

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> |