B.A. IN DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

Overview

Data science (DS) is an interdisciplinary field focused on extracting knowledge from large data sets and applying that knowledge to solve problems. Artificial intelligence (AI) is the study of systems that perceive their environment and take actions that maximize their chance of achieving their goals. The two fields are interwoven, with DS systems using AI techniques for knowledge extraction and representation, and AI systems improving by examination of existing performance data. The major in Data Science and Artificial Intelligence gives students fundamental skills in both DS and AI, and teaches them about the interplay between the two fields. This knowledge is based on an underpinning of computer science and introductory mathematics, provides a range of electives to develop skills in subareas, and exposes the application of DS and AI in various domains.

Curriculum Requirements

Code	Title	Credit Hours
Core Courses - 29 credits		
DSC 110	Introduction to Vectors and Matrices for Data Science	1
or MTH 210	Introduction to Linear Algebra	
CSC 113	Data Science for the World	4
CSC 115	Python Programming for Everyone	3
or CSC 315	Introduction to Python for Scientists	
CSC 120	Computer Programming I	4
CSC 220	Computer Programming II	4
DSC 344	Principles and Practices of Data Science (Principles and Practice of Data Science)	3
DSC 345	Principles and Practice of Artificial Intelligence (Principles and Practice of Artificial Intelligence)	3
MTH 161	Calculus I (Core)	4
PHI 115	Social and Ethical Issues in Computing	3
Electives		**6**
Techniques		
CSC 423	Database Systems	
CSC 542	Statistical Learning with Applications	
CSC 545	Introduction to Artificial Intelligence	
CIM 563	Design with AI	
EPS 351	Introduction to Statistics and Research Design	
or PSY 292	Introduction to Biobehavioral Statistics Section B	
EPS 401	Advanced statistics: Using regression for predictive modeling	
EPS 402	Statistical Programing in R and SAS	
JMM 331	Introduction to Infographics and Data Visualization	
Applications		
CSC 329	Introduction to Game Programming	
CSC 410	Computer Science Project Planning	
CSC 411	Computer Science Project Implementation	
CSC 412	Computer Science Internship	
CSC 549	Biomedical Data Science	
GEG 305	Spatial Data Analysis I	
GEG 310	Geographic Information Systems I	
GEG 405	Spatial Data Analysis II	
GEG 410	Geographic Information Systems II	
MLL 410	Digital Literacy Through Cultural and Literary Topics	
PSY 110	Introduction to Psychology	
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3

WRS 106	First-Year Writing II	3
or ENG 106	Writing About Literature and Culture	
or WRS 107	First-Year Writing II: STEM	
Quantitative Skills:		
MTH 108	Precalculus Mathematics II	3
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
Additional Requirements for the B.A.		
Language Requirement		3
Natural Sciences Course		3
Minor Requirement		15-18
Advanced Writing and Communication Requirement:		
Four W courses, including one of the following: (may be fulfilled by W courses taken for other requirements or electives)		10-12
CSC 405	Computer Science Seminars	
or CSC 410	Computer Science Project Planning	
or CSC 431	Introduction to Software Engineering	
or WRS 233	Advanced Writing for STEM	
Electives		24
Total Credit Hours		**120**

Sample Plan of Study

Freshman Year		
Fall		**Credit Hours**
CSC 115	Python Programming for Everyone	3
MTH 108	Precalculus Mathematics II	3
WRS 105	First-Year Writing I	3
A&H cognate		3
Second language 101		3
	Credit Hours	**15**
Spring		
CSC 113	Data Science for the World	4
MTH 161	Calculus I	4
WRS 106	First-Year Writing II	3
P&S cognate		3
Second language 102		3
	Credit Hours	**17**
Sophomore Year		
Fall		
CSC 120	Computer Programming I	4
DSC 110	Introduction to Vectors and Matrices for Data Science	1
Writing		3
A&H cognate		3
Second language 200		3
	Credit Hours	**14**
Spring		
CSC 220	Computer Programming II	4
Writing		3
P&S cognate		3
Natural Science		3

Minor		3
	Credit Hours	**16**
Junior Year		
Fall		
DSC 344	Principles and Practices of Data Science (Principles and Practice of Data Science)	3
PHI 115	Social and Ethical Issues in Computing	3
WRS 233	Advanced Writing for STEM	3
A&H cognate		3
Minor		3
	Credit Hours	**15**
Spring		
DSC 345	Principles and Practice of Artificial Intelligence (Principles and Practice of Artificial Intelligence)	3
Program elective		3
P&S cognate		3
Minor		3
Free elective		3
	Credit Hours	**15**
Senior Year		
Fall		
Program elective		3
Writing		3
Minor		3
Free elective		3
Free elective		3
	Credit Hours	**15**
Spring		
Minor		3
Minor		3
Free elective		3
Free elective		3
Free elective		3
	Credit Hours	**15**
	Total Credit Hours	**122**

Mission

The program prepares students for careers in the use and application of DS and AI, by giving them an understanding of both the principles and the practice of the two areas. The core courses provide knowledge that is necessary for all aspects of DS and AI, the elective courses provide knowledge in chosen subareas, and the application courses illustrate how techniques in DS and AI can be applied in a range of domains. Students with this major in DS and AI will find employment in a range of application areas, including those related to areas beyond technical development of DS and AI technology.

Student Learning Outcomes

- Students will be able to write efficient computer programs in Python and Java, using appropriate data structures, to solve application problems.
- Students will be able to use data analysis languages and libraries for the analysis of large data sets.
- Students will be able to apply basic techniques of AI.
- Students will be able to use specialized tools and techniques from DS and AI, for data repositories, statistical analysis, data visualization, machine learning, etc.
- Students will be able to translate their DS and AI skills to solve problems in application domains beyond computer science and mathematics.