# Data Science and Computer Science at CMC

Mark Huber • 2023-11-08

# Data and Computer Science faculty

**DMS = Department of Mathematical Sciences**
**QCL = Murty Sunak Quantitative and Computing Lab**


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# What is...

## Computer Science

**Computer Science** is the study of **computers** and computational systems. Unlike electrical and **computer** engineers, **computer scientists** deal mostly with software and software systems; this includes their theory, design, development, and application.

## Data Science

**Data Science** is the study of **data**. It is about extracting, analyzing, visualizing, managing and storing **data** to create insights. These insights help people to make powerful **data**-driven decisions. **Data Science** requires the usage of both unstructured and structured **data**.

# Majors and Sequences

**Computer Science**
- CS Sequence through CMC
- CS Major through HMC

**Data Science**
- DS Sequence through CMC
- DS Major through CMC

**Nonmajors**
- Welcome to take DS & CS courses at CMC

# Intro CS

# Introductory CS courses

### CS 005 HM
CS majors must take CS 005 at HMC in Spring of their first year.

### CS 004 PZ
Intro course at Pitzer, equivalent to CS 005 for all requirements

### CS 040 CM
This is the introductory course at CMC, usually offered in the Fall.

# Majors

# CS and DS

## How to be a CS major?

- Enter lottery to take CS 005 at HMC in Spring of your first year (12 spots)

- Enter lottery to take CS 060 at HMC in Fall of your Sophomore year (6 spots)

## How to be a DS major?

- Our goal is to let anyone who wishes become a DS major

- Prereqs: Calc II, first year course in programming in Python (can get outside CMC)

# Courses Overview

# Data Sci major requirements (2 + 12)
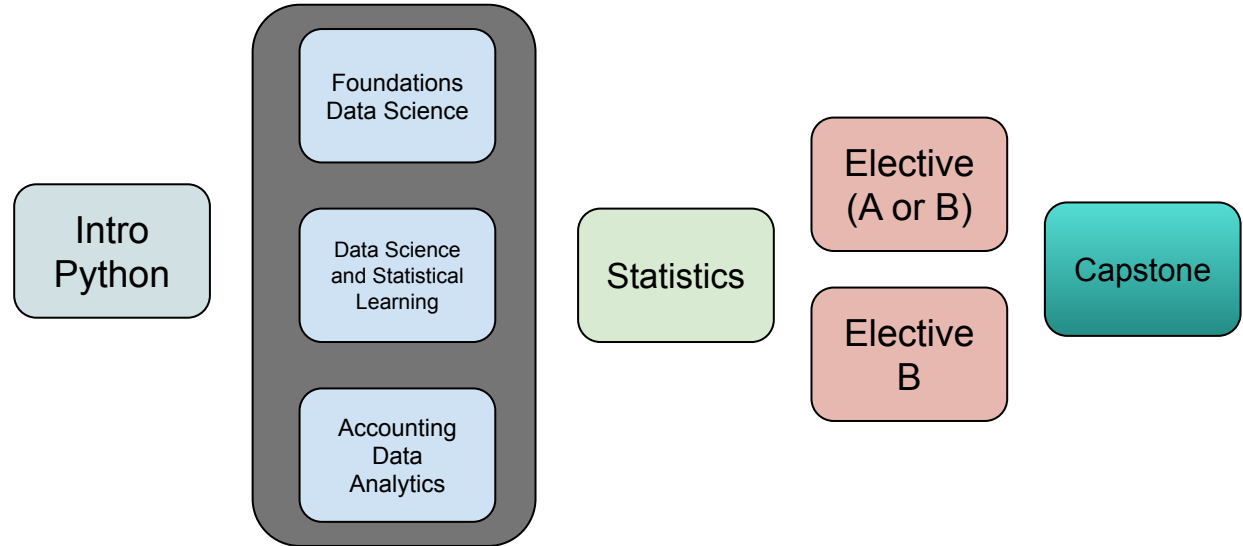
1. MATH 31
2. CSCI 040 CM
   CSCI 005 HM
   CSCI 004 PZ
   DS 001 SC
3. MATH 060C
   MATH 060
4. MATH 55
5. CSCI 036
   ECON 122
   ECON 160
6. CSCI 046 CM
   CSCI 060 HM
7. MATH 151
8. MATH 152
9. CSCI 145
10. CSCI 143
    BIOL 156L
11. Ethics
12. 2 Electives
13. DS 180
    DS 181
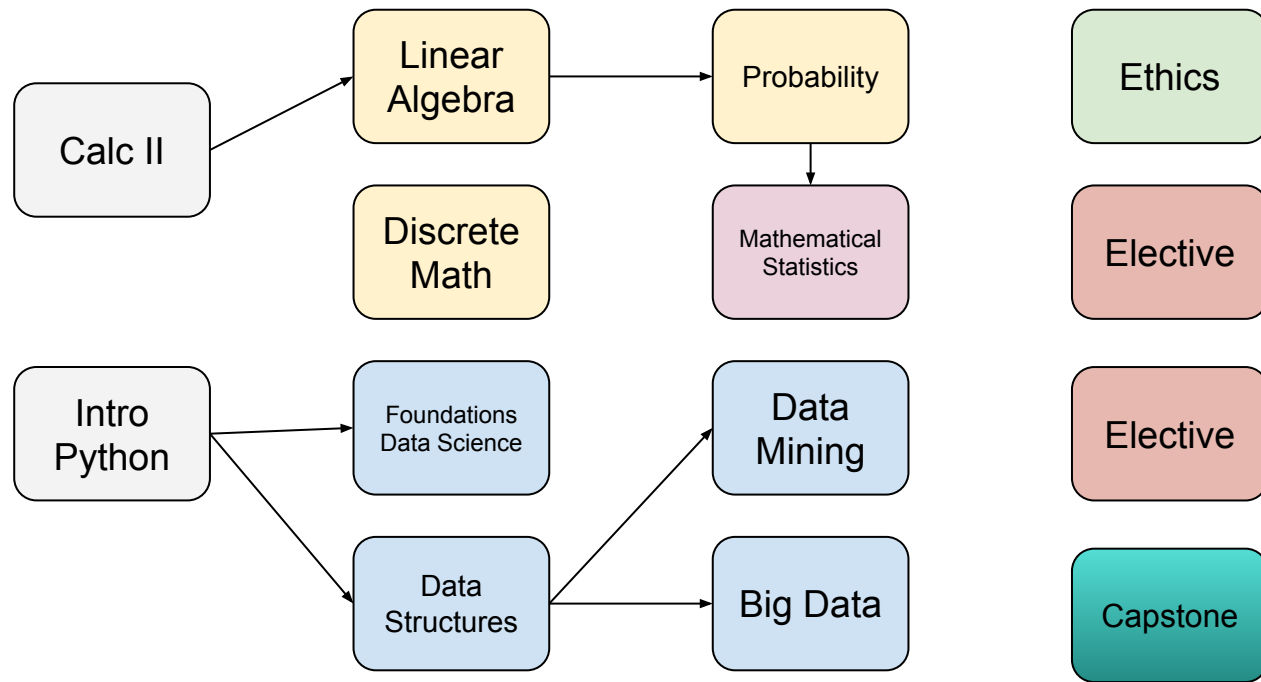
# Data Sci sequence

