REQUEST FOR AUTHORIZATION TO IMPLEMENT A MASTER OF SCIENCE IN DATA SCIENCE AT UNIVERSITY OF WISCONSIN (UW-MILWAUKEE) PREPARED BY UW-MILWAUKEE

ABSTRACT

The University of Wisconsin-Milwaukee proposes to establish a Master of Science in Data Science (M.S. in Data Science), offered by the Graduate School. The development of this program responds to the need to prepare students for careers in data science in several fields. The program is designed so that students start with required foundations if they do not have them already (credits for courses taken as foundations however will not count towards the required total credits for the degree). They then progress through seven areas of data science (described in more detail below) each involving distinctive learning outcomes. In a unique feature of this degree, in the last of these seven areas named *Specialized Skills in Data Science for Specific Applications and Fields* students will have the opportunity to pursue analytics electives related to their primary discipline of interest via courses offered in multiple disciplines including atmospheric sciences, business, biological sciences, computer science, criminal justice, Geography, healthcare, information science, political science, and sociology, among others. In their final, eighth phase of the program, students will complete either a capstone/thesis/internship project or a exam testing their ability to apply data science techniques to real-world data.

PROGRAM IDENTIFICATION

Institution Name
University of Wisconsin-Milwaukee

Title of Proposed Program
Data Science

Degree/Major Designations
Master of Science

Mode of Delivery
Single institution
Face-to-face

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 based on enrollment trends in data
analysis courses taught in different departments and colleges at UWM from Fall ‘2015 to Spring Summer ‘2021. By the end of Year 5, we expect about 125 students to be enrolled in the program over its five years and a total of 73 students to have graduated. These projections are based on an average retention rate of 75% each year (based on data for UWM). We also assume that 95% of the 25% of students who don’t continue from the academic year in which they enrolled through the end of the next academic year leave because they graduated. This results in an overall graduation rate of 68.3% among all students entering the program. Although the Graduate School does not currently have reliable overall data for graduation rates, this is consistent with their conservative estimates of master’s graduation rates. 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

<table>
<thead>
<tr>
<th>Category of Students</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Students</td>
<td>25</td>
<td>30</td>
<td>36</td>
<td>43</td>
<td>52</td>
</tr>
<tr>
<td>Continuing</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>61</td>
<td>83</td>
</tr>
<tr>
<td>Total Enrollment</td>
<td>25</td>
<td>50</td>
<td>76</td>
<td>104</td>
<td>135</td>
</tr>
<tr>
<td>Graduating</td>
<td>6</td>
<td>20</td>
<td>52</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>Total graduates</td>
<td>0</td>
<td>6</td>
<td>26</td>
<td>78</td>
<td>127</td>
</tr>
</tbody>
</table>

**Tuition Structure**
The standard tuition and fee applicable for all UWM students also apply for students enrolled in the M.S. in Data Science program. For the current academic year, residential tuition and segregated fees total $5,931.82 per semester for a full-time student enrolled in 8+ credits per semester. Of this amount, $5,350.32 is attributable to tuition. Nonresident tuition and segregated fees total $12,647.34 per semester for a full-time student enrolled in 8+ credits per semester. Of this amount, $12,065.84 is attributable to tuition. Additionally, some course delivery will be in Schools which charge ‘Master’s Surcharge Fees’. For example, Business Master’s charges $167.71 per credit for courses taken in the Lubar School of Business.

**College, School, or Functional Equivalent**
Graduate School

**Proposed Month and Year of Implementation**
Fall 2022

**DESCRIPTION OF PROGRAM**

**Overview of the Program**
Students applying to the program are expected to have proficiency, demonstrated through coursework, exams and/or a portfolio, in the following areas: Linear Algebra (3
credits), Multivariable Calculus (4 credits), Statistics (3 credits), and Computer Literacy (6 credits). Those without these proficiencies may be admitted when they have 6 credits or fewer of the proficiency requirements remaining to be completed, but proficiency coursework does not count towards the MS.

