taking such a classes twice is most likely not duplicative.

Consult your Academic Advisor about potentially duplicative coursework.

Academic Integrity

Please understand that CMU's standards for academic integrity are high *and may differ significantly from the standards at other places where you may have studied.* Conduct which may be accepted or commonplace elsewhere may result in you *failing a class* here, and may also lead to stronger sanctions, such as temporary Suspension, permanent Dismissal from the Program, and/or expulsion from CMU. As just one example, we understand that at some institutions it is acceptable to submit code written by somebody else as long as you can explain it in detail when asked to. *At CMU the submission of any code written by anybody else usually counts as an academic integrity violation, often results in a failing course grade, and may result in additional sanctions.*

Generally speaking, all work you submit must be your own, you must not use the work of others without proper citation, and you must not use resources, including other persons, except as authorized by the course or project for which you are submitting the work. *Each course may establish its own academic integrity policies, and hold enrolled students responsible for adhering to them.*

The University Policy on Academic Integrity includes the University expectations around academic integrity and provides definitions of cheating, plagiarism, and unauthorized assistance. We expect you to review the Policy, found here:

`http://www.cmu.edu/policies/student-and-student-life/academic-integrity.html`

A review of the University's Academic Disciplinary Actions procedures is also recommended. These procedures outline the process for investigating, reporting, and adjudicating violations of the University Policy on Academic Integrity. The procedures also outline the appeal process. The procedures are found here:

`https://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html`

Passing Grades

A passing grade is C or higher, regardless of the home department or level of the course. A passing grade is required for a course to count toward the Requirements or to serve as a prerequisite for another course. The University's grading policy is available at:

`http://www.cmu.edu/policies/student-and-student-life/grading.html`

In almost all cases, Pass/Fail grades do not count toward Program Requirements. One exception is 15-690, which counts toward the Applied Study degree variant. In limited circumstances, with advisor approval, Pass/Fail units may be counted toward the "MSCS Elective" category (see "MSCS Elective Units"). Another exception is grades issued under the Spring 2020 pandemic grading policy.

Retaking a Class

If it is necessary to retake a class, CMU's standard policy is that both attempts appear on the transcript and both grades contribute to overall QPA. In exceptional circumstances (e.g., documented medical issues), a student can petition the Director to count only the subsequent grade.

Review/Redress of Academic Issues

Final grades will be changed only in exceptional circumstances and only with the approval of the instructor and the department, unit, or program. Grading is a matter of sound discretion of the instructor and final grades are rarely changed without the consent of the instructor who assigned the grade. The following circumstances are the unusual exceptions that may warrant a grade appeal: (a) the final grade assigned for a course is based on manifest error (e.g., a clear error such as arithmetic error in computing a grade or failure to grade one of the answers on an exam), or (b) the faculty or staff member who assigned the grade did so in violation of a University policy.

It is often productive to clarify an issue with the relevant faculty member (instructor or research supervisor), then speak to your Academic Advisor. Others who may be involved in a grade appeal include the Program Director and/or the Computer Science department head (the department head may be most helpful when all parties to an issue are within the department). In addition, a university-level formal process is available.

The Summary of Graduate Student Appeal and Grievance Procedures, which covers a wide variety of academic and non-academic conduct, penalties, and administrative decisions, involving student and non-student conduct, may be found here:

`https://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html`

Discussing a matter with the Program may provide important perspective, and hopefully a quick resolution to some issues, but students should not feel restricted

to local resolution and should not hesitate to engage university resources and procedures when that seems appropriate.

Minimum QPA

During each semester, students must achieve each of a 3.0 QPA across all courses taken during the semester and also a 3.0 QPA in Qualifying Courses. Furthermore, students must maintain a minimum of a 3.0 QPA cumulatively across all semesters.

Transfer of Credit From Other Institutions

With the exception of joint degree programs, courses from other institutions may not be used to satisfy any requirement of the program. However, certain courses taken at other institutions may be approved by the Director to satisfy prerequisite requirements (e.g., 15-513) for CMU courses which themselves are used to satisfy program requirements. To request a prerequisite waiver, please provide an official transcript documenting your participation and grade in the course, as well as the course syllabus, to the Program Administrator. Once this is done, e-mail the Director explaining your request. Your request is not approved until you have received written or e-mail approval from the Director or Administrator.

The MSCS program does not currently count courses taken via the Pittsburgh Council on Higher Education (PCHE) cross-registration system toward program requirements. Carnegie Mellon courses and courses taken through the university's cross-registration system, whether they satisfy program requirements or not, will have grades recorded on the transcript and those grades will be factored into the QPA. All other courses taken, including courses taken by students enrolled in a joint degree program in accordance with the policies governing that joint degree program, will be recorded on the transcript indicating where each course was taken, but without a grade. Transfer credit recorded without a grade will not be taken into account for academic actions, honors, or QPA calculations.

Protocol for Evaluation of Transfer Credit

In situations involving unusual hardship, a student may petition the Program to consider transfer credit. As of 2026, no such petition has ever been submitted or approved. Transfer petitions must be approved by the Director, the Department Head, and the SCS Associate Dean for Master's Programs. A transfer petition must include:

- The course's catalog description, syllabus, and any official description of learning outcomes,
- The course's lecture schedule,
- The course's assignment handouts,
- A sample exam, if sample exams are made available to enrolled students,
- A curriculum vitae for the course instructor(s),

- An official transcript including the final course grade.

