

COMPUTER SCIENCE, MS

Overview

The Master's Program in Computer Science is offered in coursework and thesis tracks. The coursework option requires both breadth and depth requirements. The breadth requirement ensures students obtain a solid foundation in core computer science areas, while the depth requirement allows students to design a sequence of courses to target a particular area of interest. The thesis track further allows students to conduct research in a chosen area of interest. The Master's degree can also be pursued in a 4+1 format in conjunction with a major in Computer Science.

Requirements

The M.S. program requires 30 credit hours of graduate coursework. Coursework requirements vary slightly depending on the chosen track, but consist of 9 credits of core breadth coursework and 21 credits of elective depth coursework. Below we outline these degree tracks with their associated course requirements and provide some example curricula. We note that some of these example curricula do not have full-time enrollment in all semesters. Additional electives can be added in these slots as needed for full-time requirements.

Coursework and Degree Tracks

At the high level, the course requirements for the M.S. can be thought of as having a *core requirement* and an *elective requirement*. The core requirement is identical to that of our Ph.D. program, which requires of one core course from each of three breadth areas (Algorithms, Systems and Artificial Intelligence/Machine Learning), for a total of three courses counting for 9 credit hours.

Our three core areas can be fulfilled by the following courses:

- Algorithms: CMPS 6610 Algorithms (3 c.h.)
- Systems: CMPS 6750 Computer Networks (3 c.h.) or CMPS 6770 Operating Systems (3 c.h.) or CMPS 6780 Computer Architecture (3 c.h.)
- AI/ML: CMPS 6620 Artificial Intelligence (3 c.h.) or CMPS 6720 Machine Learning (3 c.h.)

The remaining 21 credits can be fulfilled through one of three degree tracks: *coursework*, *project*, and *thesis* tracks. The coursework and project tracks, but not the thesis track, can be completed in the 4+1 format.

The **coursework track** can be completed by taking 21 credits of CS graduate electives.

CS graduate electives are CS courses at the 6000-level or higher excluding CMPS 6100 Introduction to Computer Science (3 c.h.), CMPS 6160 Introduction to Data Science (3 c.h.), CMPS 6140 Intro Artificial Intelligence (3 c.h.), CMPS 6240 Intro to Machine Learning (3 c.h.), and CMPS 7010 Research Seminar (3 c.h.). Core courses not counted toward the core requirement can count toward elective requirements. A comprehensive list of current courses can be found on our catalog course list page (<https://catalog.tulane.edu/courses/cmeps/>).

The **project track** can be completed by taking 15 credits of CS graduate electives and 6 credits of CMPS 7980 Independent Study (3 c.h.) or CMPS 9980 Masters Research (0 to 3 c.h.) over the course of two semesters for a grade. These courses do not culminate in a thesis but do require that project goals and assessments are clearly stated in the syllabi for the courses. Projects are completed under the advisement of a faculty mentor who is the instructor for the project (independent study or research) courses.

Finally, the **thesis track** can be completed by taking 15 credits of CS graduate electives and 6 credits CMPS 9980 Masters Research (0 to 3 c.h.) over two semesters for a grade. The thesis is supervised by a faculty advisor chosen by the end of the 2nd semester. Students must also form an M.S. Thesis Committee by the end of their 2nd semester. The M.S. Thesis Committee will consist of an advisor, one CS faculty member, and one other SSE faculty member. The final thesis must be presented and approved by the committee prior to the end of their 4th semester.

In all track options we encourage elective choices that are coherent enough to provide a specialized area of study, but flexible enough that students can explore different areas of computer science. Below we give examples of each track with sample curricula.

Coursework Track

Example coursework tracks for 21 credit hours, or 7 CS graduate elective courses are given below.

In some instances, it may be possible to submit a petition to the Graduate Studies Committee to count non-CS courses for elective credit (e.g., in an interdisciplinary subject area). No more than 2 such graduate courses may be counted toward M.S. coursework credit.

Coursework Track: AI/ML Focus

Course ID	Title	Credits
AI/ML Focus		
Semester 1		
CMPS 6620	Artificial Intelligence (*)	3

CMPS 6790	Data Science	3
Semester 2		
CMPS 6610	Algorithms (*)	3
CMPS 6720	Machine Learning	3
CMPS 6360	Data Visualization	3
Semester 3		
CMPS 6750	Computer Networks (*)	3
CMPS 6150	Multi-agent Systems	3
CMPS 6730	Natural Language Processing	3
Semester 4		
CMPS 6280	Information Theory	3
CMPS 6740	Reinforcement Learning	3

Coursework Track: Data Science Focus

Course ID	Title	Credits
Data Science Focus		
Semester 1		
CMPS 6620	Artificial Intelligence (*)	3
CMPS 6790	Data Science	3
Semester 2		
CMPS 6610	Algorithms (*)	3
CMPS 6350	Intro to Computer Graphics	3
CMPS 6300	Software Studio	3
Semester 3		
CMPS 6360	Data Visualization	3
CMPS 6280	Information Theory	3
CMPS 6750	Computer Networks (*)	3
Semester 4		
CMPS 6720	Machine Learning	3
CMPS 6150	Multi-agent Systems	3