The degree itself consists of 30 credits in all composed of the following areas:

1. Developing insights from data, for applications (3 Credits)
2. Organizing and maintaining large data sets. (3 Credits)
3. Methods like AI, and Machine Learning to extract insight from Data (3 Credits)
4. Knowledge and skills for using probabilistic methods to analyze uncertainty in data and develop insights (3 credits)
5. Advanced Programming for Data Collection and Data Science (3 Credits)
6. Understand the importance of, and skills for, the ethical use of data (3 Credits)
7. Specialized Skills in Data Science for Specific Applications and Fields (12 Credits)
8. An optional capstone course/thesis/internship experience (3 credits) can be substituted for 3 of the 12 credits in area
9. Students who do not pursue the capstone course/thesis/internship experience option will also be required to pass an exam that tests their ability to develop a solution for a problem using data and data science techniques learned during the program. The specialization category allows for future implementations of dual degree programs, transcript designated concentrations, etc.

Student Learning Outcomes and Program Objectives
The core objective of the MS in Data Science is to prepare students for advanced careers in data science in multiple fields. The program is designed to allow students to progress through the seven areas mentioned above in the overview of the program. Six of the seven areas are core areas designed to give them skills needed to be strong and ethical data scientists. Specifically, they will (1) develop insights from data, for applications, (2) learn how to work with large data sets, (3) gain experience in advanced computer programming for data science (4) become skilled in specific areas of data science such as artificial intelligence and machine learning (5) understand how to deal with uncertainty which is an inherent characteristic of data science and (6) recognize and internalize the importance of ethical use of data and data science. First, they will gain a strong understanding of the foundations of data analytics including linear algebra, calculus, statistics, and computer programming (as mentioned above, courses taken towards building these foundations if required do not count towards the total credits required for the degree). Second, they will take courses in six core areas that represent the fundamentals of data analytics, including programming languages, databases, analytics, big data, data mining and visualization, statistics, communication, and ethics. A student can choose to reinforce the core knowledge in these key areas through a capstone course, an internship or a thesis. Enrollment in a thesis or internship is subject to the approval of the Program Director and the signature of a faculty member willing to guide the thesis or internship. Students who do not pursue the capstone course/thesis/internship option will be required to pass a Master's Comprehensive Examination. The Program Director (discussed below) will be responsible for getting the
appropriate Comprehensive Examination written by a faculty member for the student who is taking the exam and also getting the exam graded by that faculty member. During this exam, students are given a data set and a research problem to be addressed with the data, using data science techniques. Students must submit a final report in which they use the provided data set to address the research question and demonstrate that they have developed a sufficient level of expertise to work as a data scientist. This is a take-home exam and students have seven days to complete it. Third, in a unique feature of this degree, students will have the opportunity to choose and pursue electives related to their primary discipline of interest via courses offered in multiple disciplines including anthropology, business, biological sciences, computer science, GEOGraphy and sociology among others.

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

- Apply the concepts of data science inter-disciplinarily to problems in a variety of fields and industries.
- Be equipped to pursue a data science oriented career path in the discipline that they are passionate about.
- Appreciate and abide by ethical uses of data and insights from the use of data science.

Program Requirements and Curriculum

For admission to the M.S. in Data Science program, students must meet the general requirements of admission to a graduate program at UW-Milwaukee. As stated by the Graduate School, these requirements include: (1) a baccalaureate degree, or its equivalent as determined by the UWM Center on International Education, from a regionally accredited institution, completed before the first term of enrollment in the Graduate School (2) Proficiency in the English language and (3) A minimum cumulative undergraduate grade point average (GPA) of 2.75 on a 4.0 scale, or an equivalent measure on a grading system that does not use a 4.0 scale. Students applying to the program are expected to have proficiency, demonstrated through coursework, exams or a portfolio, in the following areas: Linear Algebra (3 credits), Multivariable Calculus (4 credits), Statistics (3 credits), and Computer Literacy (6 credits). Those without these proficiencies may be admitted when they have 6 credits or fewer of the proficiency requirements remaining to be completed, but proficiency coursework does not count towards the MS.

