

**REQUEST FOR AUTHORIZATION TO IMPLEMENT A
BACHELOR OF SCIENCE IN DATA ANALYTICS
AT UNIVERSITY OF WISCONSIN -MILWAUKEE
PREPARED BY UW-MILWAUKEE**

ABSTRACT

The University of Wisconsin-Milwaukee proposes to establish a Bachelor of Science in Data Analytics (B.S. in Data Analytics), jointly offered by the College of Letters and Science and the School of Information Studies. The program supports the mission of UW-Milwaukee to offer academic programs that meet the future social, cultural, and technological challenges of the state. The program responds to the need to prepare students for careers requiring data analytics skills in multiple fields. The program will provide students with a strong understanding of the foundations of data analytics including linear algebra, calculus, statistics, and computer programming while focusing on applications within a chosen discipline. Graduates of this program will possess the foundations, knowledge, and training to successfully pursue careers involving data analysis across a variety of employment settings. The program is designed to meet the growing demand for professionals with data analysis skills in fields such as natural sciences, social sciences, geography, information science and technology, and business. The program will consist of 120 credits comprised of UWM general education requirements, foundation courses, core courses, elective courses in a specialization of the student's choice, and general electives. Students are required to complete a capstone experience through a project, internship, or thesis. Standard tuition rates will apply.

PROGRAM IDENTIFICATION

University Name

University of Wisconsin-Milwaukee

Title of Proposed Academic Degree Program

Data Analytics

Degree Designation

Bachelor of Science

Mode of Delivery:

Single university

Face to face, with some online courses

Department or Functional Equivalent

This is an interdisciplinary program with multiple participating departments

College, School, or Functional Equivalent

Jointly offered by the College of Letters and Science and the School of Information Studies

Proposed Date of Implementation

Fall 2022

Projected Enrollments and Graduates by Year Five

Projected enrollments and graduations for the program over the next five years are presented in Table 1. These projections are conservative and are based on enrollment trends in data analysis courses taught in different departments and colleges at UWM from Fall 2015 to Summer 2021. By the end of Year 5, we expect about 240 students to have enrolled in the program over its five years and 35 students to have graduated. These projections are based on an average retention rate of 75% each year, a four-year graduation rate of 28% and a five-year graduation rate of 38% (based on data for UWM). Given the increasing demand for data analysts, these numbers also assume that students enrolling in this program are net additions to the campus' current total matriculants.

Table 1: Five-Year Degree Program Enrollment Projections

	Year 1	Year 2	Year 3	Year 4	Year 5
New students	50	60	72	86	104
Continuing students	0	37	72	108	135
Total Enrollment	50	97	144	194	239
Graduating students	0	0	0	14	21

Tuition Structure

The standard tuition and fee applicable for all UWM students also apply for students enrolled in the B.S. in Data Analytics program. For the current academic year, residential tuition and segregated fees total \$4,804.86 per semester for a full-time student enrolled in 12-18 credits per semester. Of this amount, \$4,045.56 is attributable to tuition and \$759.30 to segregated fees. Nonresident tuition and segregated fees total \$10,737.30 per semester for a full-time student enrolled in 12-18 credits per semester. Of this amount, \$9,978.00 is attributable to tuition and \$759.30 to segregated fees.

Additionally, students enrolled in courses offered by the College of Engineering and Applied Science will be assessed a differential tuition of \$21.63 per credit. Students enrolled in courses offered by the Lubar School of Business will be assessed a differential tuition of \$21.22 per credit.

DESCRIPTION OF PROGRAM

Overview of the Program

The B.S. in Data Analytics degree consists of 120 credits composed of the following areas: (a) 33 credits of required UWM General Education Requirements, (b) 16 credits of foundations, (c) 33 credits of core courses, (d) 24 credits of Analytics Specialization, and (e) 14 credits of general electives. Students are required to complete a capstone requirement which may be met through an internship, practicum, project, or a thesis in their discipline of interest.

The program will be overseen by a faculty oversight committee (FOC) led by a program director. Faculty from participating schools/colleges will make up the oversight committee.

