FLORIDA ATLANTIC UNIVERSITY

NEW/CHANGE PROGRAM REQUEST
Graduate Programs

UGPC Approval _____
UFS Approval _____
Banner Posted _____
Catalog _____

Department Mathematics and Statistics

College Science

Program Name

M.S. in Data Science and Analytics (Math Concentration)

☐ **New Program**

☑ **Change Program**

Effective Date
(TERM & YEAR)

Summer 2025

Please explain the requested change(s) and offer rationale below or on an attachment

We would like to modify the curriculum so that it aligns better with that at other major institutions and more effectively prepares students for careers in data science and analytics, which is a new and rapidly evolving field.

Specifically, we would like to modify the curriculum for our concentration in the following ways:

1) Replace common core course STA 5195 (Biostatistics) with STA 6106 (Statistical Computing), which is broader and more appropriate for students learning data science.

2) Replace CAP 6673 (Data Mining and Machine Learning) with CAP 5625 (Computational Foundations of AI) to provide a stronger foundation in machine learning.

We would also like to follow the program change for all concentrations in the following ways:

1) Remove the GRE requirement to align with most other graduate programs.

2) Require that students take a maximum of one course from each outside concentration to promote interdisciplinary thinking.

Faculty Contact/Email/Phone

Dr. Yang Li / yangli@fau.edu

Consult and list departments that may be affected by the change(s) and attach documentation

the other concentrations in MS in Data Science and Analytics

Approved by	***Date***
Department Chair	1/17/2025
College Curriculum Chair	2/25/2025
College Dean	2/10/2025
UGPC Chair	02/20/2025
UGC Chair	02/20/2025
Graduate College Dean	02/20/2025
UFS President	
Provost	

Email this form and attachments to UGPC@fau.edu one week before the UGPC meeting so that materials may be viewed on the UGPC website prior to the meeting.

DATA SCIENCE AND ANALYTICS
MASTER OF SCIENCE (M.S.)

Data Science via Scientific Inquiry Concentration
Data Science and Engineering Concentration
Data Science in Business Concentration
Data Science in Society Concentration

The Master of Science with Major in Data Science and Analytics (MSDSA) is a multi-college interdisciplinary program jointly administered by the Department of Mathematics and Statistics in the Charles E. Schmidt College of Science, the Department of Electrical Engineering and Computer Science in the College of Engineering and Computer Science, the Department of Information Technology and Operations Management in the College of Business and the Department of Political Science in the Dorothy F. Schmidt College of Arts and Letters. The program aims to prepare students with essential skill sets needed to analyze small, fast, big, massive and complex data. To allow for maximum flexibility in career aspirations, students may select from four concentrations:

- Data Science via Scientific Inquiry Concentration, Department of Mathematics and Statistics
- Data Science and Engineering Concentration, Department of Electrical Engineering and Computer Science (EECS) (This concentration is also available fully online.)
- Data Science in Business Concentration, Department of Information Technology and Operations Management
- Data Science in Society Concentration, Department of Political Science

Admission Requirements
To be admitted to the MSDSA program, applicants must:

1. -Have obtained a bachelor's degree from an accredited institution and possess a minimal background consisting of MAC 2233 (Methods of Calculus) or equivalent and STA 2023 (Introductory Statistics) or equivalent. Students applying to the Data Science and Engineering concentration must have completed a college-level introductory programming course with a minimum grade of "C." Knowledge of Python and statistical packages such as R, as well as coursework in linear algebra are recommended for all concentrations;
2. Have an undergraduate GPA of 3.0 or higher in the last 60 credits of undergraduate coursework;
3. Submit two letters of recommendation for all concentrations, except the Data Science and Engineering concentration;
4. ~~Have attained scores of at least 151 (verbal) and 151 (quantitative) on the Graduate Record Examination (GRE). GRE scores more than five years old are not acceptable normally. GRE is not required for admission to the Data Science and Engineering concentration;~~

~~5.~~4. Be proficient in written and spoken English. International students from non-English-speaking countries must present a score of at least 500 (paper-based test) or 213 (computer-based test) or 79 (internet-based test) on the Test of English as a Foreign Language (TOEFL) or a score of at least 6.0 on the International English Language Testing System (IELTS); and

~~6.~~5. Meet other requirements of the FAU Graduate College.

Curriculum Requirements

The MSDSA program offers both thesis and non-thesis options. Both options require a minimum of 30 credits. Students are required to take ~~one~~ two common core course, ~~two~~ one additional core course~~s~~, four concentration courses, and three elective courses for the total of 30 credits. To encourage interdisciplinarity, additional core and elective courses taken outside of the chosen concentration must be distributed across the other concentrations, such that no more than one course is taken from each of the other concentrations. The exact courses taken are to be determined by the students and their advisory committee. The thesis option requires only one elective course and 6 thesis credits. Students selecting the thesis option must complete and defend a written thesis successfully.