Table 2 illustrates the program curriculum for the proposed program. The program requirements are comprised of 30 credits, of which there are 18 credits across the six core areas, 12 credits of general electives in the seventh area for Specialized Skills in Data Science for Specific Applications and Fields of which 3 credits may be fulfilled with a capstone course. Enrollment in an internship or thesis subject to the approval of the Program Director and the signature of a faculty member willing to guide the thesis or internship.
### Table 2: Master of Science in Data Science Program Curriculum

#### Developing insights from data for applications (3 Credits)
1 of the following 3 courses  
ATM SCI 600 Data Analytics  
INFOST 687 Data Analysis for Data Science  
COMPSCI 425(G) Introduction to Data Mining

#### Organizing and maintaining large data sets (3 Credits)
1 of the following 8 courses  
INFOST 785 Database Management systems for information professionals  
INFOST 714 Metadata  
INFOST 780 XML for Libraries  
INFOST 783 Information Storage and Retrieval  
INFOST 691 Data Management and Curation  
COMPSCI 557 Database Systems  
PH 718 Data Management and Visualization in R  
BUS ADM 749 Data and Information Management

#### AI, and Machine Learning to extract insight from Data (3 Credits)
Take 1 of the following 7 courses  
INFOST 582 Introduction to Data Science  
BUS ADM 795 Seminar-in-Management: Ideas & Applications of Data Science In Different Fields  
COMPSCI 422G Introduction to Artificial Intelligence  
COMPSCI 710 Artificial Intelligence  
COMPSCI 411G Machine Learning and Applications  
COMPSCI 711 Introduction to Machine Learning  
MATH 702 Industrial MATH 2

#### Probabilistic methods to analyze uncertainty in data (3 credits)
1 of the following 19 courses  
ATM SCI 500 Statistical Methods in Atmospheric Sciences  
ATM SCI 700 Statistical Methods in Atmospheric Sciences II: Signal Detection  
BUS ADM 754 Statistical Analysis  
BUSMGMT 709 Predictive Analytics for Managers  
BUS ADM 713 Business Forecasting Methods  
BUS ADM 714 Multivariate Techniques in Mgmt Research  
IND ENG 575 Design of Experiments  
IND ENG 765 Operations Research Methods  
SOCIOl 461G Social Data Analysis Using Regression
SOCIOL 760  Advanced Statistical Methods in Sociology
SOCIOL 982  Advanced Quantitative Analysis
PSYCH 510G  Advanced Psychological Statistics
PSYCH 610G  Experimental Design
POL SCI 390G  Political Data Analysis
POL SCI 701  Techniques of Political Science Research
POL SCI 702  Advanced Techniques of Political Science Research
ECON 411G  Economic Forecasting Methods
ECON 413G  Statistics for Economists
ECON 513G  Introduction to Econometrics
GEOG 747  Spatial Analysis
PH 711  Intermediate Biostatistics
PH 818  "Statistical Computing ("This course will cover the theory and application of common algorithms used in statistical computing."
GEOG 827  Qualitative Research
COMPST 701  Mathematical & Computing Fundamentals for IT Professionals
MTHSTAT 361G  Intro Prob/Stats I
MTHSTAT 362G  Intro Prob/Stats II
MTHSTAT 563G  Regression
or 763
MTHSTAT 546G  Time Series Analysis
or 764
MATH 571G  Probability Models
COMPSCI 720  Computational models for decision making
MTHSTAT 761  Mathematical Statistics I
MTHSTAT 762  Mathematical Statistics II
ED PSY 724  Educational Statistical Methods II
ED PSY 820  Multiple Regression and Other General Linear Models

Advanced Programming for Data Collection and Data Science (3 Credits)
1 of the following 8 courses
BUSMGMT 744  R Programming for Business Analytics
COMPST 702  Software Development in Python
GEOG 748  ArcGIS Programming with Python
URBPLAN 794  Internet Geographic Information Systems
COMPST 751  Data Structures and Algorithms
MTHSTAT 566G  or 766

