Syllabus

ASTR 302: Python for Astronomy (listed as ASTR 497 in Winter'18)

T-Th, 2:30-3:50, PAB 360
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ASTR 497 (to become ASTR 302 in subsequent quarters), "Python for Astronomy", is a new 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%).

When	*Topic*	*Notes*
Jan 4	Getting Started: Why Python for Astronomers?	
Jan 9	Basic Python Refresher, Part I	
Jan 11	Basic Python Refresher, Part II	
Jan 16	How to be organized and collaborative: git and github	
Jan 18	Interactive Data Analysis: Jupyter Project	HW1 due
Jan 23	Astronomical Python: Catalogs	
Jan 25	Astronomical Python: Spectra and Images	HW2 due
Jan 30	Python Data Analysis Library: Pandas	
Feb 1	Astronomical Python: Time Series	HW3 due
Feb 6	Database Introduction for Astronomers	
Feb 8	Astronomical Data Archives	HW4 due
Feb 13	Using Databases and Archives from Python	
Feb 15	Remote Data Analysis with Jupyter	HW5 due
Feb 20	Astronomical Python: Image Reduction	

Feb 22	Astronomical Python: Object Detection and Measurement	HW6 due
Feb 27	Big Data Python: Powering the LSST Image Processing	*guest lecture*
Mar 1	When Your Code Starts to Grows: Basics of Software Engineering and Community Development	HW7 due
Mar 6	Astronomical Python: Machine Learning, Part I	
Mar 8	Astronomical Python: Machine Learning, Part II	
Mar 15		*Final Project Due*