DATA SCIENCE IN ASTRONOMY MINOR

College of Arts and Sciences

Program Website (http://astro.cornell.edu)

Program Description

The Data Science in Astronomy Minor is designed for students interested in the intersection and applications of data and computer science with topics related to astronomy.

Open to all Cornell undergraduates not enrolled in an Astronomy major. Minimum grades:

- B- in 1000–2000 level courses
- C- in 3000-level and above
- Up to 4 credits of ASTRO 4940 Independent Study in Astronomy may be applied with approval of the Astronomy Director of Undergraduate Studies

To apply for an Astronomy Minor make an appointment to visit the Director of Undergraduate Studies (astrodus@cornell.edu).

Minor Requirements

- 15 total credits
- 1 Astronomy course at or above 3000 level
- 2 Astronomy data analysis courses
- 2 Data Science courses
  - 1 Probability and Statistics
  - 1 Data Structures/Machine Learning

The Data Science in Astrology minor provides a cross-disciplinary framework linking selected Astronomy courses with appropriate courses in Computer Science, ECE, Information Science, Statistics and Data Science, and ORIE including:

Astronomy

Code	Title	Hours
Select one of the following:		**3**
ASTRO 3301	Exoplanets and Planetary Systems	3
ASTRO 3302	The Life of Stars: From Birth to Death	3
ASTRO 3303	Galaxies Across Cosmic Time	3

Astronomy Data Oriented

Code	Title	Hours
Select two of the following:		6
ASTRO 3310	Planetary Image Processing with MATLAB	
ASTRO 3334	Data Analysis and Research Techniques in Astronomy	
ASTRO 3340	Symbolic and Numerical Computing	
ASTRO 4410	Multiwavelength Astronomical Techniques	
ASTRO 4523	Modeling, Mining and Machine Learning in Astronomy	

Computer Science, ECE, Information Science, Statistics and Data Science, and Operations Research and Information Science (ORIE) [1]

Code	Title	Hours
Probability & Statistics		
Select one of the following:		3
BTRY 3010	Statistics I	
ECE 3100	Introduction to Probability and Inference for Random Signals and Systems	
ENGRD 2700	Eng Probability and Statistics: Modeling and Data Science	
MATH 4710	Basic Probability	
MATH 4720	Statistics	
ORIE 3500	Eng Probability and Statistics: Modeling and Data Science II	
STSCI 3080	Probability Models and Inference	
STSCI 4520	Statistical Computing	
STSCI 4780	Bayesian Data Analysis: Principles and Practice	4
Data Structures & Algorithms		
Select one of the following:		3
CS 2110	Object-Oriented Programming and Data Structures	
CS 3110	Data Structures and Functional Programming	
ENGRD 2720	Data Science for Engineers	
INFO 2950	Introduction to Data Science	
ORIE 3120	Practical Tools for Operations Research, Machine Learning and Data Science	
ORIE 4740	Statistical Data Mining I	
ORIE 4742	Info Theory, Probabilistic Modeling, and Deep Learning with Scientific and Financial Apps	

[1] 1 course in probability and statistics, and 1 course in data structures and algorithms, modeling, and/or machine learning subject to availability of courses and consultation with the Astronomy Director of Undergraduate Studies.