Syllabus

ASTR 302: Python for Astronomy (Winter'20)

M-W, 2:30-3:50, PAA 214

Mario Juric <mjuric@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 you know 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 Machine Learning 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 13	Getting Started: Why Python for Astronomers?	
Jan 15	Basic Python Refresher, Part I	
Jan 20	Basic Python Refresher, Part II	
Jan 22	How to be organized and collaborative: git and github	
Jan 27	Interactive Data Analysis: the Jupyter Project	
Jan 29	Astronomical Python: Catalogs	
Feb 3	Astronomical Python: Spectra and Images	
Feb 5	Python Data Analysis Library: Pandas	
Feb 10	Astronomical Python: Time Series	
Feb 12	Database Introduction for Astronomers	
Feb 17	*-- no class --*	holiday
Feb 19	Astronomical Data Archives	
Feb 24	Using Databases and Archives from Python	
Feb 26	Remote Data Analysis with Jupyter	

Mar 2	Astronomical Python: Image Reduction	
Mar 4	Astronomical Python: Object Detection and Measurement	
Mar 9	When Your Code Starts to Grows: Basics of Software Engineering and Community Development	
Mar 11	Astronomical Python: Machine Learning, Part I	
	Astronomical Python: Machine Learning, Part II	
Mar 20		*Final Project Due*