Programming and Data Analysis for Scientists and Engineers

Dates:	June 13,14 (Introduction to programming in Python) June 27,28 (Data analysis) Project work (Dates flexible)
Credits:	6 EAP
Instructors:	David Schryer (schryer@ut.ee) Lauri Võsandi
UT Course Name:	Data Analysis and Computational Methods with MATLAB (Enroll here, however, we will use Python instead of MATLAB)

The rapid changes we are witnessing with the internet revolution have also changed the way scientists and engineers must perform their work. Increasingly, the analysis of data requires basic programming skills; skills that are too often self taught using inappropriate tools.

This course provides students with hands on instruction on the use of tools that are widely used by both scientists and leading technology companies[1]. Importantly, students will follow a boot camp program that has successfully introduced scientists and engineers to the art of programming for over a decade[2].

The course will be run in two intensive two day segments. The first is an introduction to best practice programming with Python, and the second provides students with hands on instruction in IPython (to produce visual and reproducible data analysis notebooks[3,4]), matplotlib (to rapidly visualize data), Numpy + SciPy (an extensive set of useful tools for data analysis), and SymPy (for symbolic calculations). Following these, a small group project will allow the students to demonstrate their new found superpowers.

All students will be required to bring a portable computer at all times. All required tools are freely available and will be provided to the students in the form of a VirtualBox image for rapid installation and to ensure all students will have the same computational environment. If the student has difficulty installing VirtualBox, the instructors will provide assistance.

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[1] Organizations using Python

- http://wiki.python.org/moin/OrganizationsUsingPython

[2] Software Carpentry

- http://software-carpentry.org/

[3] Lectures on Scientific Computing

- https://github.com/jrjohansson/scientific-python-lectures#online-read-only-versions

[4] IPython Notebooks

- https://github.com/ipython/ipython/wiki/A-gallery-of-interesting-IPython-Notebooks