## M.S. in Bioinformatics

### Degree Requirements

A minimum of 30 credits is required for the degree, excluding bridge courses. The graduate curriculum consists of five core courses and additional elective courses, with an optional thesis (six credits) or research project (three credits).

Students with non-computing STEM background may be accepted and required to take the following bridge courses (CS 506 may count toward the credits required for the MS degree):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 280</td>
<td>Programming Language Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CS 332</td>
<td>Principles of Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS 505</td>
<td>Programming, Data Structures, and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CS 506</td>
<td>Foundations of Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**: 12

### Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 636</td>
<td>Data Analytics with R Program</td>
<td>3</td>
</tr>
<tr>
<td>MATH 663</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select at least three from the following at least 9 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 644</td>
<td>Introduction to Big Data</td>
</tr>
<tr>
<td>CS 675</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>MATH 615</td>
<td>Approaches to Quantitative Analysis in the Life Sciences</td>
</tr>
<tr>
<td>MATH 678</td>
<td>Stat Methods in Data Science</td>
</tr>
<tr>
<td>MATH 680</td>
<td>Advanced Statistical Learning</td>
</tr>
<tr>
<td>BIOL 605</td>
<td>Prin of Bioscience Processing</td>
</tr>
<tr>
<td>BIOL 630</td>
<td>Critical Thinking for the Life Sciences</td>
</tr>
<tr>
<td>R120 512</td>
<td>Cell Biology: Methods &amp; Appl</td>
</tr>
<tr>
<td>R120 515</td>
<td>Molecular Bio Of Eukaryotes</td>
</tr>
<tr>
<td>R120 524</td>
<td>Cell Molec Dev</td>
</tr>
</tbody>
</table>

Select remaining courses from the following:

**NJIT Electives**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>BME 661</td>
<td>Neural Engineering</td>
</tr>
<tr>
<td>BME 671</td>
<td>Biomechanics of Human Structure and Motion</td>
</tr>
<tr>
<td>CHEM 658</td>
<td>Advanced Physical Chemistry</td>
</tr>
<tr>
<td>CHEM 673</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>CS 631</td>
<td>Data Management System Design</td>
</tr>
<tr>
<td>CS 632</td>
<td>Advanced Database System Design</td>
</tr>
<tr>
<td>CS 659</td>
<td>Image Processing and Analysis</td>
</tr>
<tr>
<td>CS 634</td>
<td>Data Mining</td>
</tr>
<tr>
<td>CS 670</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>CS 677</td>
<td>Deep Learning</td>
</tr>
<tr>
<td>CS 681</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>CS 731</td>
<td>Applications of Database Systems</td>
</tr>
<tr>
<td>CS 732</td>
<td>Advanced Machine Learning</td>
</tr>
<tr>
<td>CS 782</td>
<td>Pattern Recognition and Applications</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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</tr>
<tr>
<td>IS 634</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>ECE 640</td>
<td>Digital Signal and Data Processing</td>
</tr>
<tr>
<td>ECE 673</td>
<td>Random Signal Analysis</td>
</tr>
<tr>
<td>MATH 635</td>
<td>Analytical Computational Neuroscience</td>
</tr>
<tr>
<td>MATH 636</td>
<td>Systems Computational Neuroscience</td>
</tr>
<tr>
<td>MATH 637</td>
<td>Foundations of Mathematical Biology</td>
</tr>
<tr>
<td>MATH 644</td>
<td>Regression Analysis Methods</td>
</tr>
<tr>
<td>MATH 654</td>
<td>Clinical Trials Design and Analysis</td>
</tr>
<tr>
<td>MATH 659</td>
<td>Survival Analysis</td>
</tr>
<tr>
<td>MATH 662</td>
<td>Probability Distributions</td>
</tr>
<tr>
<td>MATH 665</td>
<td>Statistical Inference</td>
</tr>
<tr>
<td>YWCC 691</td>
<td>Graduate Capstone Project (Counting towards the elective credits requires the program director's prior approval. In addition, it needs to be completed with an external partner (industry, lab, or government), or with a faculty only if the same faculty is not the student's MS project or MS thesis advisor.)</td>
</tr>
</tbody>
</table>

**Rutgers-Newark Electives**

<table>
<thead>
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<th>Course Title</th>
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<tr>
<td>R120 512</td>
<td>Cell Biology: Methods &amp; Appl</td>
</tr>
<tr>
<td>R120 515</td>
<td>Molecular Bio Of Eukaryotes</td>
</tr>
<tr>
<td>R120 516</td>
<td>Microbial Ecology</td>
</tr>
<tr>
<td>R120 526</td>
<td>Topics in Cell Biology</td>
</tr>
<tr>
<td>R120 548</td>
<td>Biology Of Cancer</td>
</tr>
<tr>
<td>R120 573</td>
<td>Pharmacology</td>
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<tr>
<td>UMD 5002</td>
<td></td>
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<td>UMD 5200</td>
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</table>

**Total Credits**: 12