MINIMUM GRADUATE SCHOOL REQUIREMENTS
Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

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

Minimum Credit Requirement
51 credits

Minimum Residence Credit Requirement
32 credits

Minimum Graduate Coursework Requirement
26 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).

Overall GPA Requirement
3.00 GPA required.

Graduate GPA Requirement
Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).

Other Grade Requirements
PhD 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.

Graduate School Breadth Requirement
All doctoral students are required to complete a doctoral minor or graduate/professional certificate. Refer to the Graduate School: Breadth Requirement in Doctoral Training policy: https://policy.wisc.edu/library/UW-1200 (https://policy.wisc.edu/library/UW-1200/).

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Topics</strong></td>
<td></td>
<td>6-8</td>
</tr>
<tr>
<td><strong>Biostatistics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 609 &amp; STAT 610</td>
<td>Mathematical Statistics I and Introduction to Statistical Inference</td>
<td></td>
</tr>
<tr>
<td><strong>Biostatistical Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 849 &amp; STAT 850</td>
<td>Theory and Application of Regression and Analysis of Variance I and Theory and Application of Regression and Analysis of Variance II</td>
<td></td>
</tr>
<tr>
<td><strong>Computer Science/Informatics</strong></td>
<td></td>
<td>6-7</td>
</tr>
<tr>
<td><strong>Topic 3: Machine Learning / AI</strong></td>
<td></td>
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</tr>
<tr>
<td>COMP SCI 540 &amp; COMP SCI/EC/ECE 760</td>
<td>Introduction to Artificial Intelligence and Machine Learning</td>
<td></td>
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<tr>
<td><strong>Topic 4: Database Systems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP SCI 564 &amp; COMP SCI 764</td>
<td>Database Management Systems: Design and Implementation and Topics in Database Management Systems</td>
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<tr>
<td><strong>Topic 5: Optimization</strong></td>
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<tr>
<td>COMP SCI/ISY E/MATH/STAT 525 &amp; COMP SCI/ISY E/MATH/STAT 726</td>
<td>Linear Optimization and Nonlinear Optimization I</td>
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<tr>
<td><strong>Topic 6: Algorithms</strong></td>
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<td></td>
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<tr>
<td>COMP SCI 577 &amp; COMP SCI 787</td>
<td>Introduction to Algorithms and Advanced Algorithms</td>
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<tr>
<td><strong>Additional Specializations</strong></td>
<td></td>
<td>6-8</td>
</tr>
<tr>
<td><strong>Topic 7: Clinical Informatics</strong></td>
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<tr>
<td>ISY E 417</td>
<td>Health Systems Engineering</td>
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</tr>
<tr>
<td>COMP SCI/EC/ECE 760</td>
<td>Machine Learning</td>
<td></td>
</tr>
</tbody>
</table>
or COMP SCI 766 Advanced Natural Language Processing

**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/ECE 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**

Students consult with their advisor to select courses. Possible options listed below.

- POP HLTH 750 Cancer Epidemiology
- POP HLTH 752 Principles of Population Health: Determinants of Health and Health Disparities
- POP HLTH 753 Principles of Population Health: Population Health and Healthcare Systems
- POP HLTH 795 Principles of Population Health Sciences
- POP HLTH/SOC 797 Introduction to Epidemiology
- POP HLTH 801 Epidemiology of Infectious Diseases
- POP HLTH 805 Advanced Epidemiology: Causal Inference in Epidemiological Studies
- POP HLTH 847 Cardiovascular Epidemiology
- POP HLTH/AN SCI/GENETICS 849 Genetic Epidemiology
- MICROBIO 303 Biology of Microorganisms
- MICROBIO 450 Diversity, Ecology and Evolution of Microorganisms
- MICROBIO 526 Physiology of Microorganisms
- BIOCHEM 501 Introduction to Biochemistry
- GENETICS 466 Principles of Genetics
- GENETICS 467 General Genetics 1
- GENETICS 468 General Genetics 2
- GENETICS/MD GENET 565 Human Genetics
- GENETICS/BIOCHEM/MD GENET 620 Eukaryotic Molecular Biology
- GENETICS/CHEN 626 Genomic Science
- GENETICS 633 Population Genetics
- GENETICS/MD GENET 662 Cancer Genetics
- GENETICS/MD GENET 677 Advanced Topics in Genetics

**Research Ethics Course**

- B M I 738 Ethics for Data Scientists
- 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

**Professional Development Elective**

- B M I 800 Becoming a Biomedical Data Scientist

**Second-Year Literature Seminar**

- B M I 881 Biomedical Data Science Scholarly Literature 1

**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

**Electives**

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

**Pre-Dissertator Research**

Three semester-long research rotations (2 credits each) of B M I 899 Pre-dissertator Research per semester, focusing on 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