Student Learning Outcomes and Program Objectives

The core objective of the B.S. in Data Analytics is to prepare students for careers in data analytics in a variety of disciplines and employment settings. The program is designed to allow students to progress through four areas involving distinct learning outcomes. First, they will gain a strong understanding of the foundations of data analytics including linear algebra, calculus, statistics, and computer programming. Second, they will acquire knowledge and concepts that represent the fundamentals of data analytics, including programming languages, databases, analytics, big data, data mining and visualization, statistics, communication, and ethics. The core knowledge in these key areas will be reinforced through a capstone course, either through an internship, field work, or a thesis. Third, in a unique feature of this degree, students will have the opportunity to pursue analytics electives related to their primary discipline of interest via courses offered in a variety of disciplines including business, biological sciences, computer science, geography, sociology, among others. Finally, students will round out their degree through general electives, which can extend their area of focus, supplement it with electives from complementary areas including nursing, health sciences, and public health, or apply the credits towards a complementary discipline-specific certificate.

The overall targeted outcome of the program is to develop graduates who will

- Apply data analytics concepts inter-disciplinarily to real-world problems in a variety of fields and settings.
- Effectively communicate with users and management during problem formulation, analysis, and investigation, and while presenting the results of the analysis
- Appreciate and abide by ethical uses of data and insights from the analysis

Additionally, the general education outcomes which are based on the UW System Shared Learning Goals will apply to all students in the proposed program.

Program Requirements and Curriculum

For admission to the B.S. in Data Analytics program, students must meet the general requirements of admission to UW-Milwaukee, including high school graduation with 4 units in English, 3 units in Mathematics, 3 units in Natural Science, 3 units in Social Science, and 4 units in academic electives. Performance on ACT/SAT tests may also be considered if desired by the applicant, as is an application essay.

Table 2 illustrates the curriculum for the proposed program. The program requirements are comprised of 120 credits, of which there are 16 credits of foundations, 33 credits of core courses, 24 credits of analytics specialization courses, and 14 credits of general electives and UW-Milwaukee general education requirements.

Table 2: Bachelor of Science in Data Analytics Program Curriculum

General education and breadth courses	33 credits
Oral and Written Communication Part A	3 credits
Oral and Written Communication Part B: ENGLISH 205 Business Writing	3 credits
Quantitative Literacy Part A Algebra Requirement	3 credits
Quantitative Literacy Part B Calculus Requirement: MATH 208 or one of 211 or 213, 221, 231	3 credits
Arts	3 credits
Humanities	6 credits
Natural Sciences including one lab or field experience	6 credits
Social Sciences	6 credits
Foreign Language	
Foundations	16 credits
Mathematics:	
MATH 240 Matrices and Applications	3 credits
MATH 212 Survey in Calculus and Analytic Geometry II	4 credits
BUS ADM 210 Statistical Modeling in Business Analytics or BUS ADM 211 Business Scholars: Statistical Modeling in Business Analytics or Econ 210 Economic Statistics or MTHSTAT 215 Elementary Statistical Analysis	3 credits
Computer Literacy 1:	
BUS ADM 230 Introduction to Information Technology Management, HS 224 Computational Tools for Healthcare Professionals, COMPSCI 150 Survey of Computer Science	3 credits
Computer Literacy 2:	
COMPSCI 202 Introductory Programming Using Python, 240 Introduction to Engineering Programming, 250 Introductory Computer Programming, or INFO ST 350 Introduction to Application Development	3 credits
* Computer literacy 1 and 2 can be satisfied by COMPSCI 250 and 251	
Core courses	33 credits
<i>Programming Languages</i>	<i>6 credits</i>
2 of the following 10 courses	
BUS ADM 335 Introduction to Business Application Development	3 credits
BUS ADM 432 Object-Oriented Systems Development	3 credits
INFO ST 350 Introduction to Application Development**	3 credits