The Program may require the student to obtain a professional translation into English of any of the above material, using a translator acceptable to the Program. The Program may require the student to provide for review all student work product submitted as part of participating in the course, including scores and feedback received by the student. When reviewing the transfer petition, the Program will consider the breadth and depth of material covered, compared to the most-equivalent course at CMU, with reference to the learning outcomes relevant to the Program. In compliance with CMU policy, the Program will consider the accreditation status of the institution offering the course. The minimum grade required by the Program may vary depending on the institution offering the course, but will generally be at least a B (3.0), or the equivalent grade as determined by the Program. As indicated above, if transfer credit is approved, the source of the credit will appear on the transcript and the credit will not bear a grade, affect QPA computations, etc.

Transferring Credit From Within Carnegie Mellon

Up to two courses (24 units) taken at Carnegie Mellon prior to matriculation into the Master's program may be eligible to be counted toward the program requirements. These courses cannot satisfy any requirement, including a unit-count requirement, of any degree or certification earned prior to, or concurrent with, any portion of the Master's program. To request such credit, please e-mail the Director explaining your request. This e-mail constitutes permission for the Director or designee to review your prior CMU academic records for this purpose. Your request is not approved until you have received written or e-mail approval from the Director or designee.

Curricular Practical Training (CPT) & Optional Practical Training (OPT)

International students may be eligible to take part in paid summer internships via Curricular Practical Training (CPT) and to participate in Optional Practical Training (OPT) for up to 12 months during and after the Program, and may additionally qualify for a 24-month OPT extension post-graduation, under a special program for Science, Technology, Engineering, and Mathematics (STEM). Government regulations are often nuanced and may change at any time. Interested students should contact their Academic Advisor and/or the Office of International Education for more information.

Student Status and Degree Attainment

Residency and Program Timeframe

Unless special arrangements are made, students must complete coursework while enrolled at the Pittsburgh campus and while residing in the Greater Pittsburgh area. At present there is no online or remote offering of the MSCS program.

The Program is designed to be completed in no more than four (4) semesters, and in three (3) semesters by those with a sufficiently foundational and rigorous undergraduate education in computer science or strongly related field. Students may not remain enrolled in the program for more semesters than the expected completion timeframe of their degree variant without the prior written or e-mail permission of the Director.

In some circumstances, flexibility with respect to degree-completion time may be possible, but this cannot be assumed, due to a variety of complicating factors, including financial aid and international-student status.

Financial Aid Under U.S. Federal Title IV regulations, student eligibility for federal financial aid is contingent upon enrollment in and successful completion of courses that are counted as credit toward their current degree program. To receive the maximum amount of federal financial aid for which they may be eligible, students must enroll each semester in at least 36 units that count toward their current degree program.

Students should consult with their designated college liaison in The HUB regarding billing and financial aid, particularly for early completion, longer-than-standard completion, or integrated undergraduate and master's degree programs.

International Students F-1 and J-1 non-immigrant status is tied to making normal progress toward completing degree requirements. Therefore, F-1 and J-1 students who are considering completing their degree requirements early, anticipating longer-than-standard completion, or moving from an undergraduate to a graduate student classification should consult with their designated advisor in the Office of International Education (OIE) to ensure compliance with immigration regulations.

Deferred Matriculation

Offers for admission into the Program are valid only for the academic year for which they are issued. There is no right to defer an admission offer. Should it be necessary to delay your entry to the Program, it may be necessary to reapply, including payment of any necessary fees. Should your circumstances necessitate a delay in your matriculation after your acceptance, please contact the Program Administrator or Director to request a deferral, which is granted solely at the discretion of the Program.

Progress Toward Degree

Students with at least two remaining Requirements must register for, and maintain, a schedule that includes at least two courses that are Requirements or Prerequisites for Requirements.

Satisfactory Academic Standing and Academic Actions

Any student who fails to achieve the minimum QPA, infringes the Academic Integrity policy, or otherwise fails to make appropriate progress toward graduation, falls out of Good Standing with the Program. The first time a student falls out of Good Standing, the student is subject to Academic Probation, which serves as a warning to the student and may also trigger supportive actions on the part of the Program, such as advising meetings and reduced maximum course loads.

If after one semester the student has not returned to Good Standing, or should a student fall out of Good Standing more than once during the course of the Program, the student is subject to Academic Suspension, which is a mandatory, but temporary, leave from the University. It serves as an opportunity for the student to re-evaluate goals, reflect on the requirements for success, and return to the University better prepared to succeed. Any student, who having ever previously been placed on Academic Suspension, fails to remain in Good Standing, may be Dismissed from the program (i.e., expelled). Dismissal indicates a complete and permanent separation of the student from the Program.

Elevated levels of misconduct, either within or outside of a class setting, may, upon recommendation by the Director and confirmation by the Department Head, result in Academic Probation, Suspension, or Dismissal, potentially in the midst of a semester. The Department Head's determination may be appealed (see "Appealing Final Grades and Administrative Decisions").

Students will receive official notice of academic actions, such as the imposition or removal of probation, in the form of a letter mailed to the "permanent address" on file with the University.

Full-time Status Requirement

Those students admitted with full-time status are, in general, required to carry a full-time course load, presently defined by the University as 36 units. Full-time students seeking to convert, temporarily or permanently, to part-time status must request approval from the Director. Because University policy generally prevents the conversion from part-time status to full-time status beyond the enrollment period at the beginning of the semester, status changes should occur only between semesters.

