# DATA SCIENCE
## B.S. Degree Requirements
### August 15, 2019

## 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 (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)

## Core Data Science

2.5 GPA required to graduate.

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

## Elective Data Analysis Breadth

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 5040, Stochastic Processes 1 (3)
5. Math 5080, Statistical Inference 1 (3)
6. Math 5090, Statistical Inference 2 (3)
7. Math 5770, Optimization (3)
8. CS 5150, Advanced Algorithms (3)
9. CS 5340, Natural Language Processing (3)
10. CS 5190, Probabilistic Modeling (3)
11. CS 6530, Advanced Database Systems (3)

## Elective Data Domain

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

1. ATMOS 5340, Envr. Programming & Stat. (3)
2. ATMOS 5400, The Climate System (3)
3. ECON 2010, Princ of MicroEconomics (3)
4. ECON 2020, Princ of MacroEconomics (3)
5. ECON 5190, Health Economics (3)
6. GEOG 3400, Population Geography (4)
7. GEOG 5140, Methods in GIS (4)
8. GEOG 5150, Spatial Data Design GIS (4)
9. GEO 1110, Intro to Earth Systems (3)
10. GEO 3060, Structural Geo and Tectonics (3)
11. GEO 3070, Petrology for Engineers (3)
12. BMI 6015, Applied Machine Learning in BMI (3)
13. BIOEN 6770, Genomic Signal Processing (3)

## Capstone Requirements

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

1. CS 4000, Senior Capstone Design (3)
2. CS 4500, Senior Capstone Project (3)

or

1. CS 4940, Undergraduate Research (3)
2. CS 4970, Bachelors Thesis (3)

---

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

1 Students may test out of CS 1030.
### 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 (15 credits)**
- CS 2420, Algorithms/Data Struct. (4)
- Math 3070, Applied Statistics 1 (4)
- Math 2270, Linear Algebra (4)
- [[Humanities (HF): (3)]

**Spring Semester (16 credits)**
- CS 2100, Discrete Structures (3)
- CS 2500, Data Wrangling (3)
- Math 3080, Applied Statistics 2 (4)
- ELEC: [CS 3540, Human Computer Interactions (3)]
- [[Fine Arts (FF): (3)]]

**Year 3**

**Fall Semester (17 credits)**
- CS 3190, Foundations of Data Analysis (3)
- CS 3500, Software Practice I (4)
- CS 5630, Visualization for Data Science (3)
- ELEC: [ATMOS 5340, Envir. Programming & Stat. (3)]
- [[Elective]] (3)

**Spring Semester (12 credits)**
- CS 4150, Algorithms (3)
- CS 5140, Data Mining (3)
- CS 5530, Database Systems (3)
- ELEC: [ATMOS 5400, The Climate System (3)]

**Year 4**

**Fall Semester (16 credits)**
- CS 4940, Undergraduate Research (3)
- CS 5350, Machine Learning (3)
- [CS 4962, Ethics in Data Science (BF?) (3)]
- ELEC: [GEOG 3400, Population Geography (3)]
- [[Elective]] (3)

**Spring Semester (15 credits)**
- CS 4970, Bachelors Thesis (3)
- ELEC: [CS 6190, Probabilistic Modeling (3)]
- ELEC: [CS 4300, Artificial Intelligence (3)]
- [[Fine Arts (FF): (3)]]
- [[Elective]] (3)

**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)
- ELEC: [GEO 1110, Intro to Earth Systems (3)]

**Spring Semester (16 credits)**
- CS 2100, Discrete Structures (3)
- CS 2500, Data Wrangling (3)
- Math 1320, Engineering Calculus II (QR) (4)
- [Wrtg 3012 or 3014 or 3015 (CW) (3)]
- [[Elective]] (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: [GEO 3060, Structural Geo and Tectonics (3)]

**Spring Semester (17 credits)**
- CS 3500, Software Practice I (4)
- Math 3080, Applied Statistics 2 (4)
- ELEC: [GEO 3070, Petrology for Engineers (3)]
- [[Elective]] (3)
- [[Elective]] (3)

**Year 3**

**Fall Semester (15 credits)**
- CS 3190, Foundations of Data Analysis (3)
- CS 4150, Algorithms (3)
- CS 5630, Visualization for Data Science (3)
- ELEC: [GEO 3400, Population Geography (3)]
- [CS 4962, Ethics in Data Science (BF?) (3)]

**Spring Semester (15 credits)**
- CS 5140, Data Mining (3)
- CS 5530, Database Systems (3)
- ELEC: [CS 4300, Artificial Intelligence (3)]
- [[Fine Arts (FF): (3)]]
- [[Humanities (HF): (3)]]

**Year 4**

**Fall Semester (15 credits)**
- CS 4000, Senior Capstone Design (3)
- CS 5350, Machine Learning (3)
- ELEC: [Math 5080, Statistical Inference 1 (3)]
- [[Humanities (HF): (3)]]
- [[Elective]] (3)

**Spring Semester (15 credits)**
- CS 4500, Senior Capstone Project (3)
- ELEC: [Math 5090, Statistical Inference 2 (3)]
- [[Social/Behavioral Science (BF): (3)]]
- [[American Institutions (AI) (3)]]
- [[Elective]] (3)