

BIOMEDICAL DATA SCIENCE, PH.D.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW–Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement	51 credits
Minimum Residence Credit Requirement	32 credits
Minimum Graduate Coursework Requirement	26 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy (https://policy.wisc.edu/library/UW-1244).
Overall Graduate GPA Requirement	3.00 GPA required. This program follows the Graduate School's policy: https://policy.wisc.edu/library/UW-1203 .

Other Grade Requirements Ph.D. candidates should maintain a 3.0 GPA in all core curriculum courses and may not have any more than two Incompletes on their record at any one time.

Assessments and Examinations Students must complete an Oral Preliminary Exam, ideally taken in the students' third year.

Language Requirements No language requirements.

Breadth Requirement All doctoral students are required to complete a doctoral minor or Graduate/Professional certificate.

REQUIRED COURSES

Code	Title	Credits
Core Topics		
<i>Biostatistics</i>		6-8
Students select one of the following (Topics 1-2):		
Topic 1: Biostatistics Theory and Methods		
STAT 609 & STAT 610	Mathematical Statistics I and Introduction to Statistical Inference	
Topic 2: Biostatistical Methods		
STAT 849 & STAT 850	Theory and Application of Regression and Analysis of Variance I and Theory and Application of Regression and Analysis of Variance II	
<i>Computer Science/Informatics</i>		6-7
Students select one of the following (Topics 3-6):		
Topic 3: Machine Learning / AI		
COMP SCI 540 & COMP SCI/ E C E 760	Introduction to Artificial Intelligence and Machine Learning	
Topic 4: Database Systems		
COMP SCI 564 & COMP SCI 764	Database Management Systems: Design and Implementation and Topics in Database Management Systems	
Topic 5: Optimization		
COMP SCI/I SY E/ MATH/STAT 525 & COMP SCI/ I SY E/MATH/ STAT 726	Linear Optimization and Nonlinear Optimization I	
Topic 6: Algorithms		
COMP SCI 577 & COMP SCI 787	Introduction to Algorithms and Advanced Algorithms	
<i>Additional Specializations</i>		6-8
Students select any of the above or following topics (Topics 1-11):		
Topic 7: Clinical Informatics		
I SY E 417 & B M I/ I SY E 617	Health Systems Engineering and Health Information Systems	
Topic 8: Clinical Biostatistics		
B M I/STAT 641 & STAT/B M I 642	Statistical Methods for Clinical Trials and Statistical Methods for Epidemiology	

Topic 9: Statistical Computing

Students take the following courses:

STAT 771	Statistical Computing
STAT/ECON/ GEN BUS 775	Introduction to Bayesian Decision and Control I

Topic 10: Bioinformatics / Statistical Genomics

Select two of the following courses:

B M I/ COMP SCI 576	Introduction to Bioinformatics
B M I/ COMP SCI 776	Advanced Bioinformatics
B M I/STAT 877	Statistical Methods for Molecular Biology

Topic 11: Biomedical Image Analysis

Select two of the following courses:

COMP SCI 765	Data Visualization
COMP SCI 766	Computer Vision
B M I/ COMP SCI 767	Computational Methods for Medical Image Analysis
B M I/STAT 768	Statistical Methods for Medical Image Analysis

Biology Courses 6

Students consult with their advisor to select courses.

Research Ethics Course 1-2

B M I 738	Ethics for Data Scientists
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B M I 738 is recommended. If a student is unable to take B M I 738, one of the following courses may be substituted.

ONCOLOGY 715	Ethics in Science
BIOCHEM 729	Advanced Topics (Topic: Responsible Conduct of Research)
NURSING 802	Ethics and the Responsible Conduct of Research
SURG SCI 812	Research Ethics and Career Development
OBS&GYN 955	Responsible Conduct of Research for Biomedical Graduate Students
OBS&GYN 956	Advanced Responsible Conduct of Research for Biomedical Students

Second-Year Literature Seminar

B M I 881 & B M I 882	Biomedical Data Science Scholarly Literature 1 and Biomedical Data Science Scholarly Literature 2	4
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Third-Year Professional Skills Seminar

B M I 883 & B M I 884	Biomedical Data Science Professional Skills 1 and Biomedical Data Science Professional Skills 2	2
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Electives 6

Electives are selected in consultation with the student's faculty advisor.

Pre-Dissertator Research 6

Three semester#long research rotations (2 credits of B M I 899 Pre-dissertator Research per semester) concerning a substantive problem in biomedical data science, advised by a program faculty member in collaboration with a UW faculty member from the biological, biomedical, or population health sciences.

Students take additional research and elective credits to reach 51 credits.

Total Credits 51