INFO ST 440 Web Application Development	3 credits
BIO SCI 502 Introduction to Programming and Modeling in Ecology and Evolution	3 credits
COMPSCI 351 Data Structures and Algorithms	3 credits
MTHSTAT 216 Introduction to Statistical Computing and Data Science or MTHSTAT 566 Computational Statistics	3 credits
GEOG 325 Introduction to Data Science with R, Python, and GIS	3 credits
GEOG 215 Introduction to Geographic Information Science	3 credits
GEOG 525 Geographic Information Science	3 credits
**INFO ST 350 cannot be used in this category if it was used to satisfy the 'Computer Literacy 2' requirement.	
<i>Databases</i>	<i>3 credits</i>
1 of the following 4 courses	
BUS ADM 434 Data Base Management Systems	3 credits
INFO ST 410 Database Information Retrieval Systems	3 credits
HCA 537 Health Information Technology and Management	3 credits
Comp Sci 557 Introduction to Database Systems	3 credits
<i>Analytics and Big Data/Data Mining</i>	<i>6 credits</i>
2 of the following 8 courses	
BUS ADM 336 Enterprise Systems and Data Analytics	3 credits
BUS ADM 536 Business Intelligence	3 credits
INFO ST 582 Introduction to Data Science	3 credits
INFO ST 687 Data Analysis for Data Science	3 credits
AtmSci 600 Data Analytics	3 credits
COMPSCI 411 Machine Learning and Applications	3 credits
COMPSCI 422 Introduction to Artificial Intelligence	3 credits
COMPSCI 425 Introduction to Data Mining	3 credits
Econ 411 Economic Forecasting Methods	3 credits
INFO ST 691 Special Topics – Computer Forensics***	
*** Other topics offered in a specific offering of this course must be approved for the degree by the Director of the Program	
Visualization	3 credits
1 of the following 3 courses	
BUS ADM 438 Information Technology Management Topics: Social Network Analytics	3 credits
INFO ST 370 Data Analysis and Visualization for the Information Professional	3 credits
GEOG 405 Cartography	3 credits
<i>Statistics</i>	<i>6 credits</i>

2 of the following 5 courses	
MTHSTAT 361 Introduction to Mathematical Statistics I	3 credits
MTHSTAT 362 Introduction to Mathematical Statistics II	3 credits
ATM SCI 500 Statistical Methods in Atmospheric Sciences	3 credits
ECON 413 Statistics for Economists	3 credits
ECON 513 Introduction to Econometrics	3 credits
<i>Communication</i>	3 credits
ENGLISH 310 Writing, Speaking, and Technoscience in the 21st Century	3 credits
<i>Ethics</i>	3 credits
1 of the following 6 courses	
BUS ADM 530 Introduction to eBusiness	3 credits
HS 311 Law and Ethics for Healthcare Professionals	3 credits
PHILOS 237 Technology, Values, and Society	3 credits
COMPSCI 395 Social, Professional, and Ethical Issues	3 credits
SOCIOL 327 Data, Technology, and Society	3 credits
INFO ST 661 Information Ethics	3 credits
<i>Capstone/Fieldwork/Thesis</i>	3 credits
1 of the following 21 courses	
BUS ADM 389 Real Estate Internship	3 credits
BUS ADM 394 Human Resources Management Internship	3 credits
BUS ADM 396 Finance Internship	3 credits
BUS ADM 397 Marketing Internship	3 credits
BUS ADM 398 Supply Chain & Operations Management Internship	3 credits
BUS ADM 400 Accounting Professional Internship	3 credits
BUS ADM 439 Information Technology Management Professional Internship	3 credits
BUS ADM 459 Finance Professional Internship	3 credits
BUS ADM 469 Marketing Professional Internship	3 credits
BUS ADM 479 Supply Chain & Operations Management Professional Internship	3 credits
BUS ADM 494 International Business Internship	3 credits
BUS ADM 534 Information Technology Practicum	3 credits
BUS ADM 600 Management Analysis	3 credits
Econ 489: Internship in Economics, Upper Division	3 credits
INFO ST 408 Nonprofit Information Technology	3 credits
INFO ST 490 Senior Capstone	3 credits
INFO ST 495 Information Internship	3 credits
Comp Sci 595 Capstone Project	3 credits

