

Syllabus

ASTR 302: Python for Astronomy

M-W, 11:00-12:30, PAB 360 Andrew Connolly <ajc@astro.washington.edu>

ASTR 302, “Python for Astronomy”, is a course designed to teach how to effectively use Python for research and astronomical data analysis. We begin with a gentle introduction to key tools and libraries used in astronomy, use these to analyze data (from kilobytes to tens of gigabytes!), visualize (sometimes large) datasets, automate analyses, and apply what we’ve learned to reproduce results of some key astronomy papers.

This course assumes the knowledge of Python and related astronomy libraries at the ASTR 300 level. It will give you the broad foundation needed to proceed to “ASTR 324: Introduction to AstroStatistics and Big Data in Astronomy”, or ASTR 497 “Big Data in Astronomy: Hands-on with Large Surveys”, or independent research projects.

Grading: Homeworks (70%) and a Final Project (30%).

This syllabus is for illustration and will evolve with the class

When	Topic
Jan 7	Introduction and questionnaire
Jan 9	Introduction and questionnaire
Jan 14	Basic Python Refresher, Part I
Jan 16	Basic Python Refresher, Part II
Jan 23	How to be organized and collaborative: git and github
Jan 28	Interactive Data Analysis: Jupyter Project
Jan 30	Astronomical Python: Catalogs
Feb 4	Astronomical Python: Spectra and Images
Feb 6	Python Data Analysis Library: Pandas
Feb 11	Astronomical Python: Time Series
Feb 13	Database Introduction for Astronomers
Feb 18	Astronomical Data Archives
Feb 20	Using Databases and Archives from Python
Feb 25	Remote Data Analysis with Jupyter
Feb 27	Astronomical Python: Image Reduction
Mar 4	Astronomical Python: Object Detection and Measurement
Mar 6	When Your Code Starts to Grow: Basics of Software Engineering and Community Development
Mar 11	Astronomical Python: Machine Learning, Part I

Mar 13	Astronomical Python: Machine Learning, Part II
Mar 15	<i>Final Project Due</i>