1. Python
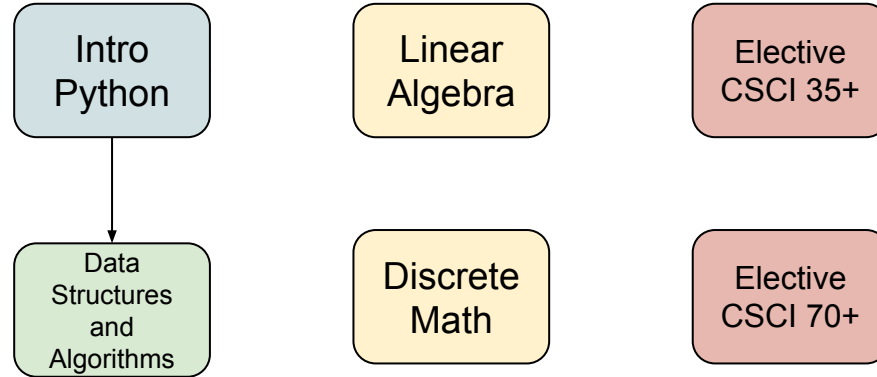2. Foundations
3. Statistics
4. Elective A or B
5. Elective B
6. Capstone

Intro Python

Foundations Data Science

Data Science and Statistical Learning

Accounting Data Analytics

Statistics

Elective (A or B)

Elective B

Capstone

# Comp Sci sequence

1. Python
2. Structures
3. Linear Algebra
4. Discrete Mathematics
5. Elective (35+)
6. Elective (70+)

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│    Intro     │      │   Linear     │      │  Elective    │
│    Python    │      │   Algebra    │      │  CSCI 35+    │
└──────┬───────┘      └──────────────┘      └──────────────┘
       │
       ▼
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│     Data     │      │   Discrete   │      │  Elective    │
│  Structures  │      │     Math     │      │  CSCI 70+    │
│     and      │      │              │      │              │
│  Algorithms  │      │              │      │              │
└──────────────┘      └──────────────┘      └──────────────┘
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# Data Science Major

# Data Sci requirements (2 + 12)

## Prerequisites

- MATH 031 (Calculus of a single variable)

- First year course in programming in Python (CS 40 CM / CS 4 PZ / DS 1 SC / CS 5 HM)

## Core/Foundations

- MATH 060C. Linear Algebra with computing (MATH 060 allowed)

