>Bioinformatics Minor

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Why Bioinformatics?
A computer-assisted approach is now central to biological research (molecular, physiological, ecological, medical). Working effectively in interdisciplinary teams is an essential skill for researchers and developers.

What is a Cross-Disciplinary Minor (CDM)?
CDMs are minors that require a number of courses from two or more different departments (BIO/CHEM and CSC and STAT in this case). CDMs require at least 12 units and no more than 24 units that do not count toward your degree.

What is the current status of the Bioinformatics CDM?
The minor is approved and will appear in the 2020-2021 Catalog. (Any student graduating after Fall 2021 can get the minor degree.)

How many units will I need to take in addition to my major?
BIO/MCRO majors take 16 units outside their degree. BCHEM majors take 24 units outside the major. CSC majors take 12 units outside their degree. STAT majors take 16 additional units.

What help and guidance is there to student pursuing the Bioinformatics CDM?
We are committed to helping student succeed and earn this degree. We expect to provide:
- Frequent email updates about classes, deadlines, etc.
- Individualized advising as needed
- Tutoring sessions by Biology, Statistics, and Computer Science seniors and graduate students
- Help enrolling in hard-to-get courses.
- Connections to a cohort of students with similar academic and career interests.
- T-shirts! Badges! Free food!
### Bioinformatics Minor Course List

“DC” means that this class counts for Degree Credit for the major listed.

<table>
<thead>
<tr>
<th>Biology/Biochemistry Requirements</th>
<th>BIO</th>
<th>BCHM</th>
<th>CSC</th>
<th>STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 161 (Intro Cell and molecular biology, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
<td>DC1</td>
</tr>
<tr>
<td>BIO 351 (Genetics, 5) or CHEM 373 (Molecular Biology, 3)</td>
<td>DC</td>
<td>DC</td>
<td>DC2</td>
<td></td>
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<tr>
<td>CHEM 124 or 127 (General Chemistry, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
<td>DC1</td>
</tr>
<tr>
<td>CHEM 125 or 128 (General Chemistry, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>CHEM 312 (Survey of Organic Chemistry, 5) or CHEM 216 (Organic Chemistry, 5)</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
</tr>
<tr>
<td>BIO/CHEM 475 (Molecular Biology Lab, 3)</td>
<td>DC</td>
<td>DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,5,6 One of BIO 305, 308, 327, 361, 413, 414, 415, 419, 442, 444, 446, BOT 326, 329, CHEM 313, 371, MCRO 320, 342, 421, 433, MSCI 330</td>
<td>DC</td>
<td>DC</td>
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<table>
<thead>
<tr>
<th>Bioinformatics Requirements</th>
<th>BIO</th>
<th>BCHM</th>
<th>CSC</th>
<th>STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO/CHEM 441 (Bioinformatics Applications, 4) or CSC 448 (Bioinformatics Algorithms, 4)</td>
<td>DC</td>
<td>DC (441)</td>
<td>DC (448)</td>
<td>DC (441)</td>
</tr>
<tr>
<td>Proposed: DATA 441/442 (Capstone, 2 units each)</td>
<td>DC</td>
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<thead>
<tr>
<th>Computer Requirements</th>
<th>BIO</th>
<th>BCHM</th>
<th>CSC</th>
<th>STAT</th>
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<tbody>
<tr>
<td>CSC 101 (Fundamentals of Computer Science, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>CSC 202 (Data Structures, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC3</td>
<td></td>
</tr>
<tr>
<td>CSC 203 (Object-Oriented Programming and Design, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistics Requirements</th>
<th>BIO</th>
<th>BCHM</th>
<th>CSC</th>
<th>STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 302 (Statistics II) or 312 (Stat Meth. for Eng) or 313 (App Exp Design), 4</td>
<td>DC (313)</td>
<td>DC (312)</td>
<td>DC (312)</td>
<td>DC (302)</td>
</tr>
<tr>
<td>STAT 331 (Statistical Computing in R, 4)</td>
<td>DC</td>
<td>DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATA 301 (Intro to Data Science, 4)</td>
<td>DC</td>
<td>DC</td>
<td>DC3</td>
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<table>
<thead>
<tr>
<th>Units beyond Major Degree Requirements</th>
<th>BIO</th>
<th>BCHM</th>
<th>CSC</th>
<th>STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16</td>
<td>24</td>
<td>12</td>
<td>16</td>
</tr>
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</table>

