

# CELLULAR, MOLECULAR, AND MICROBIAL BIOLOGY PH.D. - CELLULAR AND DEVELOPMENTAL BIOLOGY

## General Graduate Program Requirements

Graduate School policies and standards can be found on the Graduate School Policies page (<https://catalog.umn.edu/graduate/school-policies/>).

The minimum GPA for any graduate program is 3.0. Individual programs may require more than a 3.0 to remain in good standing.

The minimum grade for a course to be accepted toward any master's or doctoral requirement is C. The minimum grade for a course to be accepted toward a certificate program is B-. Individual programs may require higher grades for specific courses.

## Doctor of Philosophy - Cellular, Molecular, and Microbial Biology; Cellular and Developmental Biology Concentration

- All CMMB PhD students have a common set of requirements: students must take a total of 60 semester credits, including 20 semester credits of courses (includes any course other than Dissertation and Research).
- At least three 3-credit (or more) graduate courses at the 500 or 600 level.
- In addition to coursework, all PhD students must teach at least one semester (typically as a Graduate Teaching Assistant) and must rotate in at least two research laboratories.
- The following credit limitations apply:
  - A maximum of 6 credits of Special Topics (BCH 591, BIOB 591 and BIOM 591).
  - A maximum of 6 credits of Independent Study (BIOB 592, and BIOM 592).
  - A maximum of 20 credits of dissertation (BCH 699 and BIOM 699).

## Course Requirements

| Code                                                                                                                                                      | Title                                                  | Hours |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------|
| <b>Core Courses</b>                                                                                                                                       |                                                        |       |
| Complete all of the following courses:                                                                                                                    |                                                        |       |
| BCH 570                                                                                                                                                   | Intro to Research                                      | 2     |
| or BIOM 570                                                                                                                                               | Intro to Research                                      |       |
| BIOB 547                                                                                                                                                  | Experimental Molecular, Cellular, and Chemical Biology | 4     |
| BIOM 594                                                                                                                                                  | Molecular and Biomedical Sciences Seminar              | 4     |
| <b>Electives, Research, and Dissertation</b>                                                                                                              |                                                        |       |
| Complete 50 credits of elective courses.                                                                                                                  |                                                        | 50    |
| Elective courses can include any graduate-level course in General Biology (BIOB), Microbiology (BIOM), and Biochemistry (BCH). Suggested courses include: |                                                        |       |

|                    |                                   |
|--------------------|-----------------------------------|
| BCH 582            | Proteins and Enzymes              |
| BCH 584            | Nucleic Acids                     |
| BCH 590            | Research                          |
|                    | or BIOM 590 Research              |
| BCH 600            | Cell Organization & Mechanisms    |
| BCH 699            | Dissertation                      |
|                    | or BIOM 699 Dissertation          |
| BIOB 567           | Molecular Analysis of Development |
| BIOM 502           | Advanced Immunology               |
| <b>Total Hours</b> | <b>60</b>                         |