- MATH 055. Discrete Mathematics

- CSCI 036. Foundations of Data Science

- CSCI 046. Data Structures and Algorithms

# Data Science requirements

## Statistics/CS

- MATH 151.  Probability

- MATH 152.  Statistical Inference

- CSCI 145.  Data Mining

- CSCI 143.  Big Data

## Ethics/Electives/Clinic

- Ethics course from list of possibilities

- Two electives from list of possibilities

- DS 180 or 181.  Advanced projects in Data Science

# Other Data Science facts…

## Dual with a 2nd major

- Take two fewer courses

- Take the required courses, no electives

## Senior thesis

- Write an individual thesis with a faculty advisor

# Computer Science Major

# Off-Campus HMC CS

## Things to know

- HMC calls CMC students "off-campus"

- https://www.cs.hmc.edu/off-campus-students

- Must take CS 005 Spring of first year, no exceptions

## How to get into CS 005

- Submit a PERM request by the end of your preregistration period during fall of your first year

- There is a lottery where 12 students from CMC are selected to be admitted (Spring 2022 all student who PERMed where admitted)

# Comp Sci Math requirements (5)

## By the end of Fall sophomore year

- Calculus I
  MATH 030

- Calculus II
  MATH 031

- Calculus III
  MATH 032

## By the end of Spring sophomore year

- Linear Algebra
  MATH 060

- Discrete Mathematics
  MATH 055

# Comp Sci CS requirements (15)

## Lower level

- CSCI 5. Introduction to Computer Science

- CSCI 60 or 42. Principles of Computer Science

- CSCI 70. Data Structures and Program Development

- CSCI 81. Computability and Logic

## Kernel

- CSCI 105. Computer Systems

- CSCI 121. Software Development

- CSCI 131. Programming Languages

- CSCI 140. Algorithms

# Computer Science requirements

## Electives

- Nine units (typically three courses)
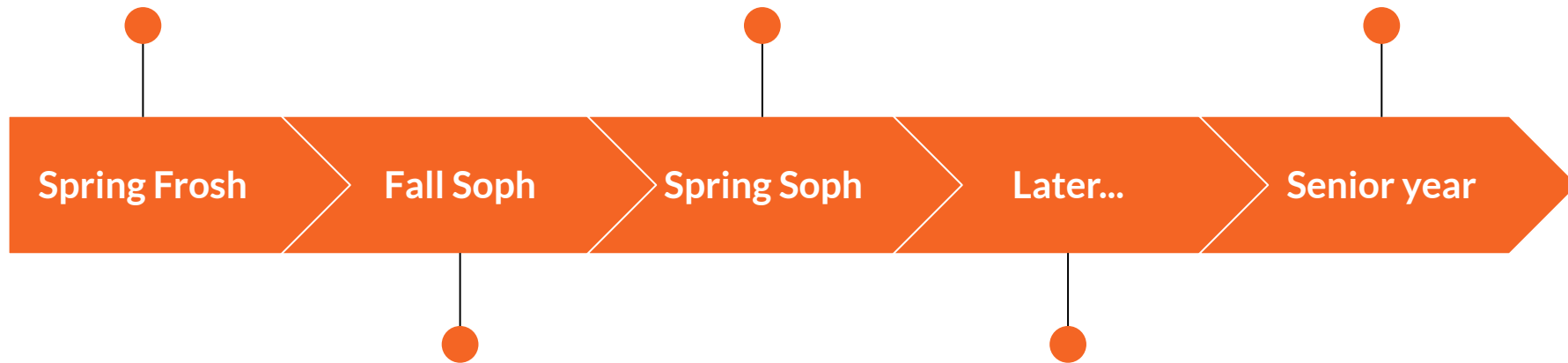- Chosen from premade list
- Electives taught at both HMC and CMC

## Colloquium/Clinic

- CSCI 195. Colloquium. Both semesters.
- CSCI 183 and 184. One year of clinic program.

Take CS 005 (Intro to CS) from HMC Spring of your first year

Take CS 070 from HMC, finish MATH 55 and MATH 60

Take CS clinic at HMC

**Spring Frosh**

**Fall Soph**

**Spring Soph**

**Later...**

**Senior year**

Take CS 060 from HMC, finish Calc III, apply to be a CS major

Take CS electives

# DS Sequence

# Data Sci requirements (6)

## Foundations

- Intro CS in Python
  CSCI 005 or CSCI 040

- Foundations
  CSCI 36 / ECON 122 / ECON 160

- Statistics
  BIOL 174L / BIOL 175 / ECON 120 / GOVT 055 / MATH 052 / PSYC 109 / MATH 152

## Electives

- Lower Elective
  Group A List

- Upper Elective
  Group B List

- Capstone
  DS 180 / DS 181

# CS Sequence

# Comp Sci requirements (6)

## Foundations

- CSCI 005 or CSCI 040 Intro CS in Python

- MATH 55
  Discrete Mathematics

- MATH 060C/060
  Linear Algebra

- CSCI 060 or CSCI 046
  Data Structures

## Electives

- Lower Elective
  CSCI 35 or higher

- Upper Elective
  CSCI 70 or higher

# Data Science and Computer Science at CMC

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