Health Care Data Analytics (HCDA)

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Health Care Data Analytics website (http://www.marquette.edu/grad/programs-healthcare-data-analytics.php)

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 application form and fee online (http://marquette.edu/grad/future_apply.shtml).
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's Requirements

Specialization: Data 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:

Data Analytics Core		15
COSC 5500	Advanced Data Science	
or COSC 6931	Topics in Computer Science	
or INSY 6156	Privacy and Security	
COSC 5820	Ethical and Social Implications of Data	
COSC 6510	Business Intelligence	
COSC 6520	Business Analytics	
COSC 6570	Data at Scale	
Health Care Context		15
HEAL 6840	The Environment of Health Care Delivery	
HEAL 6835	Health Care Informatics, Technology and Professional Issues	
HEAL 6830	Quality Improvement Science in Health Care	
HEAL 6965	Applied Health Data Analytics Practicum	
HEAL 8016	Advanced Applied Statistics	
Total Credit Hours		30

Specialization

The five COSC courses that constitute the analytics core of the program form an optional specialization in data science. The data analytics core provides the data science skills and knowledge that underpin the degree and consists of specific courses offered by COSC.

COSC 5500	Advanced Data Science	3
COSC 5820	Ethical and Social Implications of Data	3
COSC 6510	Business Intelligence	3
COSC 6520	Business Analytics [1]	3
or COSC 6540	Data Analytics	
COSC 6570	Data at Scale [2]	3
or COSC 6060	Parallel and Distributed Systems	
or COSC 6380	Advanced Database Systems	
Total Credit Hours		15

[1]   COSC 6540 recommended for students with a programming background
[2]   COSC 6060 or COSC 6380 recommended for students with a computer science background

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):

COSC 6510	Business Intelligence	3
COSC 6520	Business Analytics	3
HEAL 6840	The Environment of Health Care Delivery	3
HEAL 6835	Health Care Informatics, Technology and Professional Issues	3

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.