

# B.S. in Data Science

The Bachelor of Science degree in Data Science emphasizes the acquisition of data, extraction of knowledge from data, and communication of actionable results. The program seeks to develop a student with the capacity to acquire, manage, secure, and analyze large and varied sets of data using modern software and techniques. The goal of the program is to educate and graduate professionals who are equipped for employment as data scientists or to continue their education in graduate school.

Data Science is an applied discipline that addresses the challenge of generating actionable knowledge from data. To successfully do this requires a sequence of steps: relevant questions must be formulated, data which can address the question must be identified and acquired, the data must be cleaned and secured, the data must be analyzed, and the results must be communicated to stakeholders. The required skillset joins the fields of mathematics, computer science, and statistics, augmented by emerging techniques unique to the field of data science. A successful practitioner will also develop domain expertise in a chosen field such as Air Traffic Control, Business/Economics, Computer Science, Cyber Security, Mathematics, Physics, or Psychology.

## Students will:

- Use data to construct evidence-based solutions.
- Acquire data from a variety of sources including public research, web pages, and social media.
- Convert unstructured and varied data into analysis-ready form.
- Use software packages and libraries to support data analysis.
- Use statistical theory and modern machine learning techniques to model observations and make predictions.
- Implement data storage and processing architectures across clusters of commodity hardware and cloud resources.
- Manage issues related to program performance, scalability, and high-availability.
- Communicate deftly with proficiency in both verbal and nonverbal communication.
- Present actionable results of data analysis in multimedia formats to both technical and nontechnical audiences.
- Assimilate skills acquired through the degree program in application to a capstone project providing solutions to real-world challenges.

## Degree Requirements

The Bachelor of Science in Data Science can be earned in eight semesters assuming appropriate background and fulltime enrollment. Successful completion of a minimum of 121 credit hours is required, with a CGPA of 2.0 or higher. For Data Science majors, all MA and CS courses must be passed with a grade of C or better.

Students are required to choose a track of specialization. Some fields which complement Data Science are Air Traffic Control, Business/Economics, Computer Science, Cyber Security, Mathematics, Physics, and Psychology. Students are afforded 15 credits in Track Elective to pursue this area of focus in addition to 6 credits of open electives required in the program.

Students will be encouraged to have an applied practicum experience. This requirement may be fulfilled in several ways, including co-ops, internships, or working on an on-campus research team. Practicums provide opportunities to gain practical experience in real-world settings. A practicum experience is highly regarded by employers and increases the student's employment potential after graduation. Typically, students will engage in practical experience activities throughout the degree program so they can take maximum advantage of their undergraduate experience.

## Program Requirements

### General Education

Embry-Riddle degree programs require students to complete a minimum of 36 hours of General Education coursework. For a full description of Embry-Riddle General Education guidelines, please see the General Education section of this catalog.

Students may choose other classes outside of their requirements, but doing so can result in the student having to complete more than the degree's 121 credit hours. This will result in additional **time and cost** to the student

Communication Theory and Skills	9
Computer Science/Information Technology	3
Mathematics	6
Physical and Life Sciences (Natural Sciences)	6
Humanities and Social Sciences	12
3 hours of Lower-Level Humanities	
3 hours of Lower-Level Social Science	
3 hours of Lower-Level or Upper-Level Humanities or Social Science	
3 hours of Upper-Level Humanities or Social Science	
<b>Total Credits</b>	<b>36</b>

### Data Science Core (92 Credits)

The following course of study outlines the quickest and most cost-efficient route for students to earn their B.S. in Data Science. Students are encouraged to follow the course of study to ensure they complete all program required courses and their prerequisites within four years.

Courses in the core with a # will satisfy your general education requirements.

