BS in Applied and Computational Math Program
Data Science and Machine Learning Option

Such students are required to take 14 credits worth of CS courses, which are presented on the flowchart on the next page.

They address the following topics:

1. Introduction to Programming: Python, fundamentals of coding, VB, VBA (the latter two for actuarial science)

2. Working with Data (data management etc): Exploring and manipulating data, data curation - databases and data management organization (big data), SQL, NoSQL data systems, data wrangling (acquisition, selection, cleaning, missing data, evaluation), Ethics, Visualization.

3. Design & analysis of algorithms course: Algorithms and software foundation, procedural and functional programming methods and data structures such as lists, vectors, data frames, dictionaries, trees, and graphs; memory and execution performance; documentation practices

CS Course Flowchart for BS in Applied and Computational Math

Math of DS&ML Option

- **CS 140** *(4 SH)*
  Introduction to Programming (Python)
  Offered: every semester
  Satisfies topics requirement # 1

- **CS 205** *(4 SH)*
  Data Modeling and Database Design
  Satisfies topics requirement # 2, except for visualization & ethics, which will be covered in CS 303 & PHI 227
  Offered: every fall

- **CS 172** *(3 SH)*
  Intermediate Java Programming
  Also a DIMA program course
  Offered: every spring

- **CS 303** *(4 SH)*
  Introduction to Data Science with Python
  *(A course in data analytics using Python and Statistics)*
  Offered: every odd spring (starting in 2023)

- **CS 250** *(3 SH)*
  Introduction to Data Structures, Algorithms and Complexity
  Also a DIMA program course
  Offered: every odd fall (starting in 2021)

* This course is a DS & ML option cognate

** These courses will be required for the BS in Applied and Computational Math DS & ML option

Arrows indicate a path through the courses

Required cognate: PHI 227 Ethics in Computing, satisfies competencies W II & I.L. & part of topics requirement # 2