

# MULTIDISCIPLINARY STUDIES, DATA SCIENCE AND ANALYTICS TRACK, M.S.

## Master of Science Program

Program Code: MS-GR

Major Code: MUL

Academic Affairs Office

Dr. Kimberly J. Jackson, Director

Cleveland Hall 519, (716) 878-5902

## Interdisciplinary Unit in Data Science and Analytics

Dr. Joaquin Carbonara, Principal Adviser (Math/Statistics)

Mathematics Department

Science and Math Complex 384, (716) 587-2882

The Multidisciplinary Studies Data Science and Analytics Track is designed for individuals with quantitative talent, scientific background, and an entrepreneurial mindset wanting to join the data revolution that is changing all aspects of modern life.

Data science and analytics (DSA) is a fast-growing discipline leading to excellent job opportunities in a variety of fields, including business, industry, health, government, and education. Students who enroll in the Multidisciplinary Studies Data Science and Analytics Track will be guided to create their best degree curriculum based on their own career aspirations.

The curriculum (<https://dataanalytics.buffalostate.edu/curriculum/>) includes courses covering big data, statistics, machine learning, database management, data visualization, programming, and business intelligence. The program prepares graduates to become leaders in their profession by including applied- and experiential-learning opportunities, business/ communication courses, and a required internship.

Students in the DSA track engage immediately in advanced courses in math and computer science. Because certain background knowledge is necessary for success, it is recommended applicants should have completed introductory level undergraduate or equivalent coursework in computer programming and basic statistics. We also recommend but do not require completion of undergraduate coursework in calculus. Students who have not completed the required prerequisites may be admitted as a premajor (<https://graduateschool.buffalostate.edu/pre-major-non-degree-acceptance/>) and complete preparatory courses before admission to the Multidisciplinary Studies Data Science and Analytics Track.

Upon satisfactory completion of an approved course of study, a Master of Science (M.S.) degree is awarded.

Other available Master of Science Tracks include Individualized (<http://ecatalog.buffalostate.edu/graduate/graduate-programs/multidisciplinary-studies-ms/>) and Nutrition (<http://ecatalog.buffalostate.edu/graduate/graduate-programs/nutrition-multidisciplinary-studies-ms/>).

## Advisement

After completing the statement of intent, the student will plan a meeting with Dr. Joaquin Carbonara who will review the statement of intent, approve a plan of study, complete the Principal Adviser Consent Form and agree to serve as principal adviser.

The principal adviser also enumerates any additional requirements the student must complete before being permitted to advance to candidacy, including but not limited to requiring that the student identify a second adviser (if needed) to support the course of study and read the eventual project.

The principal adviser is charged with working closely with the student throughout the plan of the study and with service as a point of contact with the director to support and advise the student. It is the student's responsibility to initiate and maintain contact and ongoing communication with the principal adviser.

## Admission Requirements

1. A bachelor's degree from an accredited college or university with a minimum cumulative GPA of 2.5 (4.0 scale).
2. A two- to three-page statement of intent (<https://dataanalytics.buffalostate.edu/statement-intent/>) (essay) that includes: educational and professional goals, relevant background experience, and reasons for interest in the Multidisciplinary Studies, Data Science and Analytics Track Program.
3. Signed principal adviser consent form (<http://graduateschool.buffalostate.edu/supplemental-application-materials/>). Students in the DSA track will be advised by Dr. Joaquin Carbonara.
4. After the completed application is received the student will be contacted to set up an appointment for an interview with the director.

In addition, all applicants must review the Admission to a Graduate Program (<http://ecatalog.buffalostate.edu/graduate/admission-graduate-program/>) section in this catalog.

