DEGREE OFFERED
Master of Science, Plan B only

PROGRAM DESCRIPTION
The master of science in health care data analytics (HCDA) is a 30-credit interdisciplinary program developed to meet the demand within the health care and auxiliary industries for professionals with advanced training in data analytics. Career opportunities continue to emerge in large, integrated health systems as well as in health care technology startups and consulting firms. Industry-specific data expertise also is needed by health insurers, software vendors, pharmacy benefit management companies, employee wellness programs, public health departments, community health centers and national non-profit organizations.

Computer science courses (15 credit hours) compose the program’s data analytics core, and health courses (15 credit hours) provide the context for applying these technical skills. The combination of course work is designed to prepare students for a practicum in the final semester. This capstone experience is an opportunity to develop and complete an independent project under the guidance of a professional mentor.

PREREQUISITES FOR ADMISSION
Applicants should have:

- An earned baccalaureate degree in any field with a GPA of at least 3.000.
- Basic information systems competency as demonstrated by a grade of B or above in an introductory coding/programming course (e.g., COSC 1010 Introduction to Software Development or COSC 6500 Foundations of Computing, or equivalent). Alternatively, proof of successful completion of a recommended introductory online Python programming course.
- Statistical literacy as demonstrated by a grade of B or above in an introductory statistics course (e.g., SOCI 2060 Social Statistics, MATH 4720 Statistical Methods, MSSC 5710 Mathematical Statistics, or equivalent). Alternatively, proof of successful completion of a recommended introductory online statistics course using R.

APPLICATION DEADLINES
Applications are reviewed on a rolling basis. Admitted students may begin their program in fall or spring.

APPLICATION REQUIREMENTS
1. A completed online (http://marquette.edu/grad/future_apply.shtml/) application form and fee.
2. Copies of all college/university transcripts except Marquette.¹
3. A statement of purpose discussing career goals and how the program will help to reach them.
4. Up to two recommendation letters from people who can best speak to the applicant's potential for future success as a graduate student.
5. An optional resume.
6. (For international applicants only) a TOEFL score or other acceptable proof of English proficiency.

¹ Upon admission, final official transcripts from all previously attended colleges/universities, with certified English translations if original language is not English, must be submitted to the Graduate School within the first five weeks of the term of admission or a hold preventing registration for future terms will be placed on the student’s record.

Health Care Data Analytics Master of Science
This 30-credit interdisciplinary program is composed of 15 credit hours in data analytics courses and 15 credit hours in health courses.

The data analytics core provides students with the knowledge and skills to understand and quantify the value of decisions based on ethically balanced analyses. It teaches students to explore, analyze and visualize data, coupled with the knowledge about the organization of data for analysis and the tools for data and text mining to explain historical events or predict future outcomes. It uniquely includes an examination of the moral, ethical and societal impacts of data analytic problems, approaches and decisions important to many areas of application, and provides an understanding of the processes to justify value and the ethical choices being made. When ethically focused analytical skills are combined with knowledge of an application area, such as healthcare, they enable the analyst to suggest and verify the value of decisions from both a monetary and ethical viewpoint. An ethical focus is arguably especially important to the application of analytical skills to health care. The focus on ethically centered data analytics positions Marquette uniquely in the field of data analytics programs, and even more so in the more limited field of health care data analytics programs.
The health curriculum in this program provides the context and application for the skills and knowledge developed by the data analytics core. Through the health curriculum, students develop comprehensive lenses for harnessing analytical tools to address pressing questions in health care organizations, and approach data from the viewpoint of clinical and business operations. Without this viewpoint, the data are hollow and the analyses are theoretical. This context includes an overview of the U.S. health care system, its component parts and their inter-relationships, as well as its issues and challenges. It also includes the ways in which health care technology and data are structured and employed, and can be used to effectively to solve problems and address a host of issues, including quality improvement, individual and societal impacts of data use and data analytics, policy development and cost reduction. The program culminates in a practicum providing students an opportunity to pursue the analysis of relevant health care issues from identification through the development of analytics-driven, values-based decisions based on values that include non-quantifiable ethical concerns.

PROGRAM REQUIREMENTS

A student must complete a minimum of 30 credits of course work, with at least 24 credits at the 6000 level or higher. Required courses are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>COSE 5500</td>
<td>Visual Analytics</td>
<td>15</td>
</tr>
<tr>
<td>COSE 5820</td>
<td>Ethical and Social Implications of Data</td>
<td></td>
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<tr>
<td>COSE 6510</td>
<td>Business Intelligence</td>
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<tr>
<td>or COSE 6520</td>
<td>Business Analytics</td>
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<tr>
<td>or COSE 6540</td>
<td>Data Analytics</td>
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<tr>
<td>COSE 6570</td>
<td>Data at Scale</td>
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<tr>
<td>or COSE 6060</td>
<td>Parallel and Distributed Systems</td>
<td></td>
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<tr>
<td>or COSE 6380</td>
<td>Advanced Database Systems</td>
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<tr>
<td>HEAL 6840</td>
<td>The Environment of Health Care Delivery</td>
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<tr>
<td>HEAL 6835</td>
<td>Health Care Informatics, Technology and Professional Issues</td>
<td></td>
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<tr>
<td>HEAL 6830</td>
<td>Quality Improvement Science in Health Care</td>
<td></td>
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<tr>
<td>HEAL 6965</td>
<td>Applied Health Data Analytics Practicum</td>
<td></td>
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<tr>
<td>HEAL 8016</td>
<td>Advanced Applied Statistics</td>
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Total Credit Hours: 30

1. COSE 6540 Data Analytics recommended for students with a programming background
2. COSE 6060 Parallel and Distributed Systems or COSE 6380 Advanced Database Systems recommended for students with a computer science background

MASTER'S DEGREE WITH THE DATA SCIENCE CERTIFICATE

The Department of Computer Science offers a data science certificate. If a health care data analytics master’s student chooses to also earn the certificate, admission to both programs may be concurrent. The same courses may be used to satisfy the requirements of the master’s program and certificate, as outlined in the university bulletin for each program. Students are expected to be admitted into all programs they intend to complete, although course work completed prior to admission may be allowed to apply toward program requirements. Certificates must be approved individually via the curriculum approval process as Title IV aid eligible in order for students in any of these programs to be eligible to apply for federal financial aid.

Details on the data science certificate can be found in this bulletin.

ACCELERATED DEGREE PROGRAM

The accelerated degree program (ADP) is designed to give Marquette University undergraduate students a more efficient means to obtain a master of science degree in health care data analytics. Interested undergraduate Marquette students in their junior year (or equivalent) must meet the following criteria in order to apply for the ADP:

- Students may be pursuing a baccalaureate degree in any field.
- Students must have a minimum cumulative undergraduate GPA of 3.000.

Undergraduates participating in this program are granted early admission to the Graduate School and are allowed to take up to 12 credits of specific graduate-level courses during their senior year. Candidates for admission should submit transcripts, a statement of purpose stating how the program will help in reaching career goals, and two letters of recommendation. GRE scores are not required. Candidates for admission to this program should notify the health care data analytics program director of their intentions.

Only the following four courses (12 credits) are included in the ADP option (no substitutes):
Any undergraduate student in the ADP may take between one and four courses senior year. If only one course is taken, HEAL 6840 The Environment of Health Care Delivery is recommended. If two courses are taken, HEAL 6840 The Environment of Health Care Delivery and COSC 6510 Business Intelligence are recommended. If three courses are taken, HEAL 6840 The Environment of Health Care Delivery, COSC 6510 Business Intelligence, and HEAL 6835 Health Care Informatics, Technology and Professional Issues are recommended.