Coursework Track: Algorithms and Theory Focus

Course ID	Title	Credits
Algorithms and Theory Focus		
Semester 1		
CMPS 6610	Algorithms (*)	3
CMPS 6280	Information Theory	3
Semester 2		
CMPS 6250	Math Found Comp Security	3
CMPS 6310	Logic in Computer Science	3
CMPS 6720	Machine Learning (*)	3
Semester 3		
CMPS 6130	Intro Comp Geom	3
CMPS 6710	Computational Complexity	3
CMPS 6750	Computer Networks (*)	3
Semester 4		
CMPS 6260	Advanced Algorithms	3
CMPS 6740	Reinforcement Learning	3

Project Track

An example project track consisting of 15 credits of CS graduate electives and 6 credits of independent study is given below.

Project-based Track, Data Science Focus

Course ID	Title	Credits
Data Science Focus		
Semester 1		
CMPS 6360	Data Visualization	3
CMPS 6620	Artificial Intelligence (*)	3
CMPS 6790	Data Science	3
Semester 2		
CMPS 6610	Algorithms (*)	3
CMPS 6350	Intro to Computer Graphics	3
CMPS 6280	Information Theory	3
Semester 3		
CMPS 6750	Computer Networks (*)	3
CMPS 7980	Independent Study	3
Semester 4		
CMPS 6720	Machine Learning	3
CMPS 7980	Independent Study	3

Thesis Track.

An example thesis track consisting of 15 credits of CS graduate electives and 6 credits of masters research is given below.

Thesis Track, AI/ML Focus

Course ID	Title	Credits
AI/ML Focus		
Semester 1		
CMPS 6280	Information Theory	3
CMPS 6620	Artificial Intelligence (*)	3
CMPS 6750	Computer Networks (*)	3
Semester 2		
CMPS 6610	Algorithms (*)	3
CMPS 6720	Machine Learning	3
CMPS 6150	Multi-agent Systems	3
Semester 3		
CMPS 6730	Natural Language Processing	3
CMPS 9980	Masters Research	3
Semester 4		
CMPS 6740	Reinforcement Learning	3
CMPS 9980	Masters Research	3

4+1 Track

Students embarking on a 4+1 masters degree should complete 6-12 credits of graduate credit during their undergraduate degree to count towards their 4+1, leaving 18-24 credits to be completed during their 5th year to finish their masters degree. Six of the graduate credits taken during their undergraduate degree may count towards both their undergraduate and graduate degrees. The remaining 6 credits may count towards **only** their graduate degree.

Graduate credit taken during undergraduate degree policies

SSE allows at most 6 graduate credit hours to be counted toward both undergraduate and graduate degrees. In our department, advanced undergraduate electives are available as “mezzanine” courses, with undergraduate and graduate sections that can count for undergraduate or graduate credit respectively. For the 4+1 degree program, undergraduate students can count 6 credit hours of graduate credit (6000-level or higher) toward both their CS major as well as an M.S. degree.

Additionally, students may apply up to another 6 credit hours of graduate coursework completed during the undergraduate degree towards their 4+1 degree only. These additional 6 credits may not be used to satisfy any of the requirements of a student's undergraduate degree (including the 120 credit hour minimum) and will apply towards their graduate degree only.

We give two sample curricula below.

4+1 Track: Data Science Focus

Here, we assume that 2 CS graduate electives were taken during their undergraduate degree to count toward the 4+1 degree.

Course ID	Title	Credits
Data Science Focus		
Semester 1		
CMPS 6350	Intro to Computer Graphics	3
CMPS 6280	Information Theory	3
CMPS 6620	Artificial Intelligence (*)	3
CMPS 6790	Data Science	3
Semester 2		
CMPS 6610	Algorithms (*)	3
CMPS 6360	Data Visualization	3
CMPS 6750	Computer Networks (*)	3
CMPS 6150	Multi-agent Systems	3

Project-based 4+1 Track: AI/ML Focus

It is possible to incorporate a project into the 4+1 degree program by pursuing project work. Here, we assume that 2 CS graduate electives were taken during their undergraduate degree to count toward the 4+1 degree.

Course ID	Title	Credits
AI/ML Focus		
Summer 1		
CMPS 6620	Artificial Intelligence (*)	3
CMPS 7980	Independent Study	3
Semester 1		
CMPS 6610	Algorithms (*)	3
CMPS 6280	Information Theory	3
Semester 2		
CMPS 6720	Machine Learning	3
CMPS 6740	Reinforcement Learning	3
CMPS 6780	Computer Architecture (*)	3
Summer 2		
CMPS 7980	Independent Study	3

Program String and Field of Study: SEMS_GR, CMPS

Contact

For more information, contact the School of Science and Engineering (<https://applygrad.tulane.edu/register/SSEInquiry/>).