

# CHEMICAL BIOLOGY, DOCTOR OF PHILOSOPHY (PH.D.) WITH A CONCENTRATION IN BIOLOGY

## Program goal

Chemical biology presents a framework for the modern approach to studying the complexities of biological processes. It is already a leading focal point for research in the 21st century, integrating concepts and information from the molecular to the cellular level. This interdisciplinary degree program has participants from the departments of Chemistry, Biology, Biochemistry and Molecular Biology, Medicinal Chemistry and Pharmacology within the College of Humanities and Sciences and the schools of Medicine and Pharmacy.

## Student learning outcomes

1. Demonstrate expertise (breadth and depth) in chemical biology
2. Demonstrate appropriate ability to design and conduct experimental research
3. Demonstrate ability to analyze data critically and to design experiments independently
4. Develop competency in the responsible conduct of research
5. Develop effective oral and written communication skills

## 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/) (<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/) (<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/) (<https://bulletin.vcu.edu/academic-regs/grad/graduation-info/>)

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## Admission requirements

| Degree: | Semester(s) of entry: | Deadline dates: | Test requirements: |
|---------|-----------------------|-----------------|--------------------|
| Ph.D.   | Fall                  | Mar 15          | GRE                |
|         | 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. Students must present a satisfactory GPA score of a minimum of 3.0 on a 4.0 scale; satisfactory GRE scores (must be less than five years old); a written statement of the candidate's goals; and three letters of recommendation.
2. Students are required to have a bachelor's degree from an accredited college or university with 30 semester credit hours in chemistry or biology. These credit hours should consist of at least two semesters of organic chemistry and a biology course in cell biology, molecular biology or genetics. A physical chemistry course is desirable.
3. If applicants have outstanding potential but lack specific requirements, they may be accepted as provisional. Provisionally accepted students must complete all conditions within one year of enrollment.

Graduate students in the program may receive financial support via teaching or research assistantships or fellowships available from the "home" department. No part-time students are accepted at this time.

## 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 Ph.D. in Chemical Biology program are required to earn a minimum of 72 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. Other requirements: Upon completion of their course work, students will complete their dissertation requirements, which will typically consist of a written and oral dissertation proposal, research and literature seminars, and both a written and oral dissertation defense.

## Curriculum requirements

| Course                                     | Title  | Hours    |
|--|--|----------|
| <b>Courses</b> <sup>1</sup>                |  |          |
| CHEB 601                                   | Chemical Biology I   | 3        |
| CHEB 602                                   | Chemical Biology II  | 3        |
| CHEB 690                                   | Research Seminars in Chemical Biology (credit hours variable) <sup>2</sup> | variable |
| or CHEB 690                                | Research Seminars in Chemical Biology                                      |          |
| CHEB 697                                   | Chemical Biology Research Rotations (credit hours variable) <sup>3</sup>   | variable |
| CHEM 693                                   | Chemistry Perspectives and Ethics <sup>4</sup>                             | 1        |
| CHEM 697                                   | Directed Research (credit hours variable) <sup>5</sup>                     | variable |
| <b>Electives</b>                           |  |          |
| Select four of the following: <sup>6</sup> |  | 11       |
| BIOC 500- and 600-level courses            |  |          |
| BIOC 605                                   | Molecular Biology  |          |
| BIOL 500- and 600-level courses            |  |          |
| BIOL 545/<br>LFSC 510                      | Biological Complexity  |          |
| BIOL 548/<br>LFSC 520                      | Bioinformatic Technologies   |          |
| BIOL 565                                   | Advances in Cell Signaling   |          |
| BIOL 676                                   | Plant and Animal Cell Biology  |          |
| CHEM 500- and 600-level courses            |  |          |
| CHEM 504                                   | Advanced Organic Chemistry I   |          |
| CHEM 506                                   | Introduction to Spectroscopic Methods in Organic Chemistry                 |          |
| CHEM 604                                   | Advanced Organic Chemistry II  |          |
| CHEM 606                                   | Advanced Spectroscopic Methods in Organic Chemistry                        |          |
| LFSC 500- and 600-level courses            |  |          |
| LFSC 510                                   | Biological Complexity  |          |
| LFSC 520                                   | Bioinformatic Technologies   |          |
| MEDC 500- and 600-level courses            |  |          |
| PHTX 500- and 600-level courses            |  |          |

1

At least 18 credit hours of didactic course work must be completed.

2

Students are expected to participate in their home department's seminar program.

3

Students are expected to enroll in CHEB 697 or directed research (one credit minimum) every spring and fall semester.

4

Students are expected to enroll in CHEM 693 within their first year of matriculation. Other courses may be used to satisfy this requirement in research conduct and ethics in consultation with the graduate program director.

5

Students may also enroll in CHEB 697 or PHIS 697 for directed research credit hours.

6

The list of recommended electives includes some typical courses taken in this concentration, but there is flexibility in designing a program of study in consultation with the adviser and graduate program director.

**The minimum total of graduate credit hours required for this degree is 72.**

### Contact

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**Program website:** chembio.vcu.edu (<http://www.chembio.vcu.edu/>)