

# BS in DATA SCIENCE Degree Requirements\*

2020-2021

## Premajor Requirements

C or better in each course, and a minimum 3.0 average GPA (overall and within pre-major courses) required to apply for full major status.

1. CS 1030, Foundations of CS<sup>1</sup> \_\_\_\_\_(3)
2. CS 1410, Object-Orient. Prog. \_\_\_\_\_(4)
3. CS 2420, Algorithms/Data Struct. \_\_\_\_\_(4)
4. Math 1310, Engineering Calculus I (QR) \_\_\_\_\_(4)
5. Math 1320, Engineering Calculus II (QR) \_\_\_\_\_(4)

## General Ed Requirements

Honors options also accepted for WR2, CW, and AI requirements.

1. Wrtg 2010, Intermediate Writing (WR2) \_\_\_\_\_(3)
2. Wrtg 3012 or 3014 or 3015 (CW) \_\_\_\_\_(3)
3. American Institutions (AI) \_\_\_\_\_(3)

Specific Ethics of Data course

4. CS 4962, Ethics in Data Science (BF?) \_\_\_\_\_(3)

FIVE more Intellectual Exploration (IE) courses required. TWO must be upper division (3000-level or above), ONE must satisfy the Diversity requirement, and ONE must satisfy the International requirement.

5. Fine Arts (FF): \_\_\_\_\_(3)
6. Fine Arts (FF): \_\_\_\_\_(3)
7. Humanities (HF): \_\_\_\_\_(3)
8. Humanities (HF): \_\_\_\_\_(3)
  
9. Social/Behavioral Science (BF): \_\_\_\_\_(3)

Recommend ECON 2010 or ECON 2020

- Upper Division (3000+ level IE) \_\_\_\_\_
- Upper Division (3000+ level IE) \_\_\_\_\_
- Diversity (DV) \_\_\_\_\_
- International (IR) \_\_\_\_\_

## Analytical Foundations<sup>2</sup>

1. CS 2100, Discrete Structures \_\_\_\_\_(3)
2. Math 2270, Linear Algebra \_\_\_\_\_(4)
3. Math 3070, Applied Statistics 1 \_\_\_\_\_(4)  
or CS 3130/ECE 3530, Eng. Prob Stats \_\_\_\_\_(3)
4. Math 3080, Applied Statistics 2 \_\_\_\_\_(4)
5. DS 3190, Foundations of Data Analysis \_\_\_\_\_(3)

## Computing Foundations<sup>2</sup>

1. DS 2500, Data Wrangling \_\_\_\_\_(3)
2. CS 3500, Software Practice I \_\_\_\_\_(4)
3. CS 4150, Algorithms \_\_\_\_\_(3)

\*Must reach total of at least 122 credit hours. This degree requires at least 108 hours.

<sup>1</sup>Students may test out of CS 1030.

<sup>2</sup>All DS required courses must be passed with a C or better.

## Core Data Science<sup>2</sup>

2.5 GPA required to graduate.

1. DS 5140, Data Mining \_\_\_\_\_(3)
2. DS 5350, Machine Learning \_\_\_\_\_(3)
3. DS 5530, Database Systems \_\_\_\_\_(3)
4. DS 5630, Visualization for Data Science \_\_\_\_\_(3)

## Elective - Data Analysis Breadth<sup>2</sup>

Must choose 3 classes, with program director consent. 2.5 GPA required to graduate. Below are pre-approved options.

1. CS 3540, Human Computer Interactions \_\_\_\_\_(3)
2. CS 4300, Artificial Intelligence \_\_\_\_\_(3)
3. CS 4640, Image Processing Basics \_\_\_\_\_(3)
4. Math 5010, Intro to Probability \_\_\_\_\_(3)
5. Math 5040, Stochastic Processes 1 \_\_\_\_\_(3)
6. Math 5080, Statistical Inference 1 \_\_\_\_\_(3)
7. Math 5090, Statistical Inference 2 \_\_\_\_\_(3)
8. Math 5770, Optimization \_\_\_\_\_(3)
9. CS 5150, Advanced Algorithms \_\_\_\_\_(3)
10. CS 5340, Natural Language Processing \_\_\_\_\_(3)
11. CS 5635, Visualization for Scientific Data \_\_\_\_\_(3)

## Elective - Data Domain<sup>2</sup>

Must choose 3 classes, with program director consent. Below are pre-approved.