Data Science via Scientific Inquiry Concentration

Common Core Courses		
Introduction to Data Science	CAP 5768	3
~~Biostatistics~~	~~STA 5195~~	~~3~~
Statistical Computing	STA 6106	3
Take one additional core course		
~~Data Mining and Machine Learning~~	~~CAP 6673~~	~~3~~
Computational Foundations of AI	CAP 5625	3 **or**
Introduction to Business Analytics and Big Data	ISM 6404	3 **or**
Quantitative Methods in Political Science	POS 6746	3
Take four concentration courses		
Computer Data Security	CIS 6370	3
Data Analysis and Modeling for Cybersecurity	CAI 6803	3
Introduction to Cryptology and Information Security	MAD 5474	3
Graph Theory	MAD 6307	3
Cryptanalysis	MAD 6478	3
Applied Computational Topology	MTG 6329	3
~~Statistical Computing~~	~~STA 6106~~	~~3~~
Biostatistics	STA 5195	3
Survival Analysis	STA 6177	3
Regression Analysis	STA 6236	3
Mathematical Statistics	STA 6326	3
Applied Time Series Analysis	STA 6857	3

Take three elective courses from the Electives Table. Thesis option requires only one elective course and 6 thesis credits.

Data Science and Engineering Concentration (This concentration is also available fully online.)

Common Core Courses		
Introduction to Data Science	CAP 5768	3
~~Data Mining and Machine Learning~~	~~CAP 6673~~	~~3~~
Computational Foundations of AI	CAP 5625	3
Take one additional core course		
~~Biostatistics~~Statistical Computing	STA ~~5195~~6106	3 **or**
Introduction to Business Analytics and Big Data	ISM 6404	3 **or**
Quantitative Methods in Political Science	POS 6746	3
Take four concentration courses, one in cloud computing, another in database systems, and two additional courses with the prefix CAP.~~, any course with the prefix CAP offered by the EECS Department, or CEN 6405~~		
Cloud Computing	CEN 5086	3
New Directions in Database Systems	COP 6726	3 **or**
Theory and Implementation of Database Systems	COP 6731	3

Take three elective courses from the Electives Table. Thesis option requires only one elective course and 6 thesis credits.

Data Science in Business Concentration

Common Core Courses		
Introduction to Data Science	CAP 5768	3
Introduction to Business Analytics and Big Data	ISM 6404	3
Take one additional core course		
Biostatistics	STA 5195	3 **or**
Data Mining and Machine Learning	CAP 6673	3 **or**
Quantitative Methods in Political Science	POS 6746	3
Take four concentration courses		
Quantitative Communication Research	COM 6316	3
Data Mining and Predictive Analytics	ISM 6136	3
Database Management Systems	ISM 6217	3
Advanced Business Analytics	ISM 6405	3
Social Media and Web Analytics	ISM 6555	3
Data Management and Analysis with Excel	QMB 6303	3
Data Analysis for Managers	QMB 6603	3

Take three elective courses from the Electives Table. Thesis option requires only one elective course and 6 thesis credits.

Data Science in Society Concentration

Common Core Courses		
Introduction to Data Science	CAP 5768	3
Quantitative Methods in Political Science	POS 6746	3
Take one additional core course		
Biostatistics	STA 5195	3 **or**
Data Mining and Machine Learning	CAP 6673	3 **or**
Introduction to Business Analytics and Big Data	ISM 6404	3
Take four concentration courses		
Advanced Anthropological Research 2	ANG 6092	3
Quantitative Reasoning in Anthropological Research	ANG 6486	3
Social Networks and Big Data Analytics	CAP 6315	3
Quantitative Communication Research	COM 6316	3
Social Media and Web Analytics	ISM 6555	3
Seminar in Political Behavior	POS 6208	3
Research Design in Political Science	POS 6736	3
Seminar in Advanced Research Methods	SYA 6305	3

Take three elective courses from the Electives Table. Thesis option requires only one elective course and 6 thesis credits.

