CHEMISTRY, MASTER OF SCIENCE (M.S.)

Program goal

The Department of Chemistry is committed to the dual mission of teaching and research at the bachelor's, master's and doctoral level. In teaching, the purpose is to provide high quality education in chemistry to students in preparation for professional careers at all levels. In research, the goals are to advance the science of chemistry, to keep faculty on the forefront of the field and to maintain an educational program consistent with the latest technology and development of the discipline. Service to the chemical profession is also an important aspect of the department's activities.

Student learning outcomes

1. Demonstrate expertise (breadth and depth) in chemistry
2. Demonstrate effective oral and written communication skills in chemistry
3. Demonstrate ability to analyze data critically
4. Demonstrate ability to conduct independent research correctly while abiding by ethical and safety standards

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the Graduate School website (http://www.graduate.vcu.edu/) and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students. (https://bulletin.vcu.edu/academic-regs/)

Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the academic regulations section for additional information on degree candidacy requirements. (https://bulletin.vcu.edu/academic-regs/grad/candidacy/)

Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements. (https://bulletin.vcu.edu/academic-regs/grad/graduation-info/)

Other information

The Department of Chemistry graduate handbook is available online (https://chemistry.vcu.edu/graduates/graduate-handbook/).

Apply online today. (https://www.vcu.edu/admissions/apply/graduate/)

Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
M.S.	Fall	Mar 15	GRE-General
	Spring	Nov 15	

In addition to the general admission requirements of the VCU Graduate School (https://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/), the following requirements represent the minimum acceptable standards for admission:

1. Have a bachelor's degree from an accredited college or university with 30 credit hours in chemistry
2. Admission on a provisional basis is possible for a student temporarily lacking this expected chemistry background.

Degree requirements

In addition to general VCU Graduate School graduation requirements (https://bulletin.vcu.edu/academic-regs/grad/graduation-info/), students are required to complete course work in core and elective courses and to conduct significant research.

1. Credit hour requirements: Students in the M.S. in Chemistry program are required to earn a minimum of 30 graduate-level credit hours beyond the baccalaureate. At least one-half of the credit hours presented for graduation must be at the 600 level or higher.
2. Proficiency exams: Students must take proficiency exams in analytical, inorganic, organic and physical chemistry during orientation week. These examinations are standardized tests to determine weaknesses at the undergraduate level that should be corrected by selecting the appropriate elective courses.
3. Candidacy: Students can apply for M.S. candidacy upon adviser approval and after didactic courses are completed with a GPA of 3.0.

4. Other requirements: For the M.S. with thesis option, students must have an adviser and are required to write a document on their research project to present in a seminar and an oral defense to their thesis committee. For the non-thesis option, students are expected to complete a research project guided by a scientist at an industrial, government or academic laboratory. This research is to be done in collaboration with a co-advisor at VCU and can be carried out while the student is in full-time employment or during an internship. A comprehensive written report on the research done, along with a seminar presentation to the student's advisory committee, is required.

Curriculum requirements

Thesis option

Course	Title	Hours
Core courses		
CHEM 504	Advanced Organic Chemistry I	3
CHEM 510	Atomic and Molecular Structure	3
CHEM 520	Advanced Inorganic Chemistry	3
CHEM 692	Chemistry Seminar Presentation	1
CHEM 693	Chemistry Perspectives and Ethics	1
CHEM 696	Professional Skill Development	3
CHEM 698	Investigations in Current Chemistry Literature	1
Directed research		
CHEM 697	Directed Research	9
Electives		
Choose from list below.		6
Total Hours		**30**

The minimum number of graduate credit hours required for this degree is 30.

Non-thesis option

Course	Title	Hours
Core courses		
CHEM 504	Advanced Organic Chemistry I	3
CHEM 510	Atomic and Molecular Structure	3
CHEM 520	Advanced Inorganic Chemistry	3
CHEM 692	Chemistry Seminar Presentation	1
CHEM 693	Chemistry Perspectives and Ethics	1
CHEM 696	Professional Skill Development	3
CHEM 698	Investigations in Current Chemistry Literature	1
Directed research		
CHEM 697	Directed Research	6
Electives		
Choose from list below.		9
Total Hours		**30**

The minimum number of graduate credit hours required for this degree is 30.

Students will present a seminar to their thesis committee (thesis option) or advisory committee (non-thesis option) during the semester of graduation when they register for CHEM 692. This course receives a standard letter grade (A-F).

Students taking CHEM 696 for the first time are required to attend instructional sessions to clarify expectations and responsibilities and to partake in activities for development of professional skills. For non-thesis students, a maximum of nine credits of CHEM 696 can be presented toward graduation, but the course can be taken concurrently with CHEM 697. Both courses are graded as satisfactory or unsatisfactory.

Approved electives

Course	Title	Hours
CHEB 601	Chemical Biology I	3
CHEB 602	Chemical Biology II	3
CHEM 506	Introduction to Spectroscopic Methods in Organic Chemistry	1.5
CHEM 511	Chemical Thermodynamics and Kinetics	3
CHEM 512	Applied Molecular Modeling	3
CHEM 591	Topics in Chemistry	1-6
CHEM 604	Advanced Organic Chemistry II	3
CHEM 606	Advanced Spectroscopic Methods in Organic Chemistry	1.5
CHEM 622	Solid State and Materials Chemistry	1.5
CHEM 630	Electroanalytical Chemistry	1.5
CHEM 631	Separation Science	1.5
CHEM 633	Mass Spectrometry	1.5
CHEM 635	Spectrochemical Analysis	1.5
CHEM 636	Chemical Sensors and Biosensors	1.5
CHEM 637	Electrochemistry Applications	1.5
CHEM 691	Topics in Chemistry	1-6

Accelerated opportunities

The department offers opportunities for qualified undergraduate students to earn both an undergraduate and graduate degree in a minimum of five years by completing approved graduate courses during the senior year of their undergraduate program. **See the program page in the Undergraduate Bulletin** for details.

Contact
Soma Dhakal, Ph.D.
Associate professor and graduate program director
sndhakal@vcu.edu
(804) 461-3131

Additional contact
Indika U. Arachchige, Ph.D.
Associate professor and chair of graduate admissions
iuarachchige@vcu.edu
(804) 828-6855

Program website: chemistry.vcu.edu (http://chemistry.vcu.edu/)