1. ATMOS 3000, Professional Dev in Atm. Sci. \_\_\_\_\_(2)
2. ATMOS 5340, Envir. Progr. & Data Analysis \_\_\_\_\_(3)
3. ATMOS 5400, The Climate System \_\_\_\_\_(3)
4. ECON 5190, Health Economics \_\_\_\_\_(3)
5. GEOG 3400, Population Geography \_\_\_\_\_(4)
6. GEOG 4140, Methods in GIS \_\_\_\_\_(4)
7. GEOG 5150, Spatial Data Design GIS \_\_\_\_\_(4)
8. GEO 3060, Structural Geo and Tectonics \_\_\_\_\_(3)
9. GEO 3070, Petrology for Engineers \_\_\_\_\_(2)
10. LING 4020, Introduction to Syntax \_\_\_\_\_(3)
11. LING 5300, Computational Linguistics \_\_\_\_\_(3)
12. BMI 6015, Applied Machine Learn. in BMI \_\_\_\_\_(3)
13. BME 6770, Genomic Signal Processing \_\_\_\_\_(3)

## Capstone Requirements<sup>2</sup>

Choose ONE set (to be replaced with DS-specific ones):

1. DS 4800, Senior Capstone Design \_\_\_\_\_(3)
2. DS 4850, Senior Capstone Project \_\_\_\_\_(3)

or

1. DS 4940, Undergraduate Research \_\_\_\_\_(3)
2. DS 4970, Bachelors Thesis \_\_\_\_\_(3)

## Example 4 year plan (take CS 1030)

### Year 1

---

Fall Semester (16 credits)

- CS 1030, Foundations of CS \_\_\_\_\_(3)
- Math 1310, Engineering Calculus I (QR) \_\_\_\_\_(4)
- [[Wrtg 2010, Intermediate Writing (WR2) \_\_\_\_\_(3)]]
- [[American Institutions (AI) \_\_\_\_\_(3)]]
- [[Humanities (HF): \_\_\_\_\_(3)]]

Spring Semester (14 credits)

- CS 1410, Object-Orient. Prog. \_\_\_\_\_(4)
- Math 1320, Engineering Calculus II (QR) \_\_\_\_\_(4)
- [[Wrtg 3012 or 3014 or 3015 (CW) \_\_\_\_\_(3)]]
- [[Social/Behavioral Science (BF): \_\_\_\_\_(3)]]

### Year 2

---

Fall Semester (17 credits)

- CS 2420, Algorithms/Data Struct. \_\_\_\_\_(4)
- Math 3070, Applied Statistics 1 \_\_\_\_\_(4)
- Math 2270, Linear Algebra \_\_\_\_\_(4)
- ELEC:[ATMOS 3000, Professional Dev in Atm. Sci. (2)]
- [[Humanities (HF): \_\_\_\_\_(3)]]

Spring Semester (16 credits)

- CS 2100, Discrete Structures \_\_\_\_\_(3)
- DS 2500, Data Wrangling \_\_\_\_\_(3)
- Math 3080, Applied Statistics 2 \_\_\_\_\_(4)
- [[Fine Arts (FF): \_\_\_\_\_(3)]]
- [[Elective]] \_\_\_\_\_(3)

### Year 3

---

Fall Semester (16 credits)

- DS 3190, Foundations of Data Analysis \_\_\_\_\_(3)
- CS 3500, Software Practice I \_\_\_\_\_(4)
- CS 5630, Visualization for Data Science \_\_\_\_\_(3)
- ELEC:[CS 3540, Human Computer Interactions\_(3)]
- ELEC:[ATMOS 5340, Envir. Progr. & Data Analysis(3)]

Spring Semester (15 credits)

- CS 4150, Algorithms \_\_\_\_\_(3)
- DS 5140, Data Mining \_\_\_\_\_(3)
- DS 5530, Database Systems \_\_\_\_\_(3)
- ELEC:[ATMOS 5400, The Climate System \_\_\_\_\_(3)]
- [[Elective]] \_\_\_\_\_(3)

