Introduction to computation will take background courses in computer science. The specific required background courses will be determined by the students’ graduate committees with the approval of the program director. Note that credits from courses numbered 300 and below do not count toward the BCB degree requirements, though they may be required to fulfill deficiencies.

The core courses form a central, shared educational experience for all BCB students. These courses will enable them to share a common language and to discuss problems from multiple disciplinary points of view. This shared experience will also give BCB students a sense of identity and community, which will encourage them to help each other overcome cultural and terminological differences that usually make such interdisciplinary interactions challenging. When possible and appropriate, core courses will include group projects using team members with backgrounds in different disciplines.

The depth courses provide more detailed knowledge of bioinformatics and computational biology and provide the springboard for graduate research. The list of courses will evolve with the research interests of the BCB faculty participants, and more will be added as new faculty members join the program. See the program webpage at www.uidaho.edu/cogs/bcb (http://www.uidaho.edu/cogs/bcb/) for the latest information.

Other courses may be required as determined by the student’s committee.

To explicitly make it easier to bridge the traditional gap between disciplines, the BCB program includes four bridging activities:

- **Seminars and Workshops**: Seminar series are available, and BCB students are required to participate. Seminars are an opportunity for students to interact with experts in a variety of fields. Workshops will provide practical experience with tools and techniques.
- **Lab rotations**: In order to expose doctoral students to the research perspectives of another discipline, we will require them to spend at least one semester in a lab outside the discipline of their major professor. The lab will be the research lab of one of the participating BCB faculty outside the discipline of the student’s major professor. The student’s committee will determine, in conjunction with participating faculty members, with whom the student will meet this requirement. There is no lab rotation requirement for M.S. students.
- **One Credit Supplements**: General courses in computer science, mathematics, and statistics sometimes lack material specific to bioinformatics and computational biology. Participating faculty will offer one-credit supplements to current courses in order to provide this connection without duplicating courses in the current catalogue. These will be required of BCB students as determined by their graduate committees.
- **Teaching experience**: Each doctoral candidate will be required to have at least one semester of teaching experience relevant to the BCB program with the details of this requirement determined by their committee. This requirement may be satisfied, for example, by teaching a course, running a workshop, offering a supplement, or working as a teaching assistant.

The M.S. requires a minimum of 30 credits, and the Ph.D. requires a minimum of 78 credits. The BCB program assumes the usual graduate full-time load of at least 9 credits per semester. Note that the Ph.D. requires at least 18 credits of “other” supplemental, or workshop courses at the 400-level or above since there are a total of 60 minimum required core, depth, thesis, seminar, and laboratory credits, and the student must have at least 78 credits to graduate.
## M.S. Degree

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Core Courses:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 515</td>
<td>Computational Biology: Sequence Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 552</td>
<td>Professional Development for Biologists</td>
<td>3</td>
</tr>
<tr>
<td>MATH 563</td>
<td>Mathematical Genetics</td>
<td>3</td>
</tr>
<tr>
<td><strong>Depth Courses:</strong></td>
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<td>9</td>
</tr>
</tbody>
</table>

Students must complete at least 3 credits in Biological Sciences and 3 credits in Computer/Mathematical/Statistical Sciences

**Biological Sciences**
- BIOL 421 Advanced Evolution/Population Dynamics
- BIOL 444 Genomics
- BIOL 526 Systems Biology
- BIOL 545 Phylogenetics
- BIOL 547 Virology
- BIOL 554 Biochemistry II
- BIOL 585 Prokaryotic Molecular Biology
- BIOL 587 Cellular and Molecular Basis of Disease
- PLSC 588 Genetic Engineering
- WLF 561 Landscape Genetics

**Computer/Mathematical/Statistical Sciences**
- BIOL 526 Systems Biology
- CS 511 Parallel Programming
- CS 570 Artificial Intelligence
- CS 572 Evolutionary Computation
- MATH 451 Probability Theory
- MATH 452 Mathematical Statistics
- MATH 538 Stochastic Models
- MATH 428 Numerical Methods
- PHYS 533 Statistical Mechanics
- STAT 519 Multivariate Analysis
- STAT 565 Computer Intensive Statistics

**Graduate Seminar:**
- BCB 501 Seminar

**Thesis:**
- BCB 500 Master's Research and Thesis

**Total (min):**
- 30

1. Obtain understanding of the disciplines of Bioinformatics and Computational Biology (BCB): the biological sciences, computational sciences, and mathematical sciences. Master the fundamental concepts of BCB from the perspective of each of the three program disciplines with the ability to integrate the multidisciplinary principles.

2. Acquire specialized expertise and master state-of-the-art research topics in one of the three BCB areas: biological sciences, computational sciences, or mathematical sciences.

3. Be able to explain BCB concepts and research results to people with widely varying backgrounds: experts in the same and other fields as well as the general public.

4. Accomplish significant and innovative interdisciplinary research by combining concepts and theories from the three BCB areas.