MTHSTAT 489 Internship in Mathematical Statistics, Upper Division	3 credits
MATH 599 Capstone	3 credits
GEOG 600 Perspectives on Geography	3 credits
GEOG 698 GIS/Cartography Internship	3 credits
Electives in an area of specialization (choose 24 credits in an area)	24 credits
<i>Specialization: Business</i>	
BUS ADM 536 Business Intelligence	3 credits
BUS ADM 532 Web Development for Open Business Systems	3 credits
BUS ADM 533 Introduction to Connected Systems for Business	3 credits
BUS ADM 537 Enterprise Systems Concepts and Issues	3 credits
BUS ADM 539 Web Application Server Development	3 credits
BUS ADM 540 ERP Certification	3 credits
Supply Chain:	
BUS ADM 370 Introduction to Supply Chain Management	3 credits
BUS ADM 478 Supply Chain Analytics	3 credits
BUS ADM 571 Quality and Six Sigma Tools	3 credits
BUS ADM 436 Systems Analysis and Design	3 credits
Marketing:	
BUS ADM 360 Principles of Marketing	3 credits
BUS ADM 462 Marketing Research	3 credits
Finance:	
BUS ADM 350 Principles of Finance and	3 credits
BUS ADM 450 Intermediate Finance	3 credits
BUS ADM 451 Investment Finance	3 credits
BUS ADM 457 Financial Modeling	3 credits
BUS ADM 458 Venture Finance	3 credits
Recommend: BUS ADM 300 Career and Professional Development	3 credits
<i>Specialization: Information Science and Technology</i>	
INFO ST 240 Web Design I	3 credits
INFO ST 350 Introduction to Application Development	3 credits
INFO ST 315 Knowledge Organization for Information Science and Technology	3 credits
INFO ST 340 Introduction to Systems Analysis	3 credits
INFO ST 320 Web Design II	3 credits
INFO ST 325 Information Security I	3 credits
INFO ST 375 Multimedia Web Design	3 credits
INFO ST 383 Native Mobile Applications	3 credits

INFO ST 430 Multimedia Application Development	3 credits
INFO ST 465 Legal Aspects of Information Products and Services	3 credits
INFO ST 583 Survey of Information Security	3 credits
INFO ST 584 Survey of Web and Mobile Content Development	3 credits
INFO ST 695 Ethical Hacking I	3 credits
INFO ST 491*** Advanced Topics in Information Science & Technology;	
INFO ST 691*** Special Topics in Information Science	
** Topics offered in a specific offering of these courses need to be approved for the degree by the Director of the Program. A topic cannot be used here if it was applied to a prior degree requirement category.	
<i>Specialization: Health</i>	
Note: This specialization will require 3-6 credits from a different specialization as approved by the Director of the Program	
HCA 444 Introduction to Text Retrieval and Its Applications in Biomedicine	3 credits
HCA 307 Epidemiology for the Health Sciences	3 credits
HCA 541 Healthcare Information Systems Analysis and Design	3 credits
HCA 542 Healthcare Database Design and Management	3 credits
PH 355 Public Health Research Methods I	3 credits
PH 410 True Lies: Consuming and Communicating Quantitative Information	3 credits
PH 455 Public Health Research Methods II	3 credits
Recommend: HS 222 Language of Medicine	3 credits
or BMS 205 Introduction to Diagnostic Medicine	3 credits
or NURS 352 Health and Illness Concepts 1: Introduction	3 credits
<i>Specialization: Natural Sciences</i>	
BIO SCI 469 Genomic Data Analysis	3 credits
FRSHWTR 640 Sequence Analysis	3 credits
FRSHWTR 504 Quantitative Freshwater Analysis	3 credits
FRSHWTR 514 Analytical Techniques in Freshwater Sciences	3 credits
MTHSTAT 563 Regression Analysis	3 credits
MTHSTAT 564 Time Series Analysis	3 credits
MTHSTAT 568 Multivariate Statistical Analysis	3 credits
MATH 571 Introduction to Probability Models	3 credits
ACTSCI 391 Investment Mathematics I	3 credits
ACTSCI 591 Investment Mathematics II	3 credits
ACTSCI 593 Actuarial Models I	3 credits
ACTSCI 594 Actuarial Models II	3 credits
ACTSCI 596 Actuarial Statistics I	3 credits
ACTSCI 597 Actuarial Statistics II	3 credits