### Year 4

---

Fall Semester (12 credits)

- DS 4940, Undergraduate Research \_\_\_\_\_(3)
- DS 5350, Machine Learning \_\_\_\_\_(3)
- [[CS 4962, Ethics in Data Science (BF?) \_\_\_\_\_(3)]]
- ELEC:[Math 5080, Statistical Inference 1 \_\_\_\_\_(3)]

Spring Semester (16 credits)

- DS 4970, Bachelors Thesis \_\_\_\_\_(3)
- ELEC:[Math 5090, Statistical Inference 2 \_\_\_\_\_(3)]
- ELEC:[CS 4300, Artificial Intelligence \_\_\_\_\_(3)]
- [[Fine Arts (FF): \_\_\_\_\_(3)]]
- [[Elective]] \_\_\_\_\_(4)

## Example 4 year plan (skip CS 1030)

### Year 1

---

Fall Semester (14 credits)

- CS 1410, Object-Orient. Prog. \_\_\_\_\_(4)
- Math 1310, Engineering Calculus I (QR) \_\_\_\_\_(4)
- Wrtg 2010, Intermediate Writing (WR2) \_\_\_\_\_(3)
- [[American Institutions (AI) \_\_\_\_\_(3)]]

Spring Semester (16 credits)

- CS 2100, Discrete Structures \_\_\_\_\_(3)
- DS 2500, Data Wrangling \_\_\_\_\_(3)
- Math 1320, Engineering Calculus II (QR) \_\_\_\_\_(4)
- [[Wrtg 3012 or 3014 or 3015 (CW) \_\_\_\_\_(3)]]
- [[Fine Arts (FF): \_\_\_\_\_(3)]]

### Year 2

---

Fall Semester (15 credits)

- CS 2420, Algorithms/Data Struct. \_\_\_\_\_(4)
- Math 2270, Linear Algebra \_\_\_\_\_(4)
- Math 3070, Applied Statistics 1 \_\_\_\_\_(4)
- ELEC:[CS 3540, Human Computer Interactions\_(3)]

Spring Semester (17 credits)

- CS 3500, Software Practice I \_\_\_\_\_(4)
- Math 3080, Applied Statistics 2 \_\_\_\_\_(4)
- [[Fine Arts (FF): \_\_\_\_\_(3)]]
- [[Elective]] \_\_\_\_\_(3)
- [[Elective]] \_\_\_\_\_(3)

### Year 3

---

Fall Semester (15 credits)

- DS 3190, Foundations of Data Analysis \_\_\_\_\_(3)
- CS 4150, Algorithms \_\_\_\_\_(3)
- CS 5630, Visualization for Data Science \_\_\_\_\_(3)
- ELEC:[LING 4020, Introduction to Syntax \_\_\_\_\_(3)]
- [[CS 4962, Ethics in Data Science (BF?) \_\_\_\_\_(3)]]

Spring Semester (15 credits)

- DS 5140, Data Mining \_\_\_\_\_(3)
- DS 5530, Database Systems \_\_\_\_\_(3)
- ELEC:[CS 4300, Artificial Intelligence \_\_\_\_\_(3)]
- ELEC:[LING 5300, Computational Linguistics \_\_\_\_\_(3)]
- [[Humanities (HF): \_\_\_\_\_(3)]]

### Year 4

---

Fall Semester (15 credits)

- DS 4800, Senior Capstone Design \_\_\_\_\_(3)
- DS 5350, Machine Learning \_\_\_\_\_(3)
- ELEC:[CS 5340, Natural Language Processing\_(3)]
- [[Humanities (HF): \_\_\_\_\_(3)]]
- [[Elective]] \_\_\_\_\_(3)

Spring Semester (15 credits)

- DS 4850, Senior Capstone Project \_\_\_\_\_(3)
- ELEC:[BMI 6015, Applied Machine Learn. in BMI (3)]
- [[Social/Behavioral Science (BF): \_\_\_\_\_(3)]]
- [[Elective]] \_\_\_\_\_(3)
- [[Elective]] \_\_\_\_\_(3)