**BIOINFORMATICS (MS)**

**NON-THESIS**
Students gain real-world experience in an internship environment and are exposed to a breadth of course work in the field. Students will be able to pursue employment (e.g. in the biotech industry, research institutions, and government agencies), or further advanced degrees (e.g. PhD or MD).

**THESIS**
Students are trained in conducting hypothesis-driven independent research including experimental design, analysis and interpretation of results, as well as scientific writing and presentation. At the conclusion of their studies, students are primed for research positions in the private and public sector and competitive PhD programs.

**CURRICULUM**

**Degree Requirements**
Students pursuing the Master of Science in Bioinformatics must complete 30 credit hours. Six (6) courses worth a total of 17 credit hours make up the Core Curriculum requirements, and students select a Non-Thesis or Thesis track to complete the remaining 13 credit hours required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 488</td>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>COMP 483</td>
<td>Computational Biology</td>
<td>4</td>
</tr>
<tr>
<td>STAT 437</td>
<td>Quantitative Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>BIOI 500</td>
<td>Advanced Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>BIOI 501</td>
<td>Bioinformatics Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Select one of the following:

- BIOL 565 | Exploring Proteins                                          | 3     |
- CHEM 465 | Special Topics in Biochemistry (Proteomics)               |       |

**Track Requirements (see below)** 13

**Total Hours** 30

**Non-Thesis Track**
Master of Science in Bioinformatics students in the Non-thesis track complete a Bioinformatics Internship and four (4) approved electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 498</td>
<td>Bioinformatics Internship 1</td>
<td>1</td>
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</tbody>
</table>

Select four from the following 12

- BIOL 402 | Microbiology                                               |       |
- BIOL 482 | Advanced Molec Genetics                                    |       |
- BIOL 495 | Special Topics (Genomics; Infectious Diseases; Metagenomics) |       |
- CHEM 423 | Medicinal Chemistry                                        |       |
- CHEM 465 | Special Topics in Biochemistry (Advanced Enzyme Kinetics and Mechanisms; Plant Biochemistry) |       |
- COMP 406 | Data Mining                                                |       |
- COMP 413 | Intermediate Object-Oriented Development                  |       |
- COMP 439 | Distributed Systems                                        |       |
- COMP 453 | Database Programming                                       |       |
- COMP 460 | Algorithms & Complexity                                    |       |

**Total Hours** 13

**Thesis Track**
Master of Science in Bioinformatics students in the Thesis track complete one (1) approved electives as well as design and conduct thesis research under direction of faculty.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 494</td>
<td>Bioinformatics Research Design</td>
<td>1</td>
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<tr>
<td>BIOL 499</td>
<td>Bioinformatics Research</td>
<td>8</td>
</tr>
<tr>
<td>BIOI 595</td>
<td>Thesis Supervision</td>
<td>1</td>
</tr>
</tbody>
</table>

Select one of the following 3

- BIOL 402 | Microbiology                                               |       |
- BIOL 482 | Advanced Molec Genetics                                    |       |
- BIOL 495 | Special Topics (Genomics; Infectious Diseases; Metagenomics) |       |
- CHEM 423 | Medicinal Chemistry                                        |       |
- CHEM 465 | Special Topics in Biochemistry (Advanced Enzyme Kinetics and Mechanisms; Plant Biochemistry) |       |
- COMP 406 | Data Mining                                                |       |
- COMP 413 | Intermediate Object-Oriented Development                  |       |
- COMP 439 | Distributed Systems                                        |       |
- COMP 453 | Database Programming                                       |       |
- COMP 460 | Algorithms & Complexity                                    |       |
- STAT 406 | Stochastic Processes                                       |       |
- STAT 407 | Statistical Design                                         |       |
- STAT 408 | Applied Regression Analysis                                |       |
- STAT 410 | Categorical Data Analysis                                  |       |
- STAT 421 | Math Modeling & Simulation                                 |       |
- STAT 488 | Topics in Statistics (Biostatistics)                      |       |

**Total Hours** 13

All PhD students and students in thesis-based Master’s degree programs must successfully complete UNIV 370 Responsible Conduct in Research and Scholarship or other approved coursework in responsible conduct of research as part of the degree requirements. It is strongly recommended that students complete this two-day training before beginning the dissertation/thesis stage of the program.
Graduate & Professional Standards and Regulations

Students in graduate and professional programs can find their Academic Policies in Graduate and Professional Academic Standards and Regulations (https://catalog.luc.edu/graduate-professional-academic-standards-regulations/) under their school. Any additional University Policies supercede school policies.

LEARNING OUTCOMES

In Loyola’s M.S. in Bioinformatics program you will gain fundamental skills that will help you be an inquisitive scientist.

• a solid foundation in biological, computational, chemical, and statistical concepts and theory;
• the facility to interpret primary scientific literature;
• the capacity to employ statistical and computational methods to investigate and solve problems within the life sciences;
• the ability to conduct bioinformatics study in industry and/or the research environment; and
• science-related oral and written communication skills.