Electives Table

Business Analytics		
Data Mining and Predictive Analytics	ISM 6136	3
Database Management Systems	ISM 6217	3
Introduction to Business Analytics and Big Data	ISM 6404	3
Advanced Business Analytics	ISM 6405	3
Social Media and Web Analytics	ISM 6555	3
Data Management and Analysis with Excel	QMB 6303	3
Data Analysis for Managers	QMB 6603	3
Database and Cloud Computing		
Multiprocessor Architecture	CDA 6132	3
Cloud Computing	CEN 5086	3
New Directions in Database Systems	COP 6726	3
Theory and Implementation of Database Systems	COP 6731	3
Database Management Systems	ISM 6217	3
Data Mining and Machine Learning		
Introduction to Neural Networks	CAP 5615	3
Social Networks and Big Data Analytics	CAP 6315	3
Data Mining for Bioinformatics	CAP 6546	3
Machine Learning for Computer Vision	CAP 6618	3
Deep Learning	CAP 6619	3
Reinforcement Learning	CAP 6629	3

Artificial Intelligence	CAP 6635	3
Data Mining and Machine Learning	CAP 6673	3 **or**
Applied Machine Learning	CAP 6610	3
Information Retrieval	CAP 6776	3
Web Mining	CAP 6777	3
Advanced Data Mining and Machine Learning	CAP 6778	3
Big Data Analytics with Hadoop	CAP 6780	3
Computational Advertising and Real-Time Analytics	CAP 6807	3
Computer Performance Modeling	CEN 6405	3
Data Mining and Predictive Analytics	ISM 6136	3
Data Security and Privacy		
Computer Data Security	CIS 6370	3
Data Analysis and Modeling for Cybersecurity	CAI 6803	3
Management of Information Assurance and Security	ISM 6328	3
Introduction to Cryptology and Information Security	MAD 5474	3
Cryptanalysis	MAD 6478	3
Quantum Mechanics 2	PHY 6646	3
Scientific Applications and Modeling		
Photogrammetry and Aerial Photography Interpretation	GIS 6028C	3
LiDAR Remote Sensing and Applications	GIS 6032C	3
Web GIS	GIS 6061C	3
Geospatial Databases	GIS 6112C	3
Hyperspectral Remote Sensing	GIS 6127	3
Spatial Data Analysis	GIS 6306	3
Special Topics (Quantum Information Processing)	PHY 6938	3
Computational Physics	PHZ 5156	3
Numerical Relativity	PHZ 7609	3
Social Data Science		
Advanced Anthropological Research 1	ANG 6090	3
Advanced Anthropological Research 2	ANG 6092	3
Quantitative Reasoning in Anthropological Research	ANG 6486	3
Social Networks and Big Data Analytics	CAP 6315	3
Quantitative Communication Research	COM 6316	3
Quantitative Methods in Political Science	POS 6746	3
Research Design in Political Science	POS 6736	3
Seminar in Advanced Research Methods	SYA 6305	3
Statistics and Data Applications		
Biomedical Data and Informatics	BSC 6459	3
Biostatistics	STA 5195	3
Statistical Computing	STA 6106	3
Survival Analysis	STA 6177	3
Biostatistics - Longitudinal Data Analysis	STA 6197	3

Applied Statistical Methods	STA 6207	3
Regression Analysis	STA 6236	3
Mathematical Statistics	STA 6326	3
Applied Time Series Analysis	STA 6857	3
Applied Computational Topology	MTG 6329	3

Outlook

Fw: MS DSA

From Stephen Locke <lockes@fau.edu>
Date Tue 2/4/2025 5:23 PM
To cosgradadmin <cosgradadmin@fau.edu>
Cc Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>

From: Tamara Dinev <tdinev@fau.edu>
Sent: Tuesday, February 4, 2025 3:17 PM
To: Stephen Locke <lockes@fau.edu>; Karen Dye <kchinand@fau.edu>
Subject: Re: MS DSA

Hi Stephen, ITOM does not object

Best Regards:
Tamara Dinev, Ph.D.
Department Chair and Professor
Dean's Distinguished Research Fellow
Department of Information Technology and Operations Management, FL 219
College of Business,
Florida Atlantic University
Boca Raton, Florida 33431
Web: https://business.fau.edu/faculty-research/faculty-profiles/profile/tdinev.php
Google Scholar: https://scholar.google.com/citations?user=YH8QZ-YAAAAJ&hl=en

On 2/4/25 13:37, Stephen Locke wrote:

> Professor Dinev,
>
> Could you take a look at the proposed (attached) changes to the MD in Data Science and Analytics? I think these changes match with the changes requested at the last meeting with the four units (Math, EECS, PoliSci, Business), and I'm collecting comments from the other units for the curriculum revision process.
>
> Thank you.
>
> Stephen
>
> Stephen C. Locke, Professor and Graduate Director,
> Mathematics and Statistics

Outlook

Fw: MS DSA

From Stephen Locke <lockes@fau.edu>
Date Thu 2/6/2025 11:49 AM
To cosgradadmin <cosgradadmin@fau.edu>

From Political Science:

From: Dukhong Kim <dkim4@fau.edu>
Sent: Thursday, February 6, 2025 6:39 AM
To: Stephen Locke <lockes@fau.edu>
Cc: Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>
Subject: Re: MS DSA

Hi Dr. Locke,

I agree with you that these are the changes we discussed and supported.