Under certain circumstances international students may be required to maintain full-time student status. International students must seek the advice of the

Office of International Education (OIE) before assuming a part-time status, even if that status is approved by the MSCS program. Also, see "Course Load".

Leave of Absence/Withdrawal; Returning

The Program adheres to the University's procedures, policies, and process for leaves of absence and withdrawals. They can be found here:

`http://www.cmu.edu/policies/student-and-student-life/student-leave.html`

`https://www.cmu.edu/hub/registrar/leaves-and-returns/`

The Program adheres to the University's procedures, policies, and process with respect to the student's financial obligations as affected by leaves and withdrawals. These policies can be found here:

`http://www.cmu.edu/sfs/tuition/adjustment`

Students who fail to meet required standards of academic achievement may be required to leave the University, either temporarily or permanently. The University policies governing these academic actions can be found here:

`http://www.cmu.edu/policies/student-and-student-life/suspension-required-withdrawal-policy.html`

Students seeking to return from a Leave of Absence should contact their Academic Advisor to review their academic situation and academic plans, and for guidance with the university's Return Policy:

`http://www.cmu.edu/policies/student-and-student-life/return-student.html`

The return process typically requires more than a month, and more time is often necessary for international students.

Responsibility for Satisfying Requirements

It is the sole responsibility of the student to satisfy all requirements of the Program. The Director, Program Administrator, Advisors, and other faculty and staff, although sources of information and advice, are not responsible for notifying students of deficiencies in their academic plans or progress. Students are strongly encouraged to become familiar with the requirements and to review their progress each semester.

Completion, Certification, and Award of Degree

The University's academic regulations govern graduation and the awarding of academic degrees, including the Master's in Computer Science. The Program will certify a student's degree in the semester in which the student completes the Requirements, and may be required to do so by law or regulation, the provisions of a scholarship program, and/or University policy. But, strictly speaking, neither this Program's certification, nor the recommendation of the faculty that a degree be awarded, guarantee that the University shall award a degree. For example, the University may withhold degrees for individuals who have unsatisfied financial obligations.

Students awarded a degree based on satisfaction of the requirements of the MSCS program will receive, depending on declared degree variant, a diploma with the degree title of "Master of Science in Computer Science," "Master of Science in Computer Science — Foundational Studies," or "Master of Science in Computer Science — Applied Study" in accordance with the requirements described in the "Curriculum" section.

Students are eligible to participate in the first university-level Commencement ceremony that takes place after classes conclude in the semester in which degree requirements are completed. For example, students completing degree requirements in Summer 2026, Fall 2026, and Spring 2027 are eligible to participate in the May 2027 Commencement ceremonies.

Withdrawal of Degree

The University reserves the right to withdraw a degree even though it has been granted should there be discovery that the work upon which it was based or the academic records in support of it had been falsified. In such a case the degree will be withdrawn promptly upon discovery of the falsification. For further information:

`https://www.cmu.edu/student-affairs/cm-student-handbook/academic/withdraw_of_a_degree_policy.html`

Program Transfer within CSD, SCS, or CMU

Each degree program within Carnegie Mellon operates according to its own admissions process. Admission into one program does not guarantee admission into any other program, nor does it grant any preference. It is very rare for a student to transfer from one CMU master's program to another—the MSCS program does not expect even one student per year to transfer in or out. There is no "transfer application" process for non-CMU students.

Carnegie Mellon students seeking to transfer into the MSCS program should contact the Program Administrator for information about applying. Transfer applications must be approved by the Director, the Department Head, and the SCS Associate Dean for Master's Programs. MSCS students seeking to transfer to another program at Carnegie Mellon should contact that program for information about their requirements and process.

No student may accept admission offers from multiple degree programs, whether at CMU or elsewhere, that have overlapping program timelines, without permission from all of the overlapping programs. Students accepting an admission offer which overlaps the MSCS program may void, even retroactively, their admission to the MSCS program. Please consult your Academic Advisor for further details if necessary.

Grandfathering of Requirements

A student is generally bound to the Requirements in force at the time of matriculation, but may elect to satisfy any curriculum Requirements more recent than those under which they matriculated, e.g., a student matriculating in the 2025–2026 academic year may elect to satisfy the Requirements in force during the 2026–2027 academic year.

Because the Master's program is relatively short and in a relatively rapidly changing area, students returning from Leave or Suspension may not be able to return under the same catalog year, e.g., Requirements, under which they originally matriculated, as the supporting courses may no longer be offered or offered in their original form. Under these circumstances, the Director may approve exceptions to the prior Requirements or require that the returning student satisfy more-current Requirements, at the Director's option.

Additionally, the Director may revise the Requirements from time to time, so long as these revisions do not unreasonably impede the graduation of those in good standing. The Director may approve exceptions to revised requirements to mitigate the impact of revisions upon those affected.

Administrative Policies

Program Director, Role of

The Director is responsible for the conduct of the Program. The Director has the power to interpret all policies and, with good cause, to grant exceptions to Requirements and policies, as well as to revise them. The Director has the power to delegate this authority.

Employment During Academic Year

The Program is designed to be full-time and Carnegie Mellon is very demanding. Students within the Program are not permitted employment by Carnegie Mellon during their first two full-time semesters at Carnegie Mellon. This includes, but is not limited to, paid teaching assistant positions and paid research activities.

Students are permitted to conduct research, participate in teaching activities, etc., as unpaid volunteers or for course credit, so long as doing so does not interfere with academic performance or progress.