<i>Specialization: Social Sciences</i>	
Choose at most one of the following methods courses:	
CRM JST 662 Methods of Social Welfare Research	3 credits
POL SCI203 Introduction to Political Science Research	3 credits
PSYCH 325 Research Methods in Psychology	3 credits
AFRIC 301 Research Methods in African & African Diaspora Studies	3 credits
SOCIOL 361 Research Methods in Sociology	3 credits
Choose at most one of the following multiple regression courses:	
ECON 310 Research Methods for Economics	3 credits
PSYCH 610 Experimental Design	3 credits
SOCIOL 461 Social Data Analysis Using Regression	3 credits
And, take courses from the list below to complete 24 cr:	
CRM JST 510 Introduction to Crime Analysis	3 credits
CRM JST 520 Analysis Oriented Technology: Spatial Data Analysis; Crime Mapping; ArcGIS	3 credits
GEOG 215 Introduction to Geographic Information Science	3 credits
GEOG 525 Geographic Information Science	3 credits
GEOG 547 Spatial Analysis	3 credits
POL SCI390 Political Data Analysis	3 credits
POL SCI392 Survey Research	3 credits
PSYCH 510 Advanced Psychological Statistics	3 credits
SOCIOL 352 Social Networks	3 credits
<i>Specialization: Geography</i>	
GEOG 403 Remote Sensing: Environmental and Land Use Analysis	3 credits
GEOG 437 Qualitative Methods in Geography	3 credits
GEOG 547 Spatial Analysis	3 credits
GEOG 515 Watershed Analysis and Modeling	3 credits
GEOG 625 Intermediate Geographic Information Science	3 credits
GEOG 647 ArcGIS Programming with Python	3 credits
URBPLAN 591 Introduction to Urban Geographic Information Systems GIS in Planning	3 credits
CRM JST 520 Analysis Oriented Technology: Spatial Data Analysis	3 credits
General Electives	14 credits
Total Credits	120 credits

Assessment of Outcomes and Objectives

The capstone course/project/internship will serve as a major educational activity in which student learning outcomes will be assessed. Assessment of student learning outcomes will also be conducted in selected courses in the curriculum. Assessment methods will be developed and applied in accordance with the UW-Milwaukee assessment guide at <https://uwm.edu/academicaffairs/facultystaff/assessment-of-student-learning/>. Assessment data will be reviewed annually by the faculty oversight committee and actions for improvement will be identified. A survey of graduates will be employed to provide feedback as well as to serve as an indirect measure of program outcomes.

Diversity

The B.S. in Data Analytics program seeks to prepare students from diverse backgrounds by providing them the expertise to gain employment in the rapidly growing job markets for data analytics. The unique design of this program – the ability to assimilate and integrate data analytics concepts within the context of traditional applied disciplines – will contribute to broad participation of women and minorities in the field of data analytics. Additionally, 35% of undergraduate students at UWM are first-generation students and 32% are students of color. The proposed program will thus serve these diverse student populations. The program's curriculum also includes several courses that will provide students multiple opportunities to learn about, and practice, the importance of diversity of people, points of view, and theoretical perspectives through the required GER courses as well as the required Ethics component of the core of its curriculum.

UW-Milwaukee, the UW-System's most diverse campus, has a robust array of academic and student support services that students will be encouraged to access through the program website, blogs, and social media channels. The UW-Milwaukee Student Success Center, The Office of Equity and Diversity, the Cultures and Community program, and the Multicultural Student Centers offer students ways of connecting to these services and opportunities. These pursuits are active campaigns within the program to expand equity in student recruitment, access, retention, and degree completion.

