Data Science BS with Genomics and Bioinformatics Concentration

Overview

Science and technology are the foundations of our future. The Department of Computer and Information Sciences (CIS) is focused on the understanding of fundamental scientific principles and the application of these principles to solving complex problems, using computing technology.

Data Science is an interdisciplinary field of study about methods and systems to extract knowledge or insights from large quantities of data coming in various forms. The Bachelor of Science in Data Science is designed for students interested in developing expertise in data science.

Data Science students must select one of the following concentrations:

• Computation and Modeling
• Computational Analytics
• Genomics and Bioinformatics

The Concentration in Genomics and Bioinformatics provides a strong background in mathematics, computational thinking and biological data analysis, and will enable students to analyze large quantities of data to discover new knowledge and facilitate decision making. This specialization is intended for students interested in biology, ecology, evolution, human health and disease, and precision medicine. Over the past decade, the emergence of next-generation sequencing technologies has facilitated the rapid growth of genomic data; however, undergraduate training in big data management, big data processing and big data analysis has not kept up with this rapid growth in large-scale biological data generation.

Campus Location: Main

Program Code: ST-DTSC-BS

Distinction in Major

To graduate with distinction in this major, a student must satisfy the following criteria:

• achieve a minimum 3.5 cumulative GPA and
• achieve a minimum 3.5 major GPA.

Accelerated Programs

Accelerated programs provide a pathway for students to pursue both an undergraduate degree and an advanced degree in a shorter amount of time. Below is a list of available accelerated programs for students in the BS in Data Science.

• BS in Data Science / MS in Computational Data Science

Undergraduate Contact Information

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Data Science BS with Genomics and Bioinformatics Concentration

s.kumar@temple.edu

Learn more about the Bachelor of Science in Data Science.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives to view the requirements for their Bulletin year.

Bachelor of Science Requirements

Summary of Requirements for the Degree

1. University Requirements (123 total s.h.)
   • Students must complete all University requirements including those listed below.
   • All undergraduate students must complete at least two writing-intensive courses for a total of at least six credits at Temple as part of their major.
     The specific writing intensive course options for this major are:

     | Code  | Title                                      | Credit Hours |
     |-------|--------------------------------------------|--------------|
     | BIOL 2297 | Research Techniques in Genetics (S) ^1 | 3            |
     | CIS 4496  | Projects in Data Science                  | 3            |

   • Students must complete the General Education (GenEd) requirements.
     • See the General Education section of the Undergraduate Bulletin for the GenEd curriculum.
     • Students who complete CST majors receive a waiver for 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
   • Students must satisfy general Temple University residency requirements.

2. College Requirements
   • A minimum of 90 total credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), and/or the College of Engineering (ENG).
     • A minimum of 45 of these credits must be upper-level (courses numbered 2000 and above).
   • Complete a one-credit first-year or transfer seminar.
     • SCTC 1001 CST First Year Seminar for every entering first-year CST student.
     • SCTC 2001 CST Transfer Seminar for every entering transfer CST student.

3. Major Requirements for Bachelor of Science (82 s.h.)
   At least 9 courses required for the major must be completed at Temple. At least 3 CIS courses must be completed at Temple.

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<tr>
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<th>Title</th>
<th>Credit Hours</th>
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<td>Honors General Chemical Science I and Honors Chemical Science Laboratory I</td>
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<td>MATH 3031</td>
<td>Probability Theory I</td>
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<td>Mathematical Statistics</td>
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Programing Requirements

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<td>CIS 2168</td>
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Common Specialty Course Requirements

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Concentration Requirements

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<td>BIOL 2112</td>
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<td>BIOL 2207</td>
<td>Genetics (S)</td>
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<td>Research Techniques in Genetics (WI, S)</td>
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<td>BIOL 3101</td>
<td>Evolution</td>
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<td>BIOL 3111</td>
<td>Genomics in Medicine</td>
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Genomics and Bioinformatics Elective Requirements

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Total Credit Hours 82
This course has a co-requisite of BIOL 2207.

This course requires an additional prerequisite of BIOL 2227.

This course requires an additional prerequisite of BIOL 3204.

**Suggested Academic Plan**

**Bachelor of Science in Data Science with Concentration in Genomics and Bioinformatics**

**Suggested Plan for New Students Starting in the 2023-2024 Academic Year**

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### Year 3
#### Fall
- **BIOL 2112** or **BIOL 2912**: Introduction to Cellular and Molecular Biology or Honors Introduction to Cellular and Molecular Biology [4]
- **MATH 3031**: Probability Theory I [3]
- Select one of the following: [4]
  - **CHEM 2201** & **CHEM 2203**: Organic Chemistry I and Organic Chemistry Laboratory I
  - **CHEM 2211** & **CHEM 2213**: Organic Chemistry for Majors I and Organic Majors Laboratory I
  - **CHEM 2921** & **CHEM 2923**: Organic Chemistry for Honors I and Organic Honors Laboratory I
- **GenEd Breadth Course** [3]
- **Elective** [2]

**Credit Hours**: 16

#### Spring
- **BIOL 2207**: Genetics (S) [3]
- **BIOL 2297**: Research Techniques in Genetics (S) [3]
- **MATH 3032**: Mathematical Statistics (S) [3]
- Select one of the following: [4]
  - **CHEM 2202** & **CHEM 2204**: Organic Chemistry II and Organic Chemistry Laboratory II
  - **CHEM 2212** & **CHEM 2214**: Organic Chemistry for Majors II and Organic Majors Laboratory II
  - **CHEM 2922** & **CHEM 2924**: Organic Chemistry for Honors II and Organic Honors Laboratory II
- **GenEd Breadth Course** [3]

**Credit Hours**: 16

### Year 4
#### Fall
- **BIOL 3101**: Evolution (F) [3]
- **BIOL 3111**: Genomics in Medicine (F) [3]
- **Data Science: Genomics & Bioinformatics Elective** [3]
- **Data Science: Genomics & Bioinformatics Elective** [3]
- **GenEd Breadth Course** [3]

**Credit Hours**: 15

#### Spring
- **CIS 4496**: Projects in Data Science [3]
- **Data Science: Genomics & Bioinformatics Elective** [3]
- **GenEd Breadth Course** [3-4]
- **Elective** [6-5]

**Credit Hours**: 15

**Total Credit Hours**: 123

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**Code** | **Title** | **Credit Hours**
---|---|---
(F) - Fall only course
(S) - Spring only course