Best,
Dukhong

****
Dukhong Kim
Associate Professor
Interim Chair, Department of Political Science
Social Science Building(SO) 384b
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431
phone: 561-297-3216
email: dkim4@fau.edu

From: Stephen Locke <lockes@fau.edu>
Sent: Tuesday, February 4, 2025 1:31 PM
To: Dukhong Kim <dkim4@fau.edu>
Cc: Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>
Subject: MS DSA

Dr. Kim,

Could you take a look at the attached course and program changes related to the MS program in

Data Science and Analytics? I think they line up with what was discussed in the last meeting the four units (Math, PoliSci, Business, EECS) had.

I'm collecting comments for the curriculum committees, to show that these changes were agreed on by multiple units.

Thanks,

Stephen

Stephen C. Locke, Professor and Graduate Director,
Mathematics and Statistics

Outlook

Fw: STA 6106, MS Data Science

From Stephen Locke <lockes@fau.edu>
Date Tue 2/4/2025 1:25 PM
To cosgradadmin <cosgradadmin@fau.edu>

Here is a support letter from EECS. They have the most students in the MS DSA program. I will contact Political Science and Business still (I've asked Yuan and Yang for contact info).

Stephen

From: Hari Kalva <hkalva@fau.edu>
Sent: Monday, February 3, 2025 5:49 PM
To: Stephen Locke <lockes@fau.edu>; Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>
Subject: RE: STA 6106, MS Data Science

Hi Stephen, EECS department has no objections to the proposed changes.

--
Hari Kalva, Ph.D.
eecs.fau.edu

From: Stephen Locke <lockes@fau.edu>
Sent: Monday, February 3, 2025 2:47 PM
To: Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>
Cc: Hari Kalva <hkalva@fau.edu>
Subject: Fw: STA 6106, MS Data Science

Hari,

Could I get a quick comment from you to the effect that the attached changes are in line with the discussions that took place between the four units involved.

Yuan or Yang,

Do you have contact info for Political Science and Business?

From: Zhixiao Xie <xie@fau.edu>
Sent: Tuesday, January 28, 2025 9:50 AM
To: Stephen Locke <lockes@fau.edu>
Cc: cosgradadmin <cosgradadmin@fau.edu>; Marianne Porter <mporte26@fau.edu>
Subject: FW: STA 6106, MS Data Science

Hi Stephen,

We will put these to the agenda for the next CGPC meeting (Marriane or Stacee will help upload the files). Either you or Yang will give a brief description of the changes, and the committee will discuss them and vote. You mentioned that the changes were discussed in the meeting with other colleges/departments. It will help the process if a letter of support (email is fine) can be secured from relevant parties. The UGPC usually would like to see such letters for them to approve the change.

Best,

Zhixiao

From: Stephen Locke <lockes@fau.edu>
Sent: Friday, January 24, 2025 1:05 PM
To: cosgradadmin <cosgradadmin@fau.edu>; Yuan Wang <YWANG@fau.edu>; Yang Li <yangli@fau.edu>
Subject: STA 6106, MS Data Science

Zhixiao,

Attached are changes for the M.S. In Data Science and Analytics program, as discussed in a meeting with the four colleges/departments involved.

(1) Changing the prerequisites on STA 6106 to "Permission of Instructor"
(2) Replacing STA 5195 (Biostats) with STA 6106 (Statistical Computing)
(3) Removing the GRE from all concentrations
(4) Replacing CAP 6673 with CAP 5625 to provide stronger basis in machine learning
(5) Limiting students to one course from each of the other concentrations to provide more breadth

It was felt that Biostatistics, even though it is obviously a reasonable course for the program does not draw enough students, and that Statistical Computing would be something that more students would find of interest. To make STA 6106 appealing to students in the program, we are changing the prerequisites to permission of instructor.

We are removing the GRE since not all concentrations require it and this may affect student's choice of concentration. Also, GRE has been removed from the requirements for most of the graduate degrees at FAU.

Items (4) and (5) were proposed by Engineering, and are included to keep the proposals the same for all concentrations.

Yang Li is our director for the Mathematics concentration, and he prepared these documents with Yuan Wang.

Stephen

SCI #2

Final Audit Report 2025-02-21

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By:	Robert Stackman (rstackma@fau.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAAigJupiJ-m7ga1Hjty5NEGw2cCNJzHyfk

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