

Bachelor of Science with Major in Data Science and Analytics

(Minimum of 120 credits required)

The Bachelor of Science with Major in Data Science and Analytics (BSDSA) is a multi-college, interdisciplinary program jointly administered by the Department of Mathematical Sciences in the Charles E. Schmidt College of Science, the Department of Computer & Electrical Engineering and Computer Science (CEECS) in the College of Engineering and Computer Science, the Department of Information Technology and Operations Management (ITOM) in the College of Business, the Department of Political Science in the Dorothy F. Schmidt College of Arts and Letters, and the School of Criminology and Criminal Justice in the College of Design and Social Inquiry. The program aims to prepare students with the essential skill sets across disciplines needed for data-driven applications in industry, business, and government. To allow for maximum flexibility in career aspirations, students can select from three concentrations:

- Data Science in the Natural Sciences Concentration
- Data Science and Engineering Concentration
- Data Science in Business Concentration

Admission Requirements

All students must meet the minimum admission requirements of the University. Please refer to the [Admissions section](#) of this catalog.

Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete lower-division requirements including the requirements of the Intellectual Foundations Program and College Algebra and Introductory Statistics. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university, or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the BSDS degree, students must also complete the prerequisite courses for their major as outlined in the [Transition Guides](#).

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

Capstone – BS Data Science and Analytics

The Capstone for the BS degree with a Major in Data Science and Analytics is a cross college course that can be taken multiple times with a minimum of 3 credits as a requirement for the degree. Students apply their theoretical knowledge, methods, and tools acquired during the Data Science and Analytics program to a real-world problem and will engage in processing data and applying appropriate analytic methods to the problem. Students will implement a solution using appropriate tools and can work individually or in teams under the supervision of the course instructor or another faculty member. This can be accomplished in three ways: an approved PROJECT, RESEARCH EXPERIENCE, or WRITTEN THESIS.

Degree Requirements:

The minimum number of credits required for the Bachelor of Science degree with major in Data Science and Analytics is 120 credits: 36 credits Intellectual Foundations Program, 48 credits major requirements, and 36 credits free electives. Additional requirements:

1. 33 credits minimum of upper division coursework,
2. students must get a "C" or higher in all major courses to receive major credit, and
3. no major course can be taken pass/fail.

The 48 credits major requirements are listed below.

Common Core		
Introductory Statistics	STA 2023	3
Mathematics of Data Science	MAP 2190	3
Experimental Design and Data Analysis	CAP 2750	3
Tools for Data Science	CAP 2751	3
Data Management and Analysis with Excel	QMB 3302	3
Artificial Intelligence for Social Good	CCJ 3071	3
Data Science Capstone	ISC 4312	3
Common Core Credits:		21

Free Electives	
CHOOSE 2 COURSES FROM THE TABLE OF ELECTIVE COURSES FOR ALL CONCENTRATIONS	
Free Elective Credits:	6

Data Science in the Natural Sciences Concentration		
Concentration Core Requirements:		
Introduction to Computational Mathematics	MAD 2502	3
RI: Introduction to Data Science	CAP 3786	3
Computational Statistics	STA 3100	3
Concentration Core Credits:		9
Concentration Core Electives: CHOOSE 4 COURSES		
SAS for Data and Statistical Analyses	STA 3024	3
Probability and Statistics 1	STA 4442	3
Probability and Statistics 2	STA 4443	3
Applied Statistics 1 with Lab	STA 4234/4202L	3
Applied Statistics 2	STA 4702	3
Statistical Designs	STA 4222	3
Applied Time Series and Forecasting	STA 4853	3
Introduction to Biostatistics	STA 3173	3

RI: Industrial Problems in Applied Math	MAP 4913	3
Applied Mathematical Modeling	MAP 4103	3
Topology for Data Science	MTG 4328	3
Graph Theory	MAD 4301	3
Cryptography and Information Security	CIS 4362	3
Concentration Elective Credits:		12
Concentration Credits:		21

