

DATA SCIENCE MAJOR

Data and algorithms increasingly affect our lives, from recommending TV shows to detecting cancer in medical imaging to determining loan eligibility. This is due to the vast amount of available data and the computational power to process it effectively. Data science is the study of extracting meaning from large datasets to improve our understanding of the world around us.

Managing and analyzing data has become integral to sciences, social sciences, business, humanities, and engineering due to the abundance of unstructured and raw data available for discovery and decision-making. Inherently interdisciplinary, Data science combines critical thinking with principles of mathematics, statistics, and computer programming to recommend solutions in various fields. As data-driven solutions and statistical models impact more aspects of our lives, the consequences of algorithmic decision-making require urgent examination and understanding of related ethical questions.

The Data Science program is designed to provide students with the mathematical, statistical, and computer programming tools necessary to ethically interpret an increasingly data-driven world. Students develop organizational, analytical, and visualization skills to present actionable information from data. Ethical considerations are integrated throughout the curriculum, including opportunities for students to collect and analyze data responsibly. Additionally, students have the opportunity to participate in semester-long, team-based consulting projects using real data and present results to actual clients. To apply data science principles, students are encouraged to take domain-specific electives that inspire their capstone projects.

The Data Science major is ideal for students who wish to develop strong analytical, quantitative, and communication skills. It provides a solid foundation and experiences that prepare students for future endeavors, whether in employment or graduate study.

Requirements

Degree Requirements

This major is available as a bachelor of arts or bachelor of science degree, as defined in the section on degree requirements (<https://catalog.linfield.edu/degrees-and-programs/undergraduate/ba-bs-bsn/>) for all majors in this catalog.

Code	Title	Credits
Core Courses in Data Science		
DATA 125	SURVEY OF DATA SCIENCE	4
DATA 135	FAIRNESS AND RESPONSIBILITY IN DATA SCI	4
DATA 225	INTRODUCTION TO VISUALIZATIONS	4
DATA 445	MACHINE LEARNING	4
Core Courses in Mathematics		
MATH 170	CALCULUS I	5
MATH 175	CALCULUS II	3
MATH 250	LINEAR ALGEBRA	4
MATH 340	PROBABILITY AND STATISTICS I	4
Core Courses in Computer Science		
COMP 160	BEG. PROGRAMMING AND PROBLEM-SOLVING	4
COMP 260	DATABASE MANAGEMENT SYSTEMS	4
Experiential Learning Requirement		

DATA 488	DATA SCIENCE CONSULTING (or)	3
MATH 280	MATHEMATICAL MODELING EXPERIENCE (3 credits worth)	
Approved internship		
Research/Writing Requirement		
MATH 485	SENIOR SEMINAR (or)	3
COMP 490	CAPSTONE PROJECT	
Electives		
8		
Select two of the following		
BIOL 340	BIOINFORMATICS	
DATA 299	SPECIAL TOPICS IN DATA SCIENCE: SPORTS ANALYTICS	
ECON 416	ECONOMETRICS	
MATH 380	NUMERICAL ANALYSIS	
MATH 440	PROBABILITY & STATISTICS II	
PHYS 325	COMPUTATIONAL MODELING AND SIMULATION	
BNSS 255	DATA MANAGEMENT AND ANALYSIS W/ PYTHON	
or other electives approved by the program coordinator		
Total Credits		54

Student Learning Outcomes

- Learn to manage data including collecting and transforming data.
- Create visuals of data to improve or shape understanding.
- Analyze data using statistical tools to draw inference and make predictions.
- Communicate in a clear, logical, and precise fashion about data, methods, and conclusions to a range of audiences.
- Demonstrate an ethical manner in the collection, analytics, and presentation of data.
- Apply their coursework to real-world problems in a domain area of focus.
- Develop teamwork skills.