Ethics (3 credits)
1 of the following 7 courses
INFOST 660  Information Policy
INFOST 661  Information Ethics
INFOST 583 Survey of Information Security
INFOST 784 Information Security Management
INFOST 761 Information Privacy
INFOST 465G Legal aspects of info products & services (G)
BUS ADM 743 Information Privacy, Security, and Continuity

**Electives (12 credits)**
Take 4 of the following 52 courses

INFOST 691 Artificial Intelligence and Disruptive Technologies
BUS ADM 741 Web Mining and Analytics
BUS ADM 812 Machine Learning for Business.
BUS ADM 813 Social Media Analytics for Business
BUS ADM 817 Connected Systems for Business
BUS ADM 742 Big Data in Business
BUS ADM 745 Artificial Intelligence for Business
BUS ADM 763 Marketing Analytics
BUS ADM 769 Database Marketing
BUS ADM 816 Business Intelligence Technologies & Solutions
COMPSCI 712 Image Processing
COMPSCI 423G Natural Language Processing
COMPSCI 723 Natural Language Processing
COMPSCI 444G or 744 Text Retrieval
COMPSCI 469G Security
COMPSCI 535G Analysis of Algorithms
COMPSCI 704 Analysis of Algorithms
COMPSCI 759 Data Security
Comp Sci 725 Robot Motion Planning
Comp Sci 755 Information and Coding Theory
SOCIOL. 750 Research Methods in Sociology
SOCIOL. 752 Fundamentals of Survey Methodology
SOCIOL 952 Social Network Analysis
POL SCI392G Survey Research
GEOG 704 Remote Sensing: Environmental and Land Use Analysis
GEOG 705 Cartography
GEOG 716 Watershed Analysis and Modeling
GEOG 726 Geographic Information Science
GEOG 804 Advanced Remote Sensing
GEOG 826 Intermediate Geographic Information Science
GEOG 834 GIS and Society
GEOG 904 Remote Sensing and Urban Analysis
GEOG 926 Advanced Geographic Information Science: Geographic Modeling
GEOG 960 Seminar: Geographic Techniques
GEOG 999 Independent Work (with appropriate topic)
URBPLAN 692 Special Topics in Urban Planning: Transportation Planning and GIS
PH 812 Statistical Learning and Data Mining
URBPLAN 791 Introduction to Urban Geographic Information Systems for Planning
URBPLAN 792 Using Urban Geographic Information Systems for Planning
URBPLAN 999  Independent Study
ANTHRO 380  Anthropological Applications of GIS
ANTHRO 562  Techniques and Problems in Archaeology
ANTHO 768  Topics in Advanced Research Design in Anthropology
CRM JST 520G  Analysis Oriented Technology: Spatial Data Analysis; Crime Mapping; ArcGIS
CRM JST 713  Measuring Crime & Analyzing Crime Data
CRM JST 716  Advanced Analytic Techniques for Crime Analysts
CRM JST 910  Methods and Practice Capstone for Crime Analysts
ART 526G  Research in Universal Design and Fabrication
ART 316 G  Interactive and Multimedia Art
ART 317 G  3D Imaging I
ART 427 U/G  Special Topics Course
ART 313 U/G  Interactive and Multimedia Art and Programming for Artists
ED PSY 720  Techniques of Educational and Psychological Measurement
MATH 701  Industrial MATH 1
ED PSY 821  Psychometric Theory and Practice
ED PSY 822  Modern Test Theory
ED PSY 823  Structural Equation Modeling
ED PSY 824  Advanced Experimental Design and Analysis
ED PSY 825  Multivariate Methods
ED PSY 826  Analysis of Cross-Classified Categorical Data
ED PSY 827  Survey Research Methods in Education
ED PSY 832  Theory of Hierarchical Linear Modeling
BIO SCI 469  Genomic Data Analysis
BIO SCI 502  Introduction to Programming and Modeling in Ecology and Evolution
BIO SCI 572  Functional Genomics

* Every student’s program of electives must be approved by the program director; students may be able to count as Electives some courses in the “core” categories not applied to the core requirements (subject to Director’s approval). Students wishing to apply other courses not listed here towards these electives must have each course approved by the program director.