Data Science and Engineering Concentration		
Concentration Core Courses:		
Introduction to Programming in C, if applicable*	COP 2220	3
Foundations of Computer Science	COP 3014	3
Data Structures and Algorithm Analysis	COP 3530	3
Introduction to Data Science and Analytics	CAP 4773	3
Concentration Core Credits:		12
Concentration Elective Courses: CHOOSE 3 COURSES		
Introduction to Deep Learning	CAP 4613	3
Introduction to Artificial Intelligence	CAP 4630	3
Introduction to Data Mining and Machine Intelligence	CAP 4770	3
Introduction to Computer Systems Performance Evaluation	CEN 4400	3
Introduction to Database Structures	COP 3540	3
Applied Database Systems	COP 4703	3
Python Programming	COP 4045	3
Introduction to Internet Computing	COP 3813	3
Concentration Elective Credits:		9
Concentration Credits:		21

* Students that have taken a college-level introductory course in programming can substitute this course with one of the Concentration Elective Courses, with permission of the advisor.

Data Science in Business Concentration		
Concentration Core Requirements:		
Introduction to Business Analytics and Big Data	ISM 3116	3
Business Communication for Data Analysts	GEB 3231	3
Data Mining and Predictive Analytics	ISM 4117	3
Advanced Business Analytics	ISM 4403	3
Concentration Core Credits:		12
Concentration Core Electives: CHOOSE 3 COURSES		
Contemporary Issues of Digital Data Management	ISM 4041	3

Management of Information Assurance and Security	ISM 4323	3
Database Management Systems	ISM 4212	3
Social Media and Web Analytics	ISM 4420	3
Business Analytics for Marketing and Customer Relations	MAR 4615	3
Revenue Management and Predictive Analytics in the Hospitality and Tourism Industry	HFT 4881	3
Concentration Elective Credits:		9
Concentration Credits:		21

Table of Elective Courses for all Concentrations

Science Electives:		
Spatial Data Analysis	GEO 4167C	3
Photogrammetry and Aerial Photograph Interpretation	GIS 4021C	3
Applications of Geographic Information Systems	GIS 4048	3
Geospatial Databases	GIS 4118	3
Computational Physics	PHZ 3151C	3
Solar System Astronomy	AST 3110	3
Mathematical Methods in Physics	PHZ 4113	3
Practical Cell Neuroscience	PCB 4843C	3
Laboratory Methods in Biotechnology	BSC 4403L	3
Epidemiology of Infectious Diseases	MCB 4276	3
Concepts in Bioinformatics	BSC 4434C	3
RI: Introduction to Data Science	CAP 3786	3
Computational Statistics	STA 3100	3
SAS for Data and Statistical Analyses	STA 3024	3
Probability and Statistics 1	STA 4442	3
Probability and Statistics 2	STA 4443	3
Applied Statistics 1 with Lab	STA 4234/4234L	3
Applied Statistics 2	STA 4702	3
Statistical Designs	STA 4222	3
Applied Time Series and Forecasting	STA 4853	3
Introduction to Biostatistics	STA 3173	3
RI: Industrial Problems in Applied Math	MAP 4913	3
Applied Mathematical Modeling	MAP 4103	3
Topology for Data Science	MTG 4328	3
Graph Theory	MAD 4301	3
Cryptography and Information Security	CIS 4362	3
Engineering Electives:		
Introduction to Data Science and Analytics	CAP 4773	3
Introduction to Deep Learning	CAP 4613	3

Introduction to Artificial Intelligence	CAP 4630	3
Introduction to Data Mining and Machine Intelligence	CAP 4770	3
Introduction to Computer Systems Performance Evaluation	CEN 4400	3
Introduction to Database Structures	COP 3540	3
Applied Database Systems	COP 4703	3
Python Programming	COP 4045	3
Introduction to Internet Computing	COP 3813	3
Business Electives:		
Introduction to Business Analytics and Big Data	ISM 3116	3
Business Communication for Data Analysts	GEB 3231	3
Data Mining and Predictive Analytics	ISM 4117	3
Advanced Business Analytics	ISM 4403	3
Contemporary Issues of Digital Data Management	ISM 4041	3
Management of Information Assurance and Security	ISM 4323	3
Database Management Systems	ISM 4212	3
Social Media and Web Analytics	ISM 4420	3
Business Analytics for Marketing and Customer Relations	MAR 4615	3
Revenue Management and Predictive Analytics in the Hospitality and Tourism Industry	HFT 4881	3
Arts and Letters Electives:		
Research Methods	POS 3703	3
Public Opinion in America	POS 4202	3
Sociological Analysis Quantitative Methods	SYA 4400	3
Research Methods in Biological Archeology	ANT 4192	3
Information Technology in Public Administration	PAD 3712	3
Introduction to the Nonprofit Sector	PAD 4144	3
Research Methods for Public Management	PAD 4704	3
Quantitative Inquiry for Public Managers	PAD 4702	3
CDSI Electives:		
Criminal Justice Technology	CJE 3692C	3
Crime Analysis	CJE 4663	3
Computer Crime	CJE 4668	3
Teen Technology Misuse	CCJ 4554	3
Research Methods in Criminal Justice	CCJ 4700	3
Research Methods in Social Work	SOW 4403	3

