CROSS DISCIPLINARY STUDIES MINOR IN DATA SCIENCE

Offered at: San Luis Obispo Campus

Through an inter-college collaboration, the Computer Science and Statistics departments offer a cross-disciplinary minor in Data Science -- a rapidly evolving discipline that uses elements of statistics and computer science to gather, organize, summarize, and communicate information from a variety of data sources and data types. Job opportunities for data scientists are growing as the availability of data becomes ever abundant via the internet, consumer transactions, sensor arrays, medical records, embedded biometrics, bioinformatics, etc.

The cross-disciplinary minor provides an opportunity for statistics, computer science, and mathematics students to complement their major training with foundational skills for data science. Mathematics and statistics majors will acquire essential programming, database, distributed computing, and data mining skills from the Computer Science Department. Computer science and mathematics majors will acquire essential probability, regression modeling, and statistical programming skills from the Statistics Department. And, statistics and computer science students will acquire specialized calculus, discrete mathematics, and optimization methods from the Mathematics Department.

Program Learning Objectives

1. Select and use statistical modeling and data analytical methods and techniques appropriate to the scale of the problem.
2. Operate with diverse types of data (for example, weblog, spatio-temporal, basket, transaction, and master)
3. Apply data science methods (acquire, integrate, analyze, visualize) to at least one application domain (e.g., Biology, Business, Science, Geostatistics)
4. Apply computer science principles to design, build and evaluate software
5. Apply statistical models to analyze data
6. Apply mathematical principles to justify statistical and computational models and algorithms
7. Build, maintain, and query common database structures
8. Communicate analysis findings appropriately using oral, written and visual modes.
9. Recognize professional responsibilities and make informed judgments in data science practice based on legal and ethical principles.

Minor Requirements and Curriculum

The minor must be completed prior to, or at the same time as, the requirements for the bachelor's degree. A major and a minor may not be taken in the same degree program, and a minor is not required for a degree. Requirements for the minor include:

- At least half of the units must be from upper-division courses (3000-4000 level).
- At least half of the units must be taken at Cal Poly (in residence).
- No more than one-third of the units will be taken with credit-no credit grading (CR/NC), not counting courses with mandatory CR/NC. Departments may further limit CR/NC grading if desired.
- A minimum 2.0 GPA is required in all units counted for completion of the minor.

Code	Title	Units
REQUIRED COURSES		
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	4
CSC 3449	Algorithms and Complexity	4
CSC 3665	Introduction to Database Management Systems	4
DATA/STAT 1810	Introduction to Statistical Computing with R	3
DATA 3301	Introduction to Data Science	4
DATA 4401	Data Science Process and Ethics	4
DATA 4460	Senior Project - Data Science Capstone	2
DATA/CSC 4610	Fundamentals of Machine Learning	4
DATA/CSC 4620	Foundations and Applications of Deep Learning	4
MATH 1151 or MATH 2341	Linear Algebra Linear Analysis	3-4
MATH/DATA 1264 or MATH 1261	Calculus for Data Science I Calculus I	4
MATH/DATA 1265	Calculus for Data Science II	4

or MATH 1262	Calculus II	
MATH 2031	Transition to Advanced Mathematics	3
MATH/DATA 2621	Introduction to Mathematical Optimization	3
or MATH 4653	Numerical Optimization	
STAT 1510	Statistics I	3
or STAT 3210	Engineering Statistics	
STAT 2610	Introduction to Probability and Simulation	3
STAT 3520	Statistics II	3
STAT 3530	Applied Linear Models	4
Total Units		**67**