CI 460	Big Data Analytics and Machine Learning *	3
COM 122	English Composition #	3
CS 118	Fundamentals of Computer Programming #	3
CS 125	Computer Science I	4
CS 315	Data Structures and Analysis of Algorithms *	3
CS 317	Files and Database Systems *	3
DS 150	Data Science I: Introduction	3
DS 151	Data Science II: Foundations	3
DS 244	Data Acquisition and Manipulation	3
DS 312	Machine Learning	3
DS 317	Statistical Software	3
DS 411	Data Visualization	3
DS 413	Statistics for Data Science	3
DS 483	Cloud Computing	3
DS 490	Data Science Capstone	3
General Education - Communications Elective #		6
General Education - Humanities Lower-Level Elective #		3
General Education - Social Science Lower-Level Elective #		3
General Education - Humanities or Social Science Lower or Upper-Level Elective #		3
General Education - Humanities or Social Science Upper-Level Elective #		3
MA 225	Introduction to Discrete Structures	3
MA 241	Calculus and Analytical Geometry I #	4
MA 242	Calculus and Analytical Geometry II #	4
MA 243	Calculus and Analytical Geometry III	4
MA 335	Introduction to Linear and Abstract Algebra **	3
MA 412	Probability and Statistics	3
SE 300	Software Engineering Practices **	3
Social Science Upper-Level Elective		3

UNIV 101	College Success	1
<b>Total Credits</b>		<b>92</b>

**Natural Science (with one lab attached to course)****choose two (8 credits)**

BIO 120 & 120L	Foundations of Biology I and Foundations of Biology I Laboratory #	4
BIO 121 & 121L	Foundations of Biology II and Foundations of Biology II Lab #	4
CHM 110 & 110L	General Chemistry I and General Chemistry I Laboratory #	4
CHM 111 & 111L	General Chemistry II and General Chemistry II Laboratory #	4
PS 161	Physics I & II for Engineers #	4

**Track Electives (15 Credits)****Track Electives: Choose five (5) electives from a single discipline, subject to program chair approval, including:**

Business, Computer Science, Cyber Security, Economics, Intelligence, Math, Physics, or Psychology	15
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**Open Electives (6 Credits)**

Open Electives	6
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<b>Total Credits</b>	<b>121</b>
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\* Offered in Fall Only

\*\* Offered in Spring Only

# General Education Courses

All Army ROTC students are required to complete SS 321 - U.S. Military History 1900-Present (3 credits) in order to commission.

**Data Science - General****Freshman Year**

<b>Fall</b>		<b>Credits</b>
COM 122	English Composition	3
CS 118	Fundamentals of Computer Programming	3
DS 150	Data Science I: Introduction	3
MA 241	Calculus and Analytical Geometry I	4
UNIV 101	College Success	1
<b>Credits Subtotal</b>		<b>14.0</b>

**Spring**

COM 219	Speech	3
CS 125	Computer Science I	4
DS 151	Data Science II: Foundations	3
	HU LL Elective	3
MA 242	Calculus and Analytical Geometry II	4
<b>Credits Subtotal</b>		<b>17.0</b>

**Sophomore Year**

<b>Fall</b>		
MA 225	Introduction to Discrete Structures	3
MA 243	Calculus and Analytical Geometry III	4
	Natural Science Elective	3
	Social Science Lower-Level Elective	3
	Track Elective	3
<b>Credits Subtotal</b>		<b>16.0</b>

**Spring**

DS 244	Data Acquisition and Manipulation	3
MA 335	Introduction to Linear and Abstract Algebra	3
MA 412	Probability and Statistics	3

SE 300	Software Engineering Practices	3
	Track Elective	3

**Credits Subtotal 15.0****Junior Year****Fall**

COM 221	Technical Report Writing	3
or COM 222	Business Communication	3
CS 315	Data Structures and Analysis of Algorithms	3
DS 312	Machine Learning	3
	Natural Science with Lab Elective	4
	Track Elective	3

**Credits Subtotal 16.0****Spring**

CI 460	Big Data Analytics and Machine Learning	3
DS 317	Statistical Software	3
DS 413	Statistics for Data Science	3
	Humanities or Social Science Upper-Level Elective	3
	Track Elective	3

**Credits Subtotal 15.0****Senior Year****Fall**

CS 317	Files and Database Systems	3
DS 411	Data Visualization	3
DS 483	Cloud Computing	3
	Open Elective	3
	Track Elective	3

**Credits Subtotal 15.0****Spring**

DS 490	Data Science Capstone	3
	Open Elective	3
	Social Science Upper-Level Elective	3
	Humanities Upper-Level Elective	3

**Credits Subtotal 12.0****Credits Total: 120.0**