Data Science, Minor

Program Co-Directors: Wenhui Sheng, Ph.D and Michael Zimmer, Ph.D

Data Science is the emerging field that seeks to extract and quantify knowledge from data. The interdisciplinary Data Science minor (INDS) integrates statistics and mathematics with computer science, allowing students to develop the knowledge and skills necessary to discover and quantify new knowledge from data. Those prepared to integrate advanced technology with modern statistical and mathematical practices have the opportunity to use data in action to benefit society. Data scientists turn data into knowledge.

Interdisciplinary Minor in Data Science

The interdisciplinary data science minor consists of 19 credit hours of courses, including five required computer science and mathematics courses (16 credit hours) and an additional 3 credit hours of an advanced elective.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Computer Science courses:</td>
<td></td>
</tr>
<tr>
<td>COSC 1010</td>
<td>Introduction to Software Development</td>
<td>4</td>
</tr>
<tr>
<td>COSC 4610</td>
<td>Data Mining</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Required Mathematics courses - Choose one of the following sequences:</td>
<td>6</td>
</tr>
<tr>
<td>MATH 1700 &amp; MATH 2780</td>
<td>Modern Elementary Statistics and Introduction to Regression and Classification</td>
<td></td>
</tr>
<tr>
<td>MATH 4720 &amp; MATH 4780</td>
<td>Statistical Methods and Regression Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Required Computer Science or Mathematics course:</td>
<td></td>
</tr>
<tr>
<td>COSC 3570</td>
<td>Introduction to Data Science</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 3570</td>
<td>Introduction to Data Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Advanced elective: Choose one of the following courses:</td>
<td>3</td>
</tr>
<tr>
<td>COSC 3090</td>
<td>Bioinformatics Algorithms</td>
<td></td>
</tr>
<tr>
<td>COSC 3820</td>
<td>Professional Ethics in Computer &amp; Data Science</td>
<td></td>
</tr>
<tr>
<td>COSC 4500</td>
<td>Visual Analytics</td>
<td></td>
</tr>
<tr>
<td>COSC 4600</td>
<td>Fundamentals of Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>COSC 4800</td>
<td>Principles of Database Systems</td>
<td></td>
</tr>
<tr>
<td>MATH 3100</td>
<td>Linear Algebra and Matrix Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 4700</td>
<td>Theory of Probability</td>
<td></td>
</tr>
<tr>
<td>MATH 4710</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 4750</td>
<td>Computational Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 4760</td>
<td>Time Series Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 4780</td>
<td>Regression Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 4790</td>
<td>Bayesian Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credit Hours: 19

Notes:

- Other courses may be approved as an advanced elective with the consent of the departments.
- The MATH 1700 Modern Elementary Statistics and MATH 2780 Introduction to Regression and Classification sequence is recommended for students without a background in calculus. With the departments consent, MATH 1700 Modern Elementary Statistics may substituted with an equivalent statistics course.
- The MATH 4720 Statistical Methods and MATH 4780 Regression Analysis sequence is recommended for students who have successfully completed a college level calculus course and are comfortable with calculus. MATH 4740 Biostatistical Methods and Models may be substituted for MATH 4720 Statistical Methods.

