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1 Mission/Philosophy

The mission of the Computer Science Department at Colorado State University is to provide excellent undergraduate and graduate education in computer science, to conduct the best possible research, and to disseminate knowledge through graduate education and outreach programs. Graduate students play many important roles in this mission. As students, they receive graduate education. As teaching assistants, they instruct and mentor undergraduates. As researchers, they create new knowledge to advance the field.

The purpose of this manual is to assist graduate students in succeeding in the Computer Science Department at CSU. It covers many aspects of the graduate student process, including degree requirements, funding mechanisms, department expectations, and more. This manual may not answer all your questions; however, it should answer many of them, and provide links to on-line
documents that may provide additional answers. For questions not answered by this manual, students should consult with the Director of Grade Advising, the Graduate Program Director, or their research advisor (if they have one).

The program requirements listed here are over and beyond those described in the University’s *Graduate and Professional Bulletin*[^1] which specifies the minimum requirements common to *all graduate degrees* at CSU.

## 2 Graduate Application

Students applying to a graduate program in the CS department need to be admitted both by the department and by the graduate school of the university. Therefore the admission process has two steps: a departmental review (to be completed first), and a university application (to be completed if and when the department approves). The process for new graduate students, and in other departments at CSU is described on the department’s grad application web site[^2] For students who are already in the department, the process is described in Sec.[^7]

## 3 Core Requirements for all graduate degrees

We first list core requirements common to all the graduate programs in the department. All regular[^3] courses used to satisfy (the core as well as other) degree requirements must use conventional grading (no S/U/audit grading options allowed).

### 3.1 Filing a Program of study (GS-6) before the end of the second semester

Students must file a *Program of Study* (form GS-6) with the graduate school by the end of the *second semester* in the program. This is one semester earlier than the graduate school deadline. The GS-6 is an official form, and identifies three important elements of graduate study: the advisor, the committee, and a tentative list of courses that the student plans to take.

**Advisor and Committee** The advisor is the chief mentor in a graduate student’s education. This individual works closely with the student throughout the graduate career on all matters related to the degree program. Students select their advisor by mutual consent, as a mentor-mentee relationship develops through courses, department and research seminars, and 1-on-1 discussions.

Each student also has an individual graduate advisory committee, whose members are chosen by the student in consultation with the advisor, on the basis of their interests and experience. The

[^1]: https://catalog.colostate.edu/general-catalog/graduate-bulletin
[^3]: The CSU catalog defines a regular course as one whose last two digits are strictly less than 82. Non-regular courses in the CS department include independent or group study, graduate seminar, research seminar, internship, thesis and dissertation.
advisor and committee are individualized to each student, except for MCS and the Plan B Research Initiation option students. For these students, they are assigned by default.

Plan of coursework  The GS-6 also lists all courses that the student plans to take. They must conform to the University and Department degree requirements. Transfer credits if approved (and up to the university limit for transfer credits), are also reported on the GS-6 form. The GS-6 form is started on the students RAMWeb account after consultations with the advisor.

Deviations from the plan, if any occur during the course of study, are reported on the graduation application (GS-25) submitted at the beginning of the graduation term. The modified plan must still satisfy all the degree requirements.

3.2 Six regular courses (24 credits) covering a breadth of CS

All students must take at least six regular graduate courses in the Computer Science department (4 credit hours each, total 24 credit hours). No more than two of them may be at the 400 level. No course below the 400 level may count towards the degree requirements.

To ensure adequate breadth of studies in multiple foundational areas, the above six courses must include at least three courses from the list below, with one course (4 credit hours each, for 12 total) from each of the following three groups:

**Group I (AI & Theory):**

- CS510 (Image Computation)
- CS520 (Analysis of Algorithms)
- CS522 (Foundations of Cyber-Physical Systems)
- CS523 (Foundations of Computation)
- CS540 (Artificial Intelligence)
- CS542 (Natural Language Processing)
- CS545 (Machine Learning)
- CS548 (Bioinformatics Algorithms)

**Group II (Systems):**

- CS530 (Fault Tolerant Computing)
- CS535 (Big Data)
- CS553 (Compilers for High-Performance Program Generation)
- CS555 (Distributed Systems)
- CS557 (Advanced Networking)
- CS560 (Foundations of Fine-Grain Parallelism)
- CS570 (Advanced Computer Architecture)
- CS575 (Parallel Processing)
- CS5xx (Program Verification and Synthesis)
Group III (Software Engineering & Information Assurance):

- CS514 (Software Product and Process Evaluation)
- CS515 (Software Maintenance and Evolution)
- CS517 (Software Specification and Design)
- CS518 (Distributed Software System Development)
- CS533 (Database Management Systems)
- CS556 (Computer Security)
- CS559 (Quantitative Security)
- CS567 (3D User Interfaces)
- CS5yy (Perceptual Elements in Extended Reality)

3.3 Exams and Thesis/Dissertation Defences

The Ph.D. and the Plan A MS require students to defend a final thesis and/or dissertation, and some intermediate exams. These exams are all public and follow a common format.