FLORIDA ATLANTIC UNIVERSITY – INTELLECTUAL FOUNDATION PROGRAM 2019 – 2020

All courses are three (3) credits unless otherwise indicated. Course selections should be made in consultation with an academic advisor.

DATA SCIENCE AND ANALYTICS (2019-2020) MAJOR

FOUNDATIONS OF WRITTEN COMMUNICATION

(6 credit hours required – Writing Across the Curriculum - WAC)

Grade of “C” or higher is required in each course

___ ENC 1101 College Writing I (**REQUIRED**)

___ ENC 1102 College Writing II +

THE FOLLOWING COURSES BELOW MAY BE SUBSTITUTED FOR ENC 1102:

English Department

___ ENC 1930+ University Honors Seminar in Writing (**Permit Only**)

___ ENC 1939+ Special Topic: College Writing

___ ENC 2452+ Honors Composition for Science

Anthropology Department

___ ANT 1471+..... Cultural Difference in a Globalized Society

History Department

___ HIS 2050+ Writing History

Note: Students must take four Writing-Across-the-Curriculum (WAC) courses, two of which must be taken from Foundations of Written Communication.

FOUNDATIONS OF MATHEMATICS & QUANTITATIVE REASONING

(6 credit hours required – Grade of “C” or higher is required)

Student must take 2 of the following courses; 1 must be from group A.

The second course may be from group A or group B.

PRETEST IS REQUIRED BEFORE TAKING YOUR FIRST MATH COURSE

Group A

___ MGF 1106 Math for Liberal Arts 1

___ MGF 1107 Math for Liberal Arts 2

___ MAC 1105 College Algebra

___ STA 2023 Introductory Statistics

___ MAC 2311 Calculus with Analytic Geometry 1 (4 credits)

(REQUIRED for Natural Sciences and Engineering Concentrations)

or any mathematics course for which one of the above courses is the direct prerequisite

Group B

___ MAC 1140 Precalculus Algebra

___ MAC 1114 Trigonometry

___ MAC 1147 Precalculus Algebra & Trigonometry (5 credits)

___ MAC 2210 Intro Calculus w/Applications (4 credits) (**Permit Only**)

___ MAC 2233 Methods of Calculus

___ MAC 2312 Calculus with Analytic Geometry 2 (4 credits)

___ MAD 2104 Discrete Mathematics (3 credits) (**REQUIRED for Natural Sciences and Engineering Concentrations**)

Philosophy Department

___ PHI 2102 Logic

FOUNDATIONS OF SCIENCE & THE NATURAL WORLD

(6 credit hours required - **One of the courses must have a lab**)

Student must take 2 of the following courses; 1 must be from group A.

The second course may be from group A or group B.

Group A

Biology Department

___ BSC 1005 & L
Life Science (3 cr. incl. Lab)

Chemistry Department

___ CHM 1020C
Contemporary Chemical

Issues

Geosciences Department

___ ESC 2000
The Blue Planet (**online**)

___ EVR 1001
Env. Science and

Sustainability

Physics Department

___ AST 2002
Intro. to Astronomy (**P/F**)

Group B

Anthropology Department

___ ANT 2511 & L
Intro to Biological
Anthropology (4 cr. Incl. Lab)

Chemistry Department

___ CHM 2083
Chemistry in Modern Life (**P/F**)

Engineering Dean Department

___ ETG 2831
Nature: Inter. of Sci., Eng., &
the Humanities

Geosciences Department

___ GLY 2010C
Physical Geol. (4 cr. incl. Lab)

___ GLY2100
History of Earth and Life

___ MET 2010 & D
Weather and Climate

Physics Department

___ PSC 2121
Physical Science

(D) = Discussion, (L) = Lab

Courses indicating a (D) or (L) are linked with a lecture, a lab, and/or a discussion. If you select one of these courses, you must register for the lecture, lab, and/or discussion. You **must** attend the lecture, lab, and/or discussion.