In the strongest terms, the proposed program supports and advocates for equity in the recruitment and hiring of staff. UW-Milwaukee's Guiding Values highlight the worth of diversity in all of its definitions. Required coursework will be delivered by across a range of disciplines and will enable students to engage with faculty who embrace UW-Milwaukee values of innovation, creativity and diverse perspectives within an inclusive and equitable environment. Furthermore, UW-Milwaukee is an Affirmative Action / Equal Opportunity Employer and integrates these principles into recruitment and hiring practices.

Collaborative Nature of the Program

There are no plans for partnerships or collaborations with other institutions at this time.

Projected Time to Degree

The B.S. in Data Analytics can be completed in eight semesters by a full-time student completing an average of 15 credits per semester.

Program Review

According to established policy, the major will undergo the standard UW-Milwaukee undergraduate program review process. The initial review will be conducted in year five based on a self-study document following established guidelines. After the initial review, the normal program review cycle will be 10 years. The Academic Planning and Curriculum Committee reviews all undergraduate programs at the University of Wisconsin-Milwaukee. Details regarding the undergraduate program review process may be found at <https://UW-Milwaukee.edu/secu/wp-content/uploads/sites/122/2014/07/Audit-Review-Guide.pdf>. The assessment includes a review of several program elements, including enrollment, curriculum, assessment of learning outcomes, faculty resources, accreditation requirements, student support resources, and financial stability.

Accreditation

The B.S. in Data Analytics does not have specialized accreditation. It will be included in the Higher Learning Commission's overall accreditation of UW-Milwaukee.

JUSTIFICATION

Rationale and Relation to Mission

The UW-Milwaukee mission is to provide a wide array of degree programs to meet the diverse needs of Wisconsin's largest metropolitan area. The ubiquitous and sustained collection of data in all organizations and settings has fueled the need to manage, analyze, and utilize the data for more effective decision making, addressing operational as well as strategic needs of organizations. This need is more pronounced in industries and settings that are not traditionally oriented towards data analytics. The unique design of the B.S. in Data Analytics program ensures that graduates will be equipped with a competent core of data analytics skills as well as that they are firmly grounded within their reference discipline. This approach affords greater opportunities for under-represented segments of the UWM student population to acquire relevant knowledge and training in this growing field while removing the psychological barriers associated with perceived quantitatively oriented degree programs. In addition, it fills a growing need in industries and sectors that are now interested in data analytics by equipping graduates with discipline-specific knowledge as well as data analytics competencies so that they can take advantage of emerging employment opportunities in their chosen disciplines.

As such, the program supports these specific goals in the select mission of UW-Milwaukee:

- "To further academic and professional opportunities at all levels for women, minority, part-time, and financially or educationally disadvantaged students.
- To establish and maintain productive relationships with appropriate public and private organizations at the local, regional, state, national, and international levels.
- To promote public service and research efforts directed toward meeting the social, economic

and cultural needs of the state of Wisconsin and its metropolitan areas.

- To provide educational leadership in meeting future social, cultural, and technological challenges.”

University Program Array

UW-Milwaukee offers a B.S. in Data Science offered jointly by the Departments of Mathematics and Computer Science. That program is based on concepts of statistics and computer science to train graduates who are technically oriented. As noted in the curriculum section of this document, the proposed B.S. in Data Analytics program leverages the courses offered in multiple schools/colleges to present a coherent program that prepares students to be professionals in their discipline of choice who have data analytics skills. In this way, the program complements multiple programs across the university and provides opportunities for students to stay within their chosen discipline and enhance their career options through data analytics.