Optional: Internship/Thesis/Capstone
Of the required 12 elective credits, up to 3 degree credits may be awarded for a thesis or internship. Students who choose this option must complete a relevant thesis or internship that is approved by the program director. Students who choose to complete a thesis must work with a thesis advisor and have the thesis approved by the advisor and the program director. Students who choose to pursue an internship must also obtain approval from the program director. Students may select from courses such as those listed below or enroll for thesis credits with their thesis advisor (in the advisor’s department).

INFOST 790  Project Design, Implementation, and Evaluation
GEOG 798  GIS/Cartography Internship
URBPLAN 793  Applied Projects in Urban Geographic Information Systems
URBPLAN 991  Legislative/Administrative Agency Internship
MATH 790  Master's Thesis
COMPSCI 990  Master’s Thesis
Students who do not choose to pursue the optional capstone course/thesis/internship option are required to pass a qualifying exam. During this exam, students are given a data set and a research problem to be addressed with the data, using data science techniques. Students must submit a final report in which they use the provided data set to address the research question and demonstrate that they have developed a sufficient level of expertise to work as a data scientist. This is a take-home exam and students have seven days to complete it.

Assessment of Outcomes and Objectives
As mentioned above, all students will need to either pursue the optional capstone course/thesis/internship option or take a qualifying exam to complete the requirements of the degree. Performance in the capstone course/thesis/internship or the qualifying exam will serve as the primary vehicle for the assessment of outcomes and objectives. In addition, as is the case with all advanced degrees at UWM, the program will go through a campus-coordinated assessment exercise required for Higher Learning Commission (HLC) accreditation. Courses in several of the participating colleges and departments also go through their own accreditation periodically. For example, courses in Computer Science are regularly assessed as part of the Accreditation Board for Engineering and Technology (ABET) accreditation process. Similarly, degrees in the Lubar School of Business go through an accreditation process by American Association of Collegiate Schools of Business (AACSB) and hence courses in the degrees that are part of the proposed degree will also be assessed. A specific assessment of the learning outcomes and objectives of the M.S. in Data Science program will also be conducted by regularly surveying graduates of the program.

Diversity
The M.S. in Data Science program seeks to prepare students from diverse backgrounds by providing them the expertise to gain employment in the rapidly growing job markets for data science. This will therefore result in an increase in the participation of women and minorities in the programs. Additionally, 35% of undergraduate students at UWM are first-generation students and 32% are students of color. By providing them the opportunity to continue on after completing their undergraduate studies at the university, the proposed program will serve their higher education needs and thus serve these diverse student populations. The program’s curriculum also includes several courses that will provide students several opportunities to learn about, and practice, the importance of diversity of people, points of view, and theoretical perspectives through the required Ethics components of curriculum.

Program Review
Consistent with the policies and procedures of the University of Wisconsin-Milwaukee, the proposed program will be reviewed by a faculty oversight committee (FOC) every five years to ensure that the degree continuously meets the needs of
students and employers. The FOC will also be responsible for governance of the degree. The degree will be managed by a Program Director who will be appointed by the FOC.

Rationale and Relation to Mission
The UW-Milwaukee Select Mission Statement (https://uwm.edu/mission/) states:
“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, a balanced program of applied and basic research, and a faculty who are active in public service. Fulfilling this mission requires the pursuit of these mutually reinforcing academic goals”. Among the several goals listed in this statement, the MSDS program especially contributes to the following:

- “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.”

Given the rapid and continuing growth in the use of data science across all sectors of public and private activities, the proposed degree with increase professional opportunities for all students that enroll in the program and especially disadvantaged students by providing them with highly sought skills and training. This, in turn, will expand and strengthen UWM’s relationships with both public and private organizations that are in need of the skills. Additionally, graduates of the program will be well-trained to support research using data science where needed and help their employers meet the technological challenges and opportunities presented by the growing use of vast amounts of data in every sector of society.