FOUNDATIONS OF SOCIETY & HUMAN BEHAVIOR

(6 credit hours required)

Student must take 2 of the following courses; 1 must be from group A.

The second course may be from group A or group B.

Group A

History Department

___ AMH 2020 & D..... United States History Since 1877 **(P/F)**

Anthropology Department

___ ANT 2000 & D Introduction to Anthropology

Economics Department

___ ECO 2013 Macroeconomic Principles §

Political Science Department

___ POS 2041 Government of the United States

Psychology Department

___ PSY 1012 Introduction to Psychology

Sociology Department

___ SYG 1000 Sociological Perspectives

Group B

History Department

___ AMH 2010 & D..... United States History to 1877 **(P/F)**

Economics Department

___ ECO 2023 Microeconomic Principles §

___ ECP 2002 Contemporary Economic Issues

Exceptional Student Education Department

___ EEX 2091 Disability and Society

Geosciences Department

___ EVR 2017 Environment and Society

Languages, Linguistics, & Comparative Literature Department

___ LIN 2001 Introduction to Language **(online course)**

Public Administration Department

___ PAD 2258 Changing Environment of Soc., Bus., & Gov't

Sociology Department

___ SYG 2010 Social Problems

Urban & Regional Planning Department

___ URP 2051 Designing the City

FOUNDATIONS IN GLOBAL CITIZENSHIP

(6 credit hours required)

Student must choose two (2) courses from among the following:

Anthropology Department

___ ANT 2410 Culture and Society

Curriculum, Culture & Education Department

___ EDF 2854 Educated Citizen in Global Context

Geosciences Department

___ GEA 2000 World Geography

Political Science Department

___ INR 2002 Introduction to World Politics

Languages, Linguistics, & Comparative Literature Department

___ LAS 2000 Intro to Caribbean & Latin American Studies

___ LIN 2607 Global Perspectives on Language (**online course**)

Sociology Department

___ SYP 2450 Global Society

Social Work Department

___ SOW 1005 Global Perspectives of Social Services

History Department

___ WOH 2012 & D History of Civilization 1 (**WAC**) ++

___ WOH 2022 History of Civilization 2

FOUNDATIONS OF HUMANITIES

(6 credit hours required)

Student must take 2 of the following courses; 1 must be from group A.

The second course may be from group A or group B.

Group A

Visual Art & Art History Department

___ ARH 2000 Art Appreciation (**P/F**)

Music Department

___ MUL 2010 Music Appreciation

Philosophy Department

___ PHI 2010 & D Introduction to Philosophy (**WAC**) ++

Theatre & Dance Department

___ THE 2000 Theatre Appreciation

Group B

Architecture Department

___ ARC 2208 Culture & Architecture

Theatre & Dance Department

___ DAN 2100 Appreciation of Dance

School of Communication & Multimedia Studies

___ FIL 2000 & D Film Appreciation

Languages, Linguistics, & Comparative Literature Department

___ LIT 2100 Introduction to World Literature

English Department

___ LIT 2010 Interpretation of Fiction (**WAC**) ++

___ LIT 2030 Interpretation of Poetry (**WAC**) ++

___ LIT 2040 Interpretation of Drama (**WAC**) ++

___ LIT 2070 Interpretation of Creative Nonfiction (**WAC**) ++

STUDENTS ASSUME RESPONSIBILITY FOR MEETING ALL GRADUATION REQUIREMENTS

Course selections should be made in consultation with an academic advisor.

Legend

- + - ENC 1101 is a prerequisite.
- ++ - Two Foundations of Written Communications classes are required before taking this course.
- § - Sophomore standing (30 credits earned) is a requirement to take this course.
- * - Nursing majors are required to take this course in their first semester.
- ** - MAC 2311 is a prerequisite for this course. If a lab is needed, then take General Physics 1 Lab (PHY 2048 Lab).
- *** - MAC 1105 and MAC 1114 are prerequisites for this course. If a lab is needed, then take General Physics 1 Lab (PHY 2048 Lab).
- ‡ - Co-requisite of College Algebra (MAC 1105) or a prerequisite of Introductory Chemistry (CHM 1025). **WAC** - (WAC) Writing across the curriculum course.