The student makes an oral presentation. Members of the audience and committee members ask questions of the student. The public is asked to leave, and the committee privately asks questions to the student. The student is asked to leave and the committee deliberates and decides the outcome of the defense. At the conclusion of the exam, a report is filled out, signed by the committee and given to the student.

Scheduling defenses and exams: All defenses and Ph.D. exams in the Computer Science department are open to the public, and therefore must be announced well in advance. This requires informing the Director of Graduate Advising staff at least two weeks in advance of the proposed defense. The final draft of the document must also be provided to committee members at least two weeks before the defense.

When the student and advisor are in agreement that the student is ready to defend, it is the student’s responsibility to reach out to all committee members and set a date and time. Once this is done, students should schedule a room with the Computer Science Receptionist, and provide the information to the Graduate Advisor, who will make the formal announcement.

4 Masters Program Requirements

The department offers MS and the MCS (coursework) degrees. MS students choose one of four tracks: Plan A (thesis), Plan B (with two options: Project, or Research Initiation). This section describes their requirements.

\[\text{For the complete list of the required exams and associated forms, please follow the Graduate School guidelines.}\]
4.1 M.S. Plan A (thesis)

The MS Plan-A requires 37 credits beyond the bachelor’s degree, and the preparation and defense of a thesis. It is a traditional research masters in computer science, which includes course work, research and a thesis. This degree is the preferred preparation for those who intend to go on to earn a Ph.D. Note that some requirements for this degree cannot be satisfied through online courses.

Additional Coursework: In addition to the 24 credits of the core (see 3), the Plan-A masters requires the following 13 credits of additional coursework.

1. Two (2) credit hours of CS501 (1 credit each) to be taken in the first two semesters.
2. Four (4) credits of CS793 (Research Seminar) supervised by the student’s thesis advisor, and taken for a letter grade (S/U/audit grading is not allowed).
3. Three to seven (3-7) credit hours of CS699 (Thesis). If fewer than 7 credits are taken, the remainder may be satisfied, in consultation with the advisor, by either CS793, or another 500 level (or higher) course within or outside the department.

Thesis The thesis is a written formal document which addresses, in an original fashion, some important concern of the discipline. It involves significant independent work, performed under the supervision of the advisor. Usually, the preliminary work begins during the CS793, and the defense is in the following semester.

4.2 M.S. Plan B (Project/Research Initiation)

The MS Plan-B requires 36 credits beyond the bachelor’s degree, and either a research project (option 1, Project) or exposure to research (option 2, RI). Note that some of the requirements for this degree cannot be satisfied through online courses.

4.2.1 Option 1: Research Project

In addition to the 24 credits of the core (see 3), the Plan-B option 1 masters requires the following additional coursework.

1. Two (2) credit hours of CS501 (1 credit each) to be taken in the first two semesters.
2. One additional regular graduate course (4 credit hours) in the CS department (at the 500 or higher level). Note that CS793 is not a regular course.
3. Six (6) credits of CS95 (Independent Study) supervised by the student’s project advisor. In consultation with the advisor CS793 may be used to satisfy this requirement.

Project and Final Exam The student must perform a research project under the supervision of a faculty advisor. The specific work for the project is determined by mutual discussion, and will involve tackling a problem deeper than in a regular course, typically over the course of two semesters. At the conclusion of the project, the results are publicly presented to department in the form of a poster. This poster session constitutes the final exam for the project.
4.2.2 Option 2: Research Initiation (RI) Portfolio Option

This option requires no project, but more courses, and an initiation to research by (i) taking CS501 in the first semester, and (ii) developing active and ongoing awareness of departmental research. This happens through participation in activities like BMAC seminars, thesis and dissertation defenses, poster sessions for students in the project option and CS793, and public exams of Ph.D. and MS (Plan A) students. The final exam for these students consists of critical audience participation in the project poster session in their final semester. The committee for such students is set up by default when they file their Program of Study.

Specifically, in addition to the 24 credits of the core (see Section 3.1.2) the RI option masters requires the following 12 credits of additional coursework.

1. One (1) credit hour of CS501 to be taken in the first semester.
2. Two additional regular graduate courses (8 credit hours) in the CS department (at the 500 or higher level). Note that CS793 is not a regular course.
3. Three (3) flexible credits that may be satisfied through any (500 level or higher) course in the CS department, including CS793. CS501 may only be counted once (in addition the first-semester requirement above).

4.3 MCS

The Master of Computer Science degree is a non-thesis, non-research, professional masters consisting exclusively of course work. It is offered both on-campus and online. No exams or research projects, beyond those required in courses, are required, nor may any non-regular courses be counted towards the degree requirements. In addition to the core 24 credits (see 3) three (3) additional regular CS courses at the 500 level or higher are required. The Graduate Program Director serves as the de facto advisor for all MCS students, no additional committee members are needed.