At the discretion of the Director, students violating this policy may be suspended or dismissed from the Program. This policy may be waived when circumstances warrant. For example, a student who served as a teaching assistant for a specific class as a CMU undergraduate may be able to obtain permission to continue in that role after joining the MSCS program. To pursue a waiver of this policy, contact your Academic Advisor. Other circumstances are possible, such as a part-time follow-on to a previous internship. Occasionally a CMU research supervisor may suggest a paid part-time research collaboration with an off-campus CMU research partner (in specific circumstances this may be available to international students via pre-completion OPT).

Teaching Opportunities

Some MSCS students serve as teaching assistants (expectations vary widely by class, including homework preparation/grading, exam preparation/grading, recitations, and/or office hours). This generally occurs in the third semester, though some students are approved for the second semester on a case-by-case basis.

Most instructors prefer teaching assistants who have previously completed a class and done very well in it, though there are some exceptions. For example, a stellar 10-701 student may well be a good candidate to serve as a 10-601 teaching assistant. A student who was a teaching assistant for multiple semesters prior

to coming to CMU may be a candidate. Most recruiting is via the instructors of a specific class and occurs in the last two months of the previous semester. Qualifications and training vary according to the department that is offering a specific class.

Students must demonstrate fluency in English before they can instruct in Pennsylvania, as required by the English Fluency in Higher Education Act of 1990. Institutions of higher education in the commonwealth must evaluate and certify the English fluency of all instructional personnel, including teaching assistants and interns.

The full university policy can be reviewed at:

`https://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html`

Summer Employment/Internships

Students are encouraged to seek on- and off-campus opportunities for internships and other employment which reinforces and enhances scientific and professional development.

International students must consult the Office of International Education (OIE) about eligibility *before* seeking an internship/co-op or signing an offer contract. Details may be found beginning here:

`http://www.cmu.edu/oie/`

Changes of Address

Students are required to update contact information in a timely fashion, and will be held responsible for any failure to receive official notices due to correct contact information not being on file. International students may jeopardize their status if address information is not current. In particular, international students who leave Pittsburgh for an internship must update their contact information when leaving and when returning. Graduates using Optional Practical Training (OPT) must likewise inform the university of address changes.

Students can update contact information using Student Information Online ("SIO"):

`https://s3.andrew.cmu.edu/sio/`

Assistance for Individuals with Disabilities

The Office of Disability Resources works to ensure that students with physical, sensory, cognitive, or emotional disabilities have equal access to their educational experience through processes providing reasonable accommodations to qualified individuals. Students who would like to receive accommodations can begin the process through the Disability Resources secure online portal:

`https://rainier.accessiblelearning.com/cmu/`

In addition, it is possible to contact ODR by e-mailing access@andrew.cmu.edu or calling 412-268-6121. For more information please see:

`http://www.cmu.edu/disability-resources/`

Domestic Partner Registration

Carnegie Mellon University extends benefits (e.g., health insurance, CMU i.d. card) to long-term domestic partners of students. Eligible students may elect benefits for their domestic partners by following the registration procedure:

`https://www.cmu.edu/student-affairs/dean/domestic-partner/`

Policy Against Sexual Harassment and Sexual Assault

The University prohibits sex-based discrimination, sexual harassment, sexual assault, dating/domestic violence, sexual exploitation, stalking, and violation of protective measures. The University also prohibits retaliation against individuals who bring forward such concerns or allegations in good faith.

The University's Sexual Misconduct Policy is available at:

`https://www.cmu.edu/policies/administrative-and-governance/sexual-misconduct/`

The University's Policy Against Retaliation is available at:

`https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html`

If you have been impacted by any of these issues, you are encouraged to make contact with any of the following resources:

- Office of Title IX Initiatives - `http://www.cmu.edu/title-ix/`, 412-268-7125, tix@cmu.edu
- University Police - `https://www.cmu.edu/police/`, 412-268-2323

Additional resources and information can be found at:

`http://www.cmu.edu/title-ix/resources-and-information/`

Enforcement of Administrative Policies

Violations of Administrative policies, at the discretion of the Director, may result in sanctions including, but not limited to, probation, suspension, or separation from the Program.

Resources and Reference

Student Lounge

MSCS students have access to a student lounge, shared with students in the Master of Science in Machine Learning (MSML) program. Your CMU i.d. card will let you into the lounge. Please comply with all posted directives and treat the shared space, including other students, in a respectful manner. The lounge is located in Tepper 1400.

Academic Calendar

The Academic Calendar contains important dates, such as those of the registration periods, add and drop deadlines, University holidays and observances, and the final exam period. The Academic Calendar can be found here:

`http://www.cmu.edu/hub/calendar`

CPDC - Career & Professional Development Center

The Career and Professional Development Center is an outstanding resource to guide you as you begin the process of thinking about internships and life after graduation. The career consultants for the School of Computer Science are Mike Stowell, mikestow@andrew.cmu.edu, and Farhana Hasan, fhasan@andrew.cmu.edu. They are an excellent source of information about employers and opportunities, as well as a great resource as you prepare your résumé and prepare for interviews. Since the Master's program is intense, but short, you are encouraged to contact them during your first semester.

There are many career and internship fairs on campus, including the "STEM Career Fair" early in the Fall semester, "Spark" (for startups and emerging companies), and the "STEAM Career Fair" early in the Spring semester.