Elective Credits

The number of elective credits allowed varies by major. Please consult with an academic advisor to determine the number of elective credits required for your major. **Certain majors do not allow any electives.**

§ Writing Across the Curriculum (WAC)/Gordon Rule

Students must obtain grades of "C" or higher. 12 credits of writing (WAC) and 6 credits of mathematics are required.

Please note:

Students must take four (4) WAC courses. Two (2) courses are to be taken from Foundations of Written Communication. We strongly recommend the two additional WAC courses come from these courses: PHI 2010, WOH 2012, LIT 2010, LIT 2030, LIT 2040 and LIT 2070. See advisor for additional details.

P/F

Certain designated undergraduate courses may be taken for a letter grade of pass (P) or fail (F). Students must indicate the grade option preferred when registering; otherwise, a letter grade will be given. The maximum credit available to any student on the P/F option is one course per term with a maximum of 12 credits during a student's entire course of study. This option is not available for courses in the student's major, for students on probation, or for **Engineering** majors.

(D) = Discussion, (L) = Lab

Courses indicating a (D) or (L) are linked with a lecture, a lab, and/or a discussion. If you select one of these courses, you must register for the lecture, lab, and/or discussion. You **must** attend the lecture, lab, and/or discussion.

<https://myfau.fau.edu>

Go to MyFAU to: Check e-mail

See FAU

Announcements **FAU**

Self-Service: Course

schedules

Registration (drop/add classes) and withdrawals

Student records and financial aid

Tuition payments

The University Course Catalog

NOTE: Honors Seminars SHALL BE ACCEPTED AS MEETING THE GORDON RULE WRITING REQUIREMENT.

See the University Advising Services Office for details.

FREE ELECTIVES (36 credits, 12 or more courses)

Free electives are courses in any college, any department not previously taken. These credits are needed to meet the 120 credits required for graduation.

36 credits	Intellectual Foundations Program
36 credits	Free Electives
<u>48 credits</u>	<u>Major Requirements</u>
120 CREDITS	TOTAL

Note: See the catalog for specific requirements, course descriptions and additional information. The requirements for some core curriculum & other courses may be satisfied by passing the appropriate AP or CLEP exam. Check with your advisor and college.

The Major in Data Science and Analytics:

- (1) 33 credits minimum of upper division course work,
- (2) students must get a "C" or higher in all major courses to receive major credit, and
- (3) no major course can be taken pass/fail.



CONTENT KNOWLEDGE (Declarative Knowledge): Students graduating with a B.S. degree in Data science and Analytics will demonstrate knowledge of the major concepts (1) of using statistics to analyze data, (2) of leveraging computer tools for analyzing and cleaning data, and (3) of using data science to solve application problems.

All undergraduate students majoring in data science and analytics are required to complete an Introductory Statistics course (STA 2023), a course on Tools for Data Science (CAP 2751), and a Data Science Capstone (ISC 4XXX). In the former two courses, students submit solutions to homework problems, operate on data sets with software, and take examinations designed to assess their understanding of major concepts in areas (1) and (2). In the capstone experience, students must leverage data analysis in an application context (3).

COMMUNICATION (Written Communication): Students graduating with a B.S. in Data Science and Analytics degree will produce writing that is well organized and grammatically correct, and they will be able to concisely describe societal implications of large-scale data analysis applications.

All undergraduate students majoring in data science and analytics are required to complete Data Science for Social Good/Justice (CCJ 4934). In this course, students must complete writing assignments that address societal implications of data analysis. In addition, students must complete the Data Science Capstone (ISC 4xxx), which requires them to write a report detailing their approach and findings.

CRITICAL THINKING (Analytical Skills): Students graduating with a .S. in Data Science and Analytics degree will correctly analyze and determine the validity of mathematical and statistical arguments. They will apply best practices when using data science to solve concrete problems.

Students in Mathematics of Data Science (MAP 2190) are exposed to mathematical arguments and produce their own mathematical propositions, both in submitted homework and in in-class examinations. Students in Experimental Design and Data Analysis (CAP 2750) and in Data Management and Analysis with Excel (QMB 3302) combine acquired theoretical knowledge with domain-specific requirements to solve applied problems, both in submitted homework and in in-class examinations.