The Statistics and Data Science (SDS) Minor

Why an SDS minor?
Statistics and data science both equip students with skills to become informed citizens in an increasingly data-centric world. With vast amounts of data generated across disciplines and industries each day, the analysis and interpretation of these data have become essential. The statistics and data science minor will equip students with skills to think critically with and about data, engage in data-driven problem solving, foster creative thinking, and hone data-driven communication.

Who can earn an SDS minor?
The SDS minor is designed to complement many disciplines, embracing the inherent interdisciplinary nature of the fields of statistics and data science. To that end, there are many pathways to complete the SDS minor which makes it accessible to students majoring in many different disciplines, not solely majors within STEM departments.

Basic structure of the SDS minor
Every SDS minor will complete foundational courses in statistics and computation, tailoring their experience toward the domain areas of their choice through electives. All minors will take courses from a minimum of three departments, an intentional feature of the SDS minor to embrace the inherently interdisciplinary nature of statistics and data science.

Limits of an SDS minor
The SDS minor *alone* is not meant to equip students with the skills necessary to succeed in all highly technical careers in areas like data science, statistical consulting, and data analytics. This minor should supplement a student's major or other work or educational experiences, and enhance their ability to address data-driven problems that are common across fields of study and in our daily lives.

Statistics or Data Science?
Statistics is a discipline that develops methodology to help give meaning to data by understanding randomness in data and quantifying the uncertainty of any data-driven conclusion. Statisticians are often involved in the design of studies or experiments, data analysis and communication of results to a broad audience, including limitations of their findings. Data Science is an interdisciplinary field that develops domain-specific processes for the full "data cycle", including data collection, wrangling, analysis and communication. Professional data scientists need strong foundations in computation, statistics, and mathematics.

January 2024

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Requirements for Statistics and Data Science Minor

42 credits from the approved list should be taken satisfying the following requirements:

- **STAT requirement**: STAT 120 (intro to statistics), STAT 220 (intro to data science), and STAT 230 (applied regression analysis). A student may choose to replace STAT 120 with any STAT course from the list of approved elective courses.
- **CS requirement:** One computer science course (6 credits) taken at Carleton numbered CS 111 or higher.
- **Electives**: Three additional 6-credit courses taken at Carleton from the approved list of courses. At least one of these courses must be taken outside the departments of Mathematics and Statistics and Computer Science. At least two of these courses must be 200-level or above.

For computer science majors: A maximum of one elective can be a CS course.
For mathematics majors: A maximum of one elective can be a MATH course.
For majors outside computer science and mathematics: At most three courses (18 credits) may overlap with major requirements.
Statistics majors cannot earn this minor.

Elective courses:
Below is the approved list of elective courses for the SDS minor. The presence of a course on this list does not guarantee that it will be offered while you are completing your minor. Please check each department's website for course descriptions and to determine when the course will be offered. A minor may petition for a course not on the approved list to count towards the required electives. See the minor website for more information about this process.

Courses from the Mathematics and Statistics Department:

STAT 250: Intro to statistical inference
STAT 260: Intro to sampling techniques
STAT 310: Spatial statistics
STAT 320: Time series
STAT 330: Advanced statistical modeling
STAT 340: Bayesian statistics
MATH 240: Probability
MATH 271: Computational Mathematics

Courses from the Computer Science Department:

CS 252: Algorithms
CS 257: Software design
CS 314: Data visualization
CS 320: Machine learning
CS 321: Making decisions with AI
CS 322: Natural language processing
CS 328: Computational Models of Cognition
CS 334: Database systems
CS 344: Human-Computer Interaction
CS 348: Parallel and distributed computing
CS 352 Advanced Algorithms
CS 362: Computational biology

January 2024

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Courses from other departments:

ARCN 246: Archaeological Methods & Lab
BIOL 224: Landscape ecology
BIOL 321: Ecosystem ecology
BIOL 338: Genomics and bioinformatics
BIOL 352: Population ecology
CHEM 348: Introduction to Computational Chemistry
DGAH 210: Spatial Humanities
ECON 241: Growth and Development
ECON 285: Computational Economics
ECON 329: Econometrics
ENTS 120: Introduction to Geospatial Analysis & Lab
ENTS 254: Topics in Landscape Ecology
GEOL 135: Introduction to Climate Science
GEOL 340: Hydrogeology: Groundwater
HIST 231: Mapping the World Before Mercator
HIST 338: Digital History, Public Heritage & Deep Mapping
LING 318: Laboratory Phonology
MUSC 204: Theory II: Musical Structures
MUSC 227/228: Perception and Cognition of Music
PHIL 213: Ethics
PHIL 306: Causation and Explanation
PHYS 234: Computer Simulations in Complex Physical Systems
POSC 230: Methods of political research
POSC 303: Political Communication: Political Advertising in Elections and Public Policy
PSYC 200: Measurement and Data Analysis in Psychology
PSYC 365 Science and Pseudoscience in Psychology
RELG 121: Introduction to Christianity
RELG 155: Hinduism: An Introduction
RELG 274: Religion and Biomedical Ethics
SOAN 240: Methods of Social Research