**Program Requirements**

1. Completion of a minimum of 30 credit hours, comprising at least 15 hours of 600- and 700-level courses, including the master's project.
2. A maximum of 15 credit hours may be taken in a discipline that offers a master's degree when the student does a master's project (3 credits).
3. A maximum of 18 credit hours may be taken in a discipline that does not offer a master's degree.
4. A maximum of 15 credit hours may be taken at another accredited institution. This coursework must conform to the limitations stated in 2 and 3 (above), meet the requirements of the Transfer Credit policy (<http://ecatalog.buffalostate.edu/graduate/academic-requirements/transfer-credit/>), and have the prior approval of the principal adviser.
5. Only grades of B or better will be accepted as transfer credit. An official transcript showing transfer credit must be submitted to the Graduate Studies Office.
6. Coursework (including transfer credit) must be completed within the six-year period immediately preceding the date of completion of the program.
7. A maximum of 6 credit hours of independent study may be included in the program.
8. Students must maintain a minimum cumulative GPA of 3.0 (4.0 scale).
9. Master of Science candidates must complete a) a research methods course and b) a supervised project approved by the principal adviser. Individual principal advisers may impose further requirements on candidates based on practices and policies of their home department (second reader or oral defense, for example). These must be specified in writing at the outset of the degree program on the completed Principal Adviser Consent Form (<http://graduateschool.buffalostate.edu/supplemental-application-materials/>).
10. A Degree Candidacy Application Form (<http://graduateschool.buffalostate.edu/candidacy-forms/>), approved by the student's principal, secondary (if required), and tertiary (if required) must be submitted to the director before the completion of 12 credit hours at Buffalo State.
11. Students completing degree requirements each spring semester are requested to submit designated assignments/artifacts in Taskstream by the close of the semester for the Multidisciplinary Studies Program Assessment.

Code	Title	Credit Hours
<b>Required Courses (12 credit hours)</b>		
<i>Computer Science (6 credit hours)</i>		
CIS 512	INTRODUCTION TO DATA SCIENCE AND ANALYTICS	3
CIS 600	MACHINE LEARNING FOR DATA SCIENCE	3
<i>Mathematics and Statistics (6 credit hours)</i>		
MAT 646	INTRODUCTION TO STATISTICS FOR DATA SCIENCE	3

MAT 616	ELEMENTS OF MATHEMATICS, PROGRAMMING AND COMPUTER SCIENCE FOR DATA SCIENCE	3
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<b>Electives (12 credit hours)</b>		
Select 12 credit hours from the following: 12		
DSA 501	DATA ORIENTED COMPUTING AND ANALYTICS	
DSA 601	MACHINE LEARNING MODELS IN PYTHON	
DSA 610	DATABASES AND THE DATA SCIENCE INFORMATION LIFE CYCLE	
DSA 650	DATA STRATEGY AND GOVERNANCE	
BUS 519	COMMUNICATION FOR LEADERS AND MANAGERS	
GEG 584	GEOSPATIAL PROGRAMMING	
PSM 601	PROJECT MANAGEMENT FOR MATH AND SCIENCE PROFESSIONALS	
PSM 602	COMMUNICATION STRATEGIES FOR MATH AND SCIENCE PROFESSIONALS	
Other courses available with advisement		
<b>Research Methods and Internship (6 credit hours)</b>		<b>6</b>
DSA 650	DATA STRATEGY AND GOVERNANCE	
OR		
PSM 601	PROJECT MANAGEMENT FOR MATH AND SCIENCE PROFESSIONALS	
OR		
PSM 602	COMMUNICATION STRATEGIES FOR MATH AND SCIENCE PROFESSIONALS	
DSA 690	MASTER'S PROJECT	
<b>Total Credit Hours</b>		<b>30</b>

Students will:

1. Demonstrate effective and appropriate communication skills through coherent and well-organized written presentations.
2. Demonstrate effective and appropriate communication skills through coherent and well-organized oral and visual presentations.
3. Demonstrate the ability to creatively use information, concepts, analytical approaches, and critical thinking skills in one or more disciplines. Competency in making connections that will synthesize and transfer learning to new and complex situations.
4. Ethically identify, access, critically evaluate, and apply information throughout collections of work.
5. Demonstrate a basic knowledge of research design, methodology, and measurement strategies that addresses a problem in the field.
6. Demonstrate analytical skills through self-reflection to assess individual performances or collections of work.

Show evidence of personal, professional, and civic engagement/development.