For more information, and for information about additional resources, please do check the Center's Web portal:

`http://www.cmu.edu/career`

International Students

The Office of International Education (OIE) at Carnegie Mellon University is committed to supporting, promoting, and celebrating individuals in an intercultural environment. They advocate for and facilitate international and cross-cultural experi-

ences, perspectives and initiatives. They also help international students with the process of coming into the United States and maintaining legal status here, as well as with the process of settling in within the United States and on campus.

Their web site is a great resource and contains their contact information:

`http://www.cmu.edu/oie/`

Police

The University Police Department is located at 4551 Filmore Street. The department provides traditional security and police services on campus, operates crime prevention programs, offers Rape Aggression Defense Systems (RADS) classes and fingerprinting services, and operates a lost and found.

They can be reached by dialing 8-2323 (for emergencies) or 8-6232 (for non-emergency issues) from any campus phone.

When off-campus, in order to contact the local police, call the emergency dispatcher by dialing 9-1-1 from any cellular or landline phone. To reach University Police while off-campus or from a cellular phone, dial 412-268-2323 (for emergencies) or 412-268-6232 (for non-emergency issues).

University Police web pages can be found here:

`http://www.cmu.edu/police/`

Security and Safety Report

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault, and fire safety policies, and containing statistics about the number and type of crimes committed on the campus, and the number and cause of fires in campus residence facilities, during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-6232. The annual security and fire safety report also is available online:

`https://www.cmu.edu/police/reports/`

Emergency Medical Assistance

For emergency medical assistance on campus, call the University Police dispatcher at 412-268-2323. In most areas off campus, dialing 9-1-1 will put you in touch with an emergency dispatcher who can summon emergency medical assistance, e.g., an ambulance, for you.

Routine Medical and Health Care

University Health Services is the on-campus health center. It is available to provide students with routine health and medical care, including addressing nutrition, drug and alcohol problems, and other healthy lifestyle issues, and to help students find health and medical resources off-campus when needed. Appointments can be made online and by phone. For more information, please consult their Web site:

`http://www.cmu.edu/health-services/`

Counseling and Psychological Services

Counseling and Psychological Services (CaPS) offers students the opportunity to talk privately about academic and personal concerns in a safe, confidential setting. An initial consultation with CaPS can help clarify the nature of a concern, provide immediate support, and explore further options if needed. These may include a referral for counseling within CaPS, to another resource at Carnegie Mellon, or to another resource within the larger Pittsburgh community. CaPS also provides workshops and group sessions specifically for graduate students on campus. CaPS services are provided at no cost.

For an appointment, call 412-268-2922 during regular office hours. For emergencies, the phone is answered 24x7: every day, including holidays, at all hours of the day and night. If you aren't sure whether a problem is "bad enough" for you to call after regular office hours, you should call and an expert will help you decide. You may contact CaPS about an issue you personally are facing or to discuss a concern about another person.

While calling is arguably the best way to contact CaPS, you may find their web page here:

`http://www.cmu.edu/counseling/`

CMU Pantry

The CMU Pantry is a resource for undergraduate and graduate students to help combat food insecurity on campus.

`https://www.cmu.edu/student-affairs/resources/cmu-pantry/`

Campus Wellness

We believe our individual and collective well-being is rooted in healthy connections to each other and to campus resources. The university provides a wide variety of wellness, mindfulness and connectedness initiatives and resources designed to help students thrive inside and outside the classroom. The BeWell@CMU e-newsletter seeks to be a comprehensive resource for CMU regarding all wellness-

inspired events, announcements, and professional and personal development opportunities.

Newsletter sign-up:

`https://bit.ly/BeWellatCMU`

Wellness web site:

`https://www.cmu.edu/wellness/`

Religious and Spiritual Life Initiatives (RSLI)

Carnegie Mellon is committed to the holistic growth of our students, including creating opportunities for spiritual and religious practice and exploration. We have relationships with local houses of worship from various traditions and many of these groups are members of CMU's Council of Religious Advisors. We also offer programs and initiatives that cross traditional religious boundaries in order to increase knowledge of and appreciation for the full diversity of the worldview traditions. Our RSLI staff are here to support students across the spectrum of religious and spiritual practice and would be more than happy to help you make a connection into a community of faith during your time at CMU.

Web site:

`https://www.cmu.edu/wellbeing/resources/wellness-initiatives/religious-spiritual`

Ethics Hotline

The health, safety, and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity, violations of university policy, or violations of law.

Students, faculty, and staff can anonymously file a report by calling 844-587-0793 or visiting `https://cmu.ethicspoint.com`. All submissions are reported to appropriate University personnel and handled discreetly. The Ethics Hotline is not an emergency service! To report an emergency, call University Police at 412-268-2323.

Further information:

`https://www.cmu.edu/hr/resources/ethics-hotline.html`

University and Public Transit Systems

Pittsburgh Regional Transit (PRT) operates a system of buses and trains that serve the greater Pittsburgh area. Your University ID serves as a pass that allows you to ride most, if not all, of these services for free. You can find routes and schedules here:

`https://www.rideprt.org/`

The University provides a shuttle bus system that is a fixed route, fixed stop transportation option which is available to all CMU students, faculty, and staff. There are different shuttle buses which operate within the geographical areas which surround Carnegie Mellon. Presently, there are buses which service the Squirrel Hill, North Oakland and Shadyside areas. There are also shuttles serving Bakery Square (Google headquarters) and the PTC (Pittsburgh Technology Center).