Other Programs in the University of Wisconsin System
There is only one Master’s degree in Data Science currently being offered through the UW Data Science Collaborative program at UW- Eau Claire, UW-Green Bay, and UW-La Crosse. The degree however focuses on different areas of data science like data mining and visualization and does not include applications to specific disciplines. On the other hand, our program aims to provide multi and inter-disciplinary training. Such training is increasingly sought by employers and advocated by scholars. 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 also does not create unnecessary duplication.
(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.

**Need as Suggested by Current Student Demand**

We have been tracking student enrollment in 140 courses on our campus identified as imparting skills related to data analytics. The chart below shows the average enrollments in these classes, in terms of average total student credit hours per class, during each semester since 2015. As demonstrated by the chart, there has been a significant increase since 2019 in student interest in these classes.

![Chart showing enrollment trends](chart.png)

**Need as Suggested by 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 science and 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%. Importantly, the report also states: “39% of Data Scientists and Advanced Analysts require a Master’s or Ph.D. These degrees take additional years of schooling to complete, so it will take a significant time investment to train a larger pool of workers. Therefore, because these roles are already undersupplied and projected to grow rapidly, the skills shortage is in danger of worsening.”

The Bureau of Labor Statistics (https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm) also projects that Computer and Information Research Scientists category of jobs will grow 15% over the 2019-2029 period and describes this as: “…much faster than average for all occupations. Job prospects are expected to be excellent” and states that the “median annual wage for computer and information research scientists was $126,830 in May 2020.” BLS also classifies this as a category in which most jobs require a Master’s degree.

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.
COST AND REVENUE PROJECTIONS NARRATIVE
UNIVERSITY OF WISCONSIN-MILWAUKEE
Masters in Data Science

Introduction
The University of Wisconsin – Milwaukee proposes to establish a Master of Science in Data Science (MSDS) to be housed in the Graduate School. The program is designed so that students start with required foundations if they do not have them already. They then progress through seven areas of data science (described in more detail below) each involving distinctive learning outcomes. In a unique feature of this degree, the last of these seven areas named *Specialized Skills in Data Science for Specific Applications and Fields* students have the opportunity to pursue analytics electives related to their primary discipline of interest via courses offered in multiple disciplines including atmospheric sciences, business, biological sciences, computer science, criminal justice, geography, healthcare, information science, political science, and sociology, among others.

Section I – Enrollment
We anticipate the Masters in Data Science major to attract 25 new students in year one with an escalation of enrollment over five years up to 52 new students by the start of year five. Of these 25 new students, we anticipate 5 of them to be transfers. We also assume that we will have a retention rate of 75%. Student FTE assumption is that 80% of students will enroll in the program part-time.

Section II Credit Hours
Credit hours are conservatively estimated using 16 credit hours per student FTE in the program.

Section III – Faculty and Staff Appointments
The courses for this major are courses that exist as part of other majors. Therefore, instruction in the Data Sciences major will be delivered by existing faculty and instructional academic staff as part of their normal course load. No additional hires of faculty or staff are anticipated. At present there is enough existing capacity (empty seats) in classes or classes where the enrollment cap can be raised to accommodate the projected new students in the Data Sciences major without needing new sections or faculty. As the major grows, we may need to increase course offerings. That increase will only be done when enrollment numbers support such increases.
Section IV – Program Revenues

Tuition Revenues
- Tuition revenues were calculated based on the current graduate tuition rates for fall 2020 & spring 2021.
- For students enrolled in the MSDS degree, standard tuition and fee rates will apply, per University of Wisconsin-Milwaukee graduate fee schedules. For the current academic year, residential tuition and segregated fees total $5,931.82 per semester for a full-time student enrolled in 8+ credits per semester. Of this amount, $5,350.32 is attributable to tuition. Nonresident tuition and segregated fees total $12,647.34 per semester for a full-time student enrolled in 8+ credits per semester. Of this amount, $12,065.84 is attributable to tuition.

Program/Course Fees
- Additionally, some course delivery will be in Schools which charge ‘Master’s Surcharge Fees’. For example, Business Master’s charges $167.71 per credit for courses taken in the Lubar School of Business.