University Policies

- Academic Advising (https://bulletin.marquette.edu/policies/academic-advising/)
- Academic Censure - Undergraduate (https://bulletin.marquette.edu/policies/academic-censure/undergraduate/)
- Academic Integrity (https://bulletin.marquette.edu/policies/academic-integrity/)
- Academic Misconduct (https://bulletin.marquette.edu/policies/academic-misconduct-policy/)
• Academic Program Definitions (https://bulletin.marquette.edu/policies/academic-programs-defined/)
• Academic Standing (https://bulletin.marquette.edu/policies/academic-standing/)
• Accelerated Degree Programs (https://bulletin.marquette.edu/policies/accelerated-degree-programs/)
• Advanced Standing Credit - Undergraduate (https://bulletin.marquette.edu/policies/advanced-standing-undergraduate/)
• Attendance - Undergraduate (https://bulletin.marquette.edu/policies/attendance/undergraduate/)
• Audit - Undergraduate (https://bulletin.marquette.edu/policies/audit/)
• Awarding Diplomas and Certificates (https://bulletin.marquette.edu/policies/awarding-diplomas-certificates/)
• Background Checks, Drug Testing (https://bulletin.marquette.edu/policies/background-checks-drug-testing/)
• Class Rank (https://bulletin.marquette.edu/policies/class-rank/)
• Classification - Undergraduate (https://bulletin.marquette.edu/policies/classification-undergraduate/)
• Commencement (https://bulletin.marquette.edu/policies/commencement/)
• Conferral of Degrees and Certificates (https://bulletin.marquette.edu/policies/conferral-degrees-certificates/)
• Course Levels (https://bulletin.marquette.edu/policies/course-levels/)
• Credit Hour (https://bulletin.marquette.edu/policies/credit/)
• Credit Load - Undergraduate (https://bulletin.marquette.edu/policies/credit-load/undergraduate/)
• Examinations (Midterm and Final) - Undergraduate (https://bulletin.marquette.edu/policies/examinations-midterm-final-undergraduate/)
• Faculty Grading (https://bulletin.marquette.edu/policies/faculty-grading/)
• Family Education Rights and Privacy Act-FERPA (https://bulletin.marquette.edu/policies/ferpa/)
• Grade Appeals (https://bulletin.marquette.edu/policies/grade-appeals/)
• Grading System - Undergraduate and Health Science Professional (https://bulletin.marquette.edu/policies/grading-system/undergraduate-healthscienceprofessional/)
• Graduation - Undergraduate (https://bulletin.marquette.edu/policies/graduation/undergraduate/)
• Immunization and Tuberculosis Screening Requirements (https://bulletin.marquette.edu/policies/immunization-and-tuberculosis-screening/)
• Last Date of Attendance/Activity (https://bulletin.marquette.edu/policies/last-dateof-attendance-activity/)
• Major and Minor Declaration - Undergraduate (https://bulletin.marquette.edu/policies/major-declaration/)
• Medical Withdrawal (https://bulletin.marquette.edu/policies/medical-withdrawal/)
• Military Call to Active Duty or Training (https://bulletin.marquette.edu/policies/militarycall-active-duty-training/)
• Non-Degree Undergraduate Students (https://bulletin.marquette.edu/policies/non-degree-undergraduate-students/)
• Readmission - Undergraduate (https://bulletin.marquette.edu/policies/readmission/)
• Registration - Undergraduate (https://bulletin.marquette.edu/policies/registration/undergraduate/)
• Repeated Courses - Undergraduate (https://bulletin.marquette.edu/policies/repeated-courses/undergraduate/)
• Second Language Course Placement - Undergraduate (https://bulletin.marquette.edu/policies/second-language-course-placement-undergraduate/)
• Second/Additional Bachelor Degree (https://bulletin.marquette.edu/policies/second-additional-bachelor-degree/)
• Student Data Use and Privacy (https://bulletin.marquette.edu/policies/student-data-use-privacy/)
• Study at Other Institutions - Undergraduate (https://bulletin.marquette.edu/policies/study-institutions/)
• Transcripts-Official (https://bulletin.marquette.edu/policies/transcripts-official/)
• Transfer (Internal) to Another Undergraduate College within the University (https://bulletin.marquette.edu/policies/transfer-internal-another-undergraduate-college-within-university/)
• Transfer Course Credit - Undergraduate (https://bulletin.marquette.edu/policies/transfer-course-credit-policy/undergraduate/)
• Withdrawal - Undergraduate (https://bulletin.marquette.edu/policies/withdrawals/undergraduate/)

College of Arts and Sciences Policies

• Absences from Final Examinations (https://bulletin.marquette.edu/arts-sciences/policies/absences-final-examinations/)
• Academic Dismissal/Probation/Academic Alert (CAA) (https://bulletin.marquette.edu/arts-sciences/policies/dismissal-probation-alert/)
• Academic Integrity (https://bulletin.marquette.edu/arts-sciences/policies/academic-integrity/)
• Advisers (https://bulletin.marquette.edu/arts-sciences/policies/advisers/)
• Attendance (https://bulletin.marquette.edu/arts-sciences/policies/attendance/)
• Credit Overload (https://bulletin.marquette.edu/arts-sciences/policies/credit-overload/)
• Degrees Offered (https://bulletin.marquette.edu/arts-sciences/policies/degrees-offered/)
• Elective Courses (https://bulletin.marquette.edu/arts-sciences/policies/elective-courses/)
• Grade Minimums (https://bulletin.marquette.edu/arts-sciences/policies/grade-minimums/)
• Independent Study Courses (https://bulletin.marquette.edu/arts-sciences/policies/independent-study-courses/)
• Interdisciplinary Programs (https://bulletin.marquette.edu/arts-sciences/policies/interdisciplinary-programs/)
• Majors and Minors (https://bulletin.marquette.edu/arts-sciences/policies/majors-minors/)
• Transfer Credit Policy (https://bulletin.marquette.edu/arts-sciences/policies/transfer-credit-policy/)