The shuttles run by the neighboring University of Pittsburgh accept CMU i.d. cards as well.

The NightSafe Transit Service is a transportation option that serves the geographical areas surrounding Carnegie Mellon, including Squirrel Hill, Shadyside, Friendship, and Oakland. The service provides transportation from 5 designated campus pick-up locations to the intersection closest to the rider's residence, including for one guest per CMU rider. The pick-up locations are marked by official university signage, bearing the word "NightSafe."

More information about shuttles and NightSafe can be found at:

`https://www.cmu.edu/transportation/transport/shuttle.html`

`https://www.cmu.edu/transportation/transport/nightsafe.html`

University Student/Faculty Ombudsperson

An ombudsperson is a resource for exploring and understanding options, including formal procedural options but also informal people-interaction options. Consulting an ombudsperson may be helpful when a situation seems complicated and it's unclear what to do next.

CMU's Office of the Student and Faculty Ombudsperson provides a confidential resource and informal conflict resolution services to help manage and resolve concerns and conflicts that arise within the university community.

More information:

`https://www.cmu.edu/ombudsperson/`

Legal Consultation

The Graduate Student Assembly, the Office of the Provost, and the Undergraduate Student Senate have partnered to offer all CMU graduate and undergraduate students free legal consultations. Typical areas of inquiry include, but are not limited to: Landlord/Tenant, Criminal/DUI, Contracts, Employment, Civil Lawsuits (Plaintiff or Defendant), Personal Injury. Further information:

`https://www.cmu.edu/student-affairs/resources/legal-consultation.html`

Graduate Student Assembly (GSA)

The Graduate Student Assembly (GSA) is the primary campus-wide organization run by graduate students for graduate students. It is a vehicle for collaboration between graduate students and the University administration and the general student body, and is one element of the University's structured Student Government. One very notable role on campus is providing events for graduate students from across campus to take a break from their studies and research, get together, relax, and have some fun.

GSA passes legislation, allocates student activities funding, advocates for legislative action locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA is the host of the Graduate Student Lounge on the third floor of the Cohon University Center — a great place to study or meet up with friends.

More information about GSA and GSA events can be found on their Web page:
`http://www.cmu.edu/stugov/gsa/`

Student Academic Success Center

The Student Academic Success Center unifies a variety of programs, such as:

Communication and Language Support Trained consultants offer free one-on-one tutoring and workshops to help students with written, oral, and visual communication projects, including class assignments. Consultants are available to meet during the day or in the evening, and some weekend time slots are available. You can get personal expert help with writing an essay or paper for a class, designing a research poster, or writing a thesis. Workshop topics include crafting professional e-mails, team communication, slide presentation design, data visualization, and job application materials.

Language and Cross-cultural Support More than 60% of graduate students at Carnegie Mellon are international students, and others are non-native speakers of English who have attended high school or undergraduate programs in the US. Many of these students want to hone their language and cross-cultural skills for academic and professional success. Students can choose from sessions on how to give a strong presentation, writing academic e-mails, expectations and strategies for clear academic writing, how to talk about yourself as a professional in the U.S., developing clearer pronunciation, using accurate grammar, building fluency, and more. Students can make an appointment with a Language Development Specialist to get individualized coaching on language or cross-cultural issues.

The Student Academic Success Center is also charged with certifying the language of International Teaching Assistants (ITAs), ensuring that non-native English

speakers have the language proficiency needed to succeed as teaching assistants in Carnegie Mellon classrooms. Students preparing to do an ITA Certification should plan to take classes offered by the language support team at the SASC from the beginning of their first semester. Start by contacting the language support team at the SASC website or attend a Language Support Orientation at the SASC or in your department.

Learning Support Learning Support services include Academic Coaching (one-on-one and small group sessions on time management, productivity habits, stress management, and study skills); Peer Tutoring (weekly one-on-one and small-group tutoring sessions); and a variety of workshops (e.g., exam skills).

SASC website Further information about the Student Academic Success Center:
`https://www.cmu.edu/student-success`

Center for Student Diversity & Inclusion

Diversity and inclusion have a singular place among the values of Carnegie Mellon University. The Center for Student Diversity & Inclusion actively cultivates a strong, diverse and inclusive community capable of living out these values and advancing research, creativity, learning, and development that changes the world.

The Center offers resources to enhance an inclusive and transformative student experience in dimensions such as access, success, campus climate, and intergroup dialogue. Additionally, the Center supports and connects historically underrepresented students and those who are first in their family to attend college, in a setting where students' differences and talents are appreciated and reinforced.

The Center's web site is:
`http://www.cmu.edu/student-diversity/`

Veterans and Military Community

Military veterans are a vital part of the Carnegie Mellon University community. Graduate students can find information on veterans education benefits, campus services, veterans' groups at CMU, non-educational resources, and international military service information through the Veterans and Military Community website:
`http://www.cmu.edu/veterans/`

Office of Graduate and Postdoctoral Affairs

The Office of Graduate and Postdoctoral Affairs provides central support for all master's and doctoral students, as well as academic programs, with a focus on

supporting graduate student success at Carnegie Mellon. Information is available here:

`https://www.cmu.edu/graduate`

Office of the Dean of Students

The Office of the Dean of Students provides central leadership of the metacurricular experience at Carnegie Mellon. In addition to specific services and policies explicitly described in this handbook, Student Affairs is responsible for many student and community services and initiatives, e.g., athletics, Student Involvement & Traditions ("SIT"), and wellness initiatives.

More information about Student Affairs can be found here:

`http://www.cmu.edu/student-affairs`

Emergency Funding and Financial Aid

The Office of the Dean of Students manages the Student Emergency Support Funding process. There are three forms of support funding for enrolled students: emergency student loans, parental assistance loans, and the Tartan Emergency Support Fund. These funds are made available through generous gifts of alumni and friends of the university as well as support from student organizations, Undergraduate Student Senate and the Graduate Student Assembly. Students will be provided with information about the various types of funding during a consultation meeting with a member of the Dean of Students team. Tuition costs are not eligible for Student Emergency Support Funding. Further information:

`https://www.cmu.edu/student-affairs/dean/loans/`

Students who are eligible for federal or state financial aid and loans (e.g., Federal Direct Loan, Federal Direct Graduate PLUS Loan) can find procedural information here:

`https://www.cmu.edu/sfs/financial-aid/graduate/`

Research, Conference, and Travel Funding

The first source of funding for research (lab equipment, cloud services, etc.) is typically a faculty member supervising the research in question. The same is true of funding for costs associated with attending research conferences (travel, lodging, conference fees): the faculty member who supervised the research (whether at CMU or elsewhere) should be asked about this sort of funding.

Some university-wide funding is available via a collaboration between the Graduate Student Assembly and Graduate and Postdoctoral Affairs. Please note that it is necessary to apply for this funding substantially in advance—the best time is probably as soon as a publication is accepted.

Limited amounts of funding from the Computer Science Department are available in special circumstances.

In general, more funding may be available for presenters than for co-authors, and more funding for research authors than for attending a conference without a publication. Similarly, more funding may be available for full papers than for posters, and more funding for conferences than workshops.

The university's information about research funding, conference-presentation funding, and professional-engagement funding is here:

`https://www.cmu.edu/graduate/funding/`

Computing

Carnegie Mellon has a rich computing environment, including macOS-, Linux-, and Windows- based computers, public printers, public wireless networking, and a large library of software licensed for use by students. As members of this community, we are all responsible for the security of these shared resources.

Safe Computing:

`http://www.cmu.edu/computing/safe/`

University Computing Policy:

`https://www.cmu.edu/policies/information-technology/computing.html`

Computing Services Web site:

`http://www.cmu.edu/computing/start/`

If you need assistance, you can contact the Help Center at 412-268-HELP or it-help@andrew.cmu.edu.

University Libraries

University Libraries offers a wide range of information resources and services supporting graduate students in coursework, research, teaching, and publishing. The library licenses and purchases books, journals, media, and other needed materials in various formats.

Library experts can help and advise with locating and obtaining specific resources, research support, and the use and management of data. Workshops include data visualization with Tableau, cleaning data with OpenRefine, and getting started with Zotero. Drop-in hours for Digital Humanities and for Research Data Management are scheduled during the academic year.

The University Libraries home page:

`https://www.library.cmu.edu`

Parking

Parking on campus is largely based upon an annual fee-for-permit system, although there are a few short-term meters, and the East Campus garage accepts fee-per-use users at low-volume times, and is often free on evenings and weekends. For more information about parking on campus, please contact Parking and Transportation Services:

`https://www.cmu.edu/transportation/park/`

Housing

Carnegie Mellon offers on- and off- campus housing for students, and resources for finding housing in the community. For more information see the Off-Campus Housing resource page:

`https://offcampus.housing.cmu.edu`

Appendix

Systems Courses, Pre-Approved

Please do *not* assume that a non-listed class with "Systems" in its name can be counted toward the Systems requirement.

15-605 Operating Systems[‡]
15-611 Compiler Design
15-612 Operating System Practicum
15-645 Database Systems
15-618 Parallel Computer Architecture and Programming
15-640 Distributed Systems
15-641 Computer Networks
15-712 Advanced Operating Systems[‡]
15-719 Advanced Cloud Computing[‡]
15-721 Database Systems[‡]
15-740 Computer Architecture
15-744 Computer Networks
15-745 Optimizing Compilers
15-746 Advanced Storage Systems
15-821 Mobile and Pervasive Computing

Theoretical Foundations Courses, Pre-Approved

10-726 Machine Learning Theory[†]
15-614 Bug Catching: Automated Program Verification and Testing
15-635 Foundations of Blockchains[†]
15-651 Algorithms
15-652 Foundations of Programming Languages[‡]
15-657 Constructive Logic
15-653 Logic & Mechanized Reasoning
15-659 Probability & Computing
15-750 Graduate Algorithms
15-751 A Theorist's Toolkit
15-756 Randomized Algorithms[†]
15-768 Discrete Differential Geometry[†]
15-791 Advanced Topics in Foundations of Programming Languages[‡]

[‡]Academic Advisor approval is required for this class.
[†]Consult your Academic Advisor before planning this class for your first semester.