Grants/Extramural Funding
- No grant funding is anticipated for this major.

Program Revenue (PR)
- No non-tuition revenue is anticipated for this major.

General Program Revenue (GPR)
- No non-tuition revenue is anticipated for this major.

Section V – Program Expenses

As the proposed degree primarily utilizes existing courses the cost to the university will be minimal. We will make strategic investments into marketing campaigns.

Salary and Fringe Expenses
- Instruction in the proposed program will be delivered by existing faculty as part of their normal course load. No additional salary expenses are anticipated. Salary and Fringe is based on existing course section instruction. The FTE Time commitment will increase in line with enrollment.
- Advising and recruitment in the Data Analytics major will be delivered by a new student services staff member who will be hired for recruiting and advising of both the BSDA and MSDS programs. A current faculty member will serve as the Program Director and will be compensated by course release. This includes both salary and fringes and as the program grows so will our FTE time commitment.
Other Expenses

The degree will be marketed similar to the promotion of other Master’s degrees and the expenses included are in line with our normal promotional activities.

Section VI – Net Revenue

Net revenues will be distributed according to the UWM budget model. Any portion of net revenues above expenses would be invested in strategic priorities for the unit.
## University of Wisconsin - Milwaukee

### Cost and Revenue Projections For Newly Proposed Program

<table>
<thead>
<tr>
<th>Items</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong></td>
<td>Enrollment (New Student) Headcount</td>
<td>25</td>
<td>30</td>
<td>36</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Enrollment (Continuing Student) Headcount</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Enrollment (New Student) FTE</td>
<td>20</td>
<td>24</td>
<td>28.8</td>
<td>34.56</td>
</tr>
<tr>
<td></td>
<td>Enrollment (Continuing Student) FTE</td>
<td>0</td>
<td>16</td>
<td>32</td>
<td>48.64</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td>Total New Credit Hours</td>
<td>320</td>
<td>384</td>
<td>461</td>
<td>553</td>
</tr>
<tr>
<td></td>
<td>Existing Credit Hours</td>
<td>0</td>
<td>256</td>
<td>512</td>
<td>778</td>
</tr>
<tr>
<td><strong>III</strong></td>
<td>FTE of New Faculty/Instructional Staff</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>FTE of Current Faculty/Instructional Staff</td>
<td>0.625</td>
<td>1.375</td>
<td>2</td>
<td>2.625</td>
</tr>
<tr>
<td></td>
<td>FTE of New Admin Staff</td>
<td>0</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FTE Current Admin Staff</td>
<td>0.5625</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>IV</strong></td>
<td>Revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>From Tuition</td>
<td>$214,013</td>
<td>$428,026</td>
<td>$650,599</td>
<td>$890,293</td>
</tr>
<tr>
<td></td>
<td>From Fees</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>From Fees Distance Education</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Program Revenue (Grants)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Program Revenue - Other</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>GPR (re)allocation</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Total New Revenue</td>
<td>$214,013</td>
<td>$428,026</td>
<td>$650,599</td>
<td>$890,293</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td>Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salaries plus Fringes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faculty/Instructional Staff</td>
<td>$60,000</td>
<td>$116,000</td>
<td>$173,000</td>
<td>$229,000</td>
</tr>
<tr>
<td></td>
<td>Other Staff</td>
<td>$47,695</td>
<td>$85,170</td>
<td>$127,755</td>
<td>$175,451</td>
</tr>
<tr>
<td></td>
<td>Other Expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilities</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Other Marketing</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td></td>
<td>Other (please list)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Total Expenses</td>
<td>$127,695</td>
<td>$221,170</td>
<td>$320,755</td>
<td>$424,451</td>
</tr>
<tr>
<td><strong>VI</strong></td>
<td>Net Revenue</td>
<td>$86,318</td>
<td>$206,856</td>
<td>$329,844</td>
<td>$465,842</td>
</tr>
</tbody>
</table>

Submit budget narrative in MS Word Format

Provost's Signature: Date:

Chief Business Officer's Signature: Date: