CHEMICAL SCIENCES, MCS

Your future in chemistry starts at Penn. Whether you're currently a chemistry professional or seeking to enter the field, Penn's rigorous Master of Chemical Sciences (MCS) prepares you to take advantage of the myriad career possibilities available in the chemical sciences. Our program equips you with theoretical and technical expertise in biological chemistry, inorganic chemistry, organic chemistry, physical chemistry, environmental chemistry and materials.

For more information: https://www.sas.upenn.edu/lps/graduate/mcs (https://www.sas.upenn.edu/lps/graduate/mcs/)

Curriculum

The Master of Chemical Sciences degree is designed to give you a well-rounded, mechanistic foundation in a blend of chemistry topics. To that end, the curriculum is structured with a combination of core concentration courses and electives, which allow you to focus on topics best suited to your interests and goals.

Our program may be completed full time in two years. Students can also enroll part time. Our advisors are dedicated to offering each student a tailored academic plan that meets the needs of both full-time and part-time students. For example, if you are currently in the industry, you may complete the research component of the degree while at work. If you are considering part-time enrollment or would like to discuss our customizable options, please contact the Associate Director (https://www.sas.upenn.edu/lps/graduate/mcs/contact/), Dr. Tina Morgan Ross directly to learn more.

As a new student in the Master of Chemical Sciences program, you will complete a week-long new student orientation, a placement test, and meet with your academic advisor to review your previous experiences and your future goals. Based on this discussion, you will create an individualized academic schedule.

The Master of Chemical Sciences requires the minimum completion of 10 course units (CU)[1] as follows:

Code	Title	Course Units
MCS 5400	MCS Proseminar	1
Select 4 core courses based on your concentration		4
Select 2-4 elective courses based on your concentration and capstone project		2-4
Optional Independent Studies		1
Capstone Project		1-2
Total Course Units		**10**

Pro-Seminar course

The Pro-Seminar will review fundamental concepts regarding research design, the scientific method and professional skills, and scientific communication. The course will also familiarize students with techniques for searching scientific databases and with the basis of ethical conduct in science. (MCS 5400|, 1 CU)

Concentration courses

The concentration courses (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/) allow you to develop specific expertise and also signify your mastery of a field to potential employers.

The number of elective courses you take will depend upon the requirements for your area of concentration, and upon the curriculum that you plan with your academic advisor. These concentration courses allow you to acquire the skills and the critical perspective necessary to master a chemical sciences subdiscipline, and will help prepare you to pursue the final capstone project (below).

You may choose from the following six chemical sciences concentrations:

- Biological Chemistry (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#bio)
- Inorganic Chemistry (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#Inorganic)
- Organic Chemistry (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#Organic)
- Physical Chemistry (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#Physical)
- Environmental Chemistry (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#Environmental)
- Materials (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/concentration-courses/#Materials)

Independent Studies

The optional Independent Studies course will be offered each fall and spring semester, giving you an opportunity to participate in one of the research projects being conducted in one of our chemistry laboratories. During the study, you will also learn analytical skills relevant to your capstone research project and career goals. You can participate in the Independent Studies course during your first year in the program as a one-course unit elective course option. The Independent Studies course is available in the fall, spring and summer terms. (MCS 5990|, 1 CU maximum)

Capstone project

The capstone project is a distinguishing feature of the Master of Chemical Sciences program, blending academic and professional experiences and serving as the culmination of your work in the program. You will develop a project drawing from your learning in and outside of the classroom to demonstrate mastery of an area in the chemical sciences.

The subject of this project is related to your professional concentration and may be selected to complement or further develop a work-related interest. It's an opportunity to showcase your specialization and your unique perspective within the field.

Your capstone component may be a Penn laboratory research project (https://www.sas.upenn.edu/lps/graduate/mcs/curriculum/advising/), an off-campus laboratory research project (https://www.sas.upenn.edu/lps/graduate/mcs/research-partners-and-opportunities/) or a literature-based review project. All components will require a completed scientific report. It is expected that the capstone project will take an average of six to ten months to complete. Most students are expected to start at the end of the first academic year in the summer and conclude at the end of fall semester of the second year. Depending on the capstone option

selected, students may begin to work on the capstone as early as the spring semester of their first year in the program.

All capstone project proposals must be pre-approved by your committee composed of a concentration advisor and/or research supervisor, Master of Chemical Sciences Program Director and a secondary reader. If necessary, nondisclosure agreements will be signed by students securing projects with private companies. Additionally, students from private industry may be able to complete a defined capstone project at their current place of employment. All capstone projects culminate in a final written report, to be graded by the student's concentration advisor who is a member of the standing faculty or staff instructor in the Chemistry Department.

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2024 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.
