

# Bioinformatics and Biological Data Science PSM

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## COLLEGE OF SCIENCE AND TECHNOLOGY

Learn more about the Professional Science Master's in Bioinformatics and Biological Data Science.

### About the Program

Bioinformatics and Biological Data Science are the disciplines of science wherein computers are joined with the latest discoveries in genomics, biochemistry and biophysics. These rapidly growing fields bring together elements of biology, chemistry, computer science, physics and statistics. The Bioinformatics and Biological Data Science degree at Temple University, a leader in the field, is a two-year Professional Science Master's (PSM) degree that features:

- an interdisciplinary approach involving scientists from across Temple University;
- classes taught by esteemed tenure and tenure-track faculty, as well as by our industry and government partners;
- hands-on training in professional and management skills;
- partnerships with industry and government leaders, including a diverse and active External Advisory Board;
- access to real-world independent research projects; and
- an applied focus on responsibility and ethics in research and policy.

**Time Limit for Degree Completion:** 2 years

**Campus Location:** Main

**Full-Time/Part-Time Status:** The degree program can be completed on a full- or part-time basis. Most of the classes are offered in the evenings or on weekends to enable full-time working professionals to be enrolled in the program. International students are required to register as full-time students.

**Interdisciplinary Study:** Students in the Temple University Bioinformatics and Biological Data Science master's degree program benefit from an advanced curriculum developed by leading Temple faculty in the Departments of Biology, Chemistry, and Computer and Information Sciences. The program has been designed to provide students with extensive skills in computer programming as well as deep knowledge in genomics and structural biology. All three areas are required in this challenging and exciting field. Because the degree is a Professional Science Master's, the program also offers:

- professional skills through courses in professional development;
- a research internship in a biotech company or other research center; and
- connections to key employers in the Philadelphia area.

**Accreditation:** Temple University is fully accredited by the Middle States Commission on Higher Education.

**Areas of Specialization:** The PSM degree program offers concentrations in:

- Bioinformatics
- Biological Data Science

Students selecting a concentration are required to take the two courses (6 credits) listed under the chosen concentration on the Program Requirements grid. Students may also opt to take one course from each concentration and thereby complete the requirements for the degree without a transcribed concentration.

**Job Prospects:** Official job placement is not offered, but Bioinformatics and Biological Data Science are areas of rapid job growth and have become essential parts of healthcare research and the biotechnology and pharmaceutical industries. Graduates of PSM programs are in high demand, underscoring the PSM as an attractive career path for those who do not wish to become academic researchers or pursue a doctorate.

**Non-Matriculated Student Policy:** Non-matriculated students may enroll in a total of three courses (9 credits) with permission of the instructor and the Biology Department.

**Financing Opportunities:** Financial assistance in the form of Research or Teaching Assistantships is not offered at this time.

### Admission Requirements and Deadlines

**Application Deadline:**

*Fall Priority Deadline:* March 1; December 15 international

Applications submitted after the priority deadline will be considered for admission on a rolling basis.

*APPLY ONLINE to this graduate program.*

**Letters of Reference:**

*Number Required: 2*

*From Whom:* Letters should be obtained from college/university faculty or faculty who are familiar with the applicant's competency. If the applicant has an established career in a related field, the applicant's immediate supervisor should provide one of the letters.

**Coursework Required for Admission Consideration:** Applicants should have a strong background in one or more STEM fields: Science, Technology, Engineering and Mathematics.

**Bachelor's Degree in Discipline/Related Discipline:** The Bioinformatics and Biological Data Science PSM program has been designed for recent graduates and professionals who have a bachelor's degree or equivalent in a STEM field.

**Statement of Goals:** In approximately 500 to 1,000 words, specify your interest in the Bioinformatics and Biological Data Science PSM program, career goals, and academic and professional achievements.

**Standardized Test Scores:**

GRE: Required. A combined minimum score of 305 on the quantitative and verbal reasoning sections is expected.

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 90
- IELTS Academic: 6.5
- PTE Academic: 61
- Duolingo: 110

**Resume:** Current resume required.

**Interview:** An in-person or Skype interview is required.

**Transfer Credit:** Graduate credits from an accredited institution may be transferred into the Bioinformatics and Biological Data Science PSM program. The credits must be equivalent to coursework offered by the Biology Department at Temple University. A grade of "B" or better must have been earned for the credits to transfer. The PSM in Bioinformatics and Biological Data Science Steering Committee makes recommendations to the Department Chair for transferring credit on an individual basis. The maximum number of credits a student may transfer is 6.