15-812 Programming Language Semantics
15-814 Type Systems for Programming Languages
15-850 Advanced Algorithms
15-852 Parallel and Concurrent Algorithms
15-853 Theory of Markov Processes‡
15-855 Graduate Computational Complexity Theory
15-857 Analytical Performance Modeling & Design of Computer Systems

Artificial Intelligence Courses, Pre-Approved

10-601 Introduction to Machine Learning (Master's)
10-617 Intermediate Deep Learning♯
10-623 Generative AI
10-703 Deep Reinforcement Learning & Control♯
11-611 Natural Language Processing
11-685/785 Introduction to Deep Learning
15-686 Neural Computation
15-688 Practical Data Science
15-780 Graduate Artificial Intelligence
16-720 Computer Vision

10-605 Machine Learning with Large Datasets†
10-701 Introduction to Machine Learning (Ph.D.)†
10-707 Advanced Deep Learning†,♯
10-715 Advanced Topics in Machine Learning‡
10-714 Deep Learning Systems†,♯
10-725 Optimization for Machine Learning†
11-777 Multimodal Machine Learning†
15-783 Trustworthy AI: Theory and Practice†
15-784 Cooperative AI†

♯See "Duplicative Coursework" list.
†Consult your Academic Advisor before planning this class for your first semester.
‡Academic Advisor approval is required for this class.

Outside of CSD, Pre-approved as Qualifying

Courses on the Systems, Theoretical Foundations, and AI lists are Qualifying, as are the courses listed below.

Twelve-unit Courses

02-712 Computational Methods for Biological Modeling & Simulation
05-631 Software Structures for User Interfaces (SSUI)
05-834/11-663 Applied Machine Learning♯
05-891 Designing Human-Centered Software
10-625 Introduction to Convex Optimization
10-708 Probabilistic Graphical Models
10-716 Advanced Machine Learning: Theory & Methods
11-637 Foundations of Computational Data Science♯
11-641/741 Machine Learning for Text Mining
11-624/724 Human Language for Artificial Intelligence
11-642 Search Engines
16-642 Manipulation, Estimation, and Control
16-782 Planning and Decision-making in Robotics
16-811 Mathematical Foundations for Robotics
11-868 Large Language Model Systems♯
17-637 Web Application Development
17-663 Programming Language Pragmatics
17-645 Machine Learning in Production (also 11-695)♯
17-665 Program Analysis
17-703 Cryptocurrencies, Blockchains, & Applications
17-731 Foundations of Privacy
17-770 Virtual Machines and Managed Runtimes†
17-759 Advanced Topics in Machine Learning & Game Theory
17-780 API Design & Implementation
18-631 Introduction to Information Security
18-756 Packet Switching and Computer Networks
21-701 Discrete Mathematics
33-658 Quantum Computation & Quantum Information Theory
36-700 Probability and Mathematical Statistics
36-705 Intermediate Statistics
80-713 Category Theory

♯See “Duplicative Coursework” list.
†Consult your Academic Advisor before planning this class for your first semester.

Nine-unit Courses

05-813 Human Factors

Six-unit Courses

The program may restrict the number of units beyond 12 counted as Qualifying that come from six-unit and three-unit classes. Please be sure to consult your Academic Advisor.

17-622 Agile Methods
17-625 API Design
17-642 Software Management Theory
17-643 Quality Management
17-662 Law of Computer Technology
47-830 Integer Programming
47-834 Linear Programming

Three-unit Courses

The program may restrict the number of units beyond 12 counted as Qualifying that come from six-unit and three-unit classes. Please be sure to consult your Academic Advisor.

17-702 Current Topics in Privacy Seminar
17-603 Communications for Software Leaders I
17-604 Communications for Software Leaders II

Graduate Courses Within CSD, Frequently Offered

15-605 Operating System Design and Implementation
15-611 Compiler Design
15-612 Operating System Practicum
15-617 HOT Compilation
15-618 Parallel Computer Architecture and Programming
15-619 Cloud Computing (Qualifying)
15-622 Introduction to Computer Music
15-640 Distributed Systems
15-641 Computer Networks
15-642 Machine Learning Systems (Qualifying)[♯]
15-651 Algorithms
15-652 Principles of Programming Languages
15-657 Constructive Logic

[♯] See “Duplicative Coursework” list.

15-659 Probability & Computing
15-662 Computer Graphics
15-663 Computational Photography
15-666 Computer Game Programming
15-668 Physics-Based Rendering
15-672 Real-Time Graphics
15-686 Neural Computation
15-688 Practical Data Science
15-712 Advanced OS and Distributed Systems
15-719 Advanced Cloud Computing
15-721 Database Systems
15-740 Computer Architecture
15-744 Computer Networks
15-745 Optimizing Compilers for Modern Architectures
15-746 Advanced Storage Systems
15-750 Graduate Algorithms
15-780 Graduate Artificial Intelligence
15-812 Programming Language Semantics
15-814 Type Systems for Programming Languages
15-821 Mobile and Pervasive Computing
15-855 Graduate Computational Complexity Theory
15-857 Analytical Performance Modeling & Design of Computer Systems
15-859 Special Topics in Theory
15-883 Computational Models of Neural Systems

Selected SCS Courses Counted as "MSCS Elective"

This list is not intended to be exhaustive. If a class does not appear on any Handbook list, it is important that you consult your Academic Advisor instead of guessing. This list in particular should be regarded as "cache" of recent determinations.

10-606 Mathematical Foundations for Machine Learning
10-607 Computational Foundations for Machine Learning
10-615 Art and Machine Learning
11-601 Coding & Algorithms Bootcamp
15-503/513 Introduction to Computer Systems
15-621 Developing Blockchain Use Cases
15-661 Interaction & Expression using the Pausch Bridge Lighting
16-735 Ethics and Robotics
17-514 Principles of Software Construction
17-617 Programming Quantum Computers
17-636 DevOps and Continuous Integration
17-684 Ethics and Policy Issues in Computing