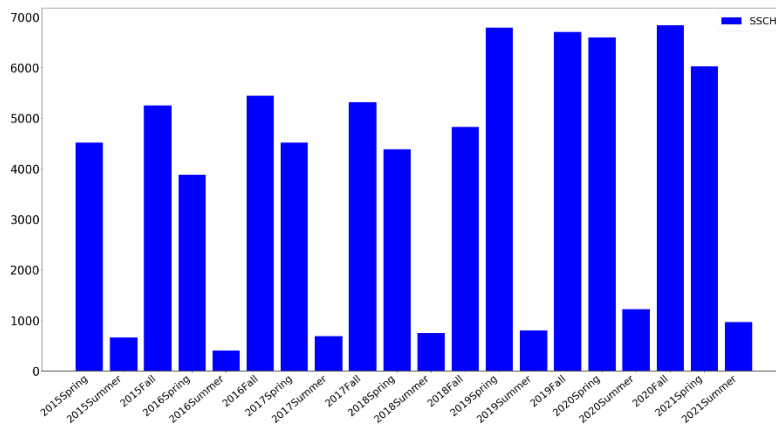
UW-Milwaukee also has a few certificates in data analysis. These programs however focus on specific disciplines or broad areas (e.g., the certificate in Quantitative Social Data Analysis). A workshop convened by the National Research Council's *Committee on Applied and Theoretical Statistics; Board on Mathematical Sciences and Their Applications; Division on Engineering and Physical Sciences* (<https://www.ncbi.nlm.nih.gov/books/NBK299101/>) recommends that academic data science and data analytics programs should be designed to be inter-disciplinary all through and also foster collaborative skills. This proposed program is thus designed to be consistent with employer needs and recommendations by national scholars and does not create unnecessary duplication.

Other Programs in the University of Wisconsin System

There is only one major degree in Data Analytics currently being offered at a UW institution, a B.S. in Data Analytics at UW-Stevens Point. The degree, however, focuses extensively on business applications of data analytics but does not consider other fields or inter-disciplinary training of the graduates. Three other campuses in the system, UW-Madison, UW-Stout, as well as UW-Milwaukee, also offer undergraduate degrees in Data Science. The Data Science degree programs however focus on skills in mathematics, statistics, and computer science, rather than on inter-disciplinary and application-oriented training. The Burning Glass report described in more detail below estimated a total of 61,799 jobs for Data Scientists, with such training, in 2020. On the other hand, the estimated jobs for data analysts and decision makers who need to analyze and use data was 1,066,354. It is this market that the proposed degree is aimed to serve.

Need as Suggested by Current Student Demand

Student enrollment in 140 courses at UW-Milwaukee identified as imparting skills related to data analytics have been tracked. The chart below shows the average enrollments in these classes, in terms of total student credit hours in the courses, during each semester since 2015. As demonstrated by the chart, there has been a significant increase since 2019 in student interest in these classes.



Need as Suggested by Market Demand

The Bureau of Labor Statistics and the Job Center of Wisconsin do not track the demand for data analysts as a category. Instead, these jobs are classified under statisticians and management analysts. Further, the nature of the program which trains students to apply data analysis skills in their own field of choice does not lend itself to be categorized in a Standard Occupational Code (SOC) to conduct specific analysis of occupational projections. However, inferences can be made by projections in related areas. A report from the employment outlook firm Burning Glass produced jointly with IBM and the Business Higher Education Forum identified several job categories in the data analytics field, including data driven decision makers (“leverage data to inform strategic and operational decisions”) and functional analysts (“utilize data and analytical models to inform specific functions and business decisions”). They estimated a national demand of 1.8 million job postings nationwide for 2020, with a 5-year growth rate of approximately 15%. Estimates for statisticians’ median salaries for 2020 are \$93,000 and the field is expected to grow 33% over the 2019-2029 period. Estimates for management analyst salaries for 2020 are \$87,660 and the field is expected to grow 11% over the 2019-2029 period. Both these categories have salaries far above the national median, and growth rates that are much faster than average. Additionally, some demand will be manifest in other categories like programmers and industry-specific analysts.

Additional evidence of demand is also seen in investments made by employers like Northwestern Mutual that have invested significant resources of \$15 million in the establishment of the Northwestern Mutual Data Science Institute to support the launch and growth of undergraduate and graduate programs related to data including data science and data analytics.