1. GE area B2 or B3  
2. Support elective  
3. List B elective  
4. BIO 305, BIO/CHEM 308, BOT 329, CHEM 313, MSCI 330 prerequisites are fulfilled by required courses in the CDSM. All other courses include additional prerequisites that do not count toward CDSM degree credit.  
5. If CHEM 216 is used to fulfill CDSM degree requirement, MCRO 320 and MCRO 433 should not be used to fulfill this requirement to ensure that half CDSM units are upper division.  
6. If a GE Area F course is used to fulfill this requirement take care to ensure that at least 12 units of CDSM courses do not count for degree credit.
Stay on track for your degree. Take 16 or more units most quarters. For the Bioinformatics Minor, take...

**BIO/MICRO**

**Freshman**
- **CSC 101 in Spring** (Prereq: AP Math or Math 118)

**Sophomore**
- **CSC 202 in Fall** (Prereq: CSC 101)
- **CSC 203 in Winter** (Prereq: CSC 202)

**Junior**
- **STAT 313 in Fall** (Prereq: STAT 218)
- **STAT 331 in Winter** (Prereq: CSC 101, STAT 313)
- **DATA 301 in Spring** (Prereq: CSC 202, STAT 313)

**Senior**
- **BIO/CHEM 441 in Fall** (Prereq: BIO 161, BIO 351)
- **DATA 441 in Winter** (Prereq: BIO 441, DATA 301)
- **DATA 442 in Spring** (Prereq: DATA 441)

**BCHEM**

**Freshman**
- **CSC 101 in Spring** (Prereq: AP Math or Math 118)

**Sophomore**
- **CSC 202 in Winter** (Prereq: CSC 101)
- **CSC 203 in Spring** (Prereq: CSC 202)

**Junior**
- **STAT 312 in Fall** (Prereq: Math 142 or higher)
- **STAT 331 in Winter** (Prereq: CSC 101, STAT 312)
- **DATA 301 in Spring** (Prereq: CSC 202, STAT 312)

**Senior**
- **BIO/CHEM 441 in Fall** (Prereq: BIO 161, BIO 351)
- **DATA 441 in Winter** (Prereq: BIO 441, DATA 301)
- **DATA 442 in Spring** (Prereq: DATA 441)

**CSC**

**Freshman**
- **BIO 161 in Spring** (Prereq: AP Math or Math 118)

**Sophomore**
- **CHEM 124 in Fall** (Prereq: CSC 101)
- **CHEM 125 in Winter** (Prereq: CSC 202)

**Junior**
- This year take:
  - **CHEM 312**
  - **BIO 351, BIO 475**
  - **DATA 301, STAT 331**

**Senior**
- **CSC 448 in Fall** (Prereq: BIO 161, BIO 351)
- **DATA 441 in Winter** (Prereq: BIO 441, DATA 301)
- **DATA 442 in Spring** (Prereq: DATA 441)

**STAT**

**Freshman**
- **STAT 302 + CSC 101 in Spring** (Prereq: AP Math or Math 118)

**Sophomore**
- **CSC202+BIO161 Fall** (Prereq: CSC 101)
- **STAT 331+CHEM 124/127 Winter** (Prereq: CSC 202)

**Junior**
- **DATA 301+CHEM 312** (Prereq: STAT 218)
- **CSC 203+BIO 351** (Prereq: CSC 101, STAT 313)
- **BIO475+Bioinf. elect.** (Prereq: CSC 202, STAT 313)

**Senior**
- **BIO 441 or CSC 448** (Prereq: BIO 161, BIO 351)
- **DATA 441 in Winter** (Prereq: BIO 441, DATA 301)
- **DATA 442 in Spring** (Prereq: DATA 441)