## Program Requirements

**General Program Requirements:**

*Number of Credits Required Beyond the Baccalaureate: 30*

*Required Courses:*

Code	Title	Credit Hours
<b>Core Courses</b>		
BIOL 5312	Biostatistics	3
BIOL 5403	Genomics	3
BIOL 5411	Structural Bioinformatics I	3
BIOL 5506	Professional Development Seminar for PSM in Biotechnology	1
BIOL 5511	Ethics in Bioinformatics	2
BIOL 5514	Biological Models in Python	3
<b>Concentration Core Courses</b>		
Select two courses from the following: <sup>1,2</sup>		6
Bioinformatics		
BIOL 5509	Computational Genomics	
CHEM 5412	Structural Bioinformatics II	
Biological Data Science		
BIOL 5323	Global Change Science: Analytics with R	

CIS 5528	Predictive Modeling in Biomedicine	
<b>Electives</b> <sup>3</sup>		<b>6</b>
<b>Capstone Course</b>		
BIOL 9995	Capstone Project	3
<b>Total Credit Hours</b>		<b>30</b>

1

Students who elect to earn a transcribed concentration are required to take the two courses (6 credits) listed under the chosen concentration. Students may also opt to take one course from each field of study and thereby complete the requirements for the degree without a transcribed concentration.

2

With the Advisor's permission, any one Bioinformatics concentration course may be replaced with a graduate-level Bioinformatics course to complete the Bioinformatics concentration. Similarly, any one Biological Data Science concentration course may be replaced with a graduate-level Biological Data Science course to complete the Biological Data Science concentration.

3

In consultation with and approval from the Advisor, students may take any two graduate-level courses based on their optional concentration, specific research and career interests.

## Proposed Plan of Study Outlined by Year and Term

Year 1		
<b>Fall</b>		<b>Credit Hours</b>
BIOL 5403	Genomics	3
BIOL 5514	Biological Models in Python	3
Select one from the following:		3
BIOL 5312	Biostatistics <sup>1</sup>	
BIOL 5411	Structural Bioinformatics I <sup>1</sup>	
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
Elective		3
Select two from the following:		6
BIOL 5323	Global Change Science: Analytics with R <sup>2</sup>	
BIOL 5509	Computational Genomics <sup>3</sup>	
CHEM 5412	Structural Bioinformatics II <sup>3</sup>	
CIS 5528	Predictive Modeling in Biomedicine <sup>2</sup>	
<b>Credit Hours</b>		<b>9</b>
<b>Year 2</b>		
<b>Summer I</b>		
BIOL 5506	Professional Development Seminar for PSM in Biotechnology	1
<b>Credit Hours</b>		<b>1</b>
<b>Fall</b>		
BIOL 5511	Ethics in Bioinformatics	2
BIOL 9995	Capstone Project	1
Select one from the following:		3
BIOL 5312	Biostatistics <sup>1</sup>	
BIOL 5411	Structural Bioinformatics I <sup>1</sup>	
<b>Credit Hours</b>		<b>6</b>
<b>Spring</b>		
BIOL 9995	Capstone Project	2
Elective		3
<b>Credit Hours</b>		<b>5</b>
<b>Total Credit Hours</b>		<b>30</b>

1

All students should take BIOL 5411 in Year 1 and BIOL 5312 in Year 2, except for those opting for the Biological Data Science concentration. Students who choose the Biological Data Science concentration should start with BIOL 5312 in Year 1 and take BIOL 5411 in Year 2.

2

Students opting for a transcripted concentration in Biological Data Science select BIOL 5323 and CIS 5528.

3

Students opting for a transcripted concentration in Bioinformatics select BIOL 5509 and CHEM 5412.

**Culminating Event:**

*Capstone Project:*

BIOL 9995 Capstone Project constitutes a culminating event of the Bioinformatics and Biological Data Science PSM and requires the submission of a written project and oral presentation of the results. Capstone research may be completed in any laboratory at Temple University at the invitation of the Principal Investigator (PI) or through an internship/co-op/full-time job in the field of Bioinformatics or Biological Data Science in industry, the healthcare system, or a government agency. Since all Bioinformatics and Biological Data Science PSM classes are offered in the evening, students can avail themselves of these opportunities during the day. The process of locating internships is facilitated by the Bioinformatics and Biological Data Sciences PSM program based on the choice of optional concentration, specific research and career interests of the individual student.

## **Contacts**

### **Program Web Address:**

<https://www.temple.edu/academics/degree-programs/bioinformatics-psm-st-binf-psm>

### **Department Information:**

Dept. of Biology  
255 Biology-Life Sciences Building  
1900 N. 12th Street  
Philadelphia, PA 19122-6078  
cst.psm@temple.edu  
215-204-8854

### **Submission Address for Application Materials:**

<https://cst.temple.edu/academics/graduate-programs/apply-now>

### **Department Contacts:**

*Program Director:*

David Liberles, PhD  
daliberles@temple.edu