

Notice of Intent – B.S. in Data Analytics

University of Wisconsin–Milwaukee

Name of the proposed program: Bachelor of Science in Data Analytics

Institutional setting: The degree will not be housed in any specific department but will be jointly awarded by the College of Letters and Sciences and the Lubar School of Business

Mode of delivery: Face-to-face

Institutional contact: Devarajan Venugopalan, Vice Provost, Academic Affairs, dv@uwm.edu

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Program and Learning Outcomes

The core objective of the BS in Data Analytics is to prepare students for careers in data analytics in multiple fields. The program is designed to allow students to progress through four areas involving distinctive 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 take courses 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 have the opportunity to pursue analytics electives related to their primary discipline of interest via courses offered in multiple 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, or supplement it with electives from complementary areas like nursing, health sciences, or public health.

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

- Apply data analytics concepts inter-disciplinarily to problems in a variety of fields and industries.
- Effectively communicate 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

Contents of the Program

The degree consists of 120 credits in all composed of the following areas: (a) 33 credits of required UWM General Education Requirements, (b) 16 credits of the Foundations described above, (c) 33 credits of Core courses including Programming Languages (6 credits), Databases (3 credits), Analytics (6 credits), Big Data/Data Mining/Data Visualization (3 credits), Statistics (6 credits), Communication (3 credits),

Ethics (3 credits) and Capstone/Internship/Field Work/Thesis (1-3 credits) (d) 24 credits of Analytics Electives (e) 15 credits of General Electives.

Resources

Courses in this program will not require new resources as the proposed degree comprises courses that are currently offered by different Departments and Colleges at UWM. Resources would however be required for administrative and advising services associated with the degree. Administration of the degree, in particular, would require a Director, and in the early years of the program there will also be a need for at least one advisor. Administration of the degree will be by a Faculty Oversight committee consisting of faculty from Colleges and Departments whose courses are part of the program. The committee will appoint the Director and the Advisor(s). Decisions and recommendations made by the oversight committee will be reviewed and approved by the program committees of the College of Letters and Sciences and the Lubar School of Business Administration.

Alignment with institutional mission

The proposed program responds to the following aspects of UWM Select Mission Statement, which can be found at <https://uwm.edu/mission/>:

To fulfill its mission as a major urban doctoral university and to meet the diverse needs of Wisconsin's largest metropolitan area, the University of Wisconsin–Milwaukee must provide a wide array of degree programs [...]. Fulfilling this mission requires the pursuit of these mutually reinforcing academic goals:

- *To develop and maintain high quality undergraduate, graduate and continuing education programs appropriate to a major urban doctoral university.*
- *To attract highly qualified students who demonstrate the potential for intellectual development, innovation, and leadership for their communities.*
- *To further academic and professional opportunities at all levels for women, minority, part-time, and financially or educationally disadvantaged students.*
- *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.*

The proposed program advances these goals by providing students with the unique knowledge and skills needed in the data analytics profession. Theoretical knowledge and practical skills are provided in a discipline-agnostic manner, allowing students to translate and apply this material to a wide variety of disciplines and applications. This unique approach will increase their appeal to employers in multiple industries and also ensures that the graduates are flexible and able to practice in several disciplines throughout their career, boosting their employability and adaptability

Need for the program

Market demand

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%. The Bureau of Labor Statistics does not track the demand for data analysts as a category. Instead, these jobs are classified under statisticians and management analysts. 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.

Similar programs in the system and the region

There is only one major degree in Data Analytics currently being offered at a UW institution, a BS 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 UWM, 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 mentioned above 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.

UWM 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.