### *UW Contract Course for Isilon Systems, LLC*

**PYTHON 300: System Development with Python**

September 17-November 19, Tuesday, 6-9 PM

# Course Description

This intermediate-level Python class focuses on larger-scale application development with emphasis on features to extend the language and support testing. By the end of this class, students will have completed a medium-scale project of their own choosing (1000 to 3000 source lines) that includes unit testing and use of advanced language features.

In-class exercises will be worked on as a group after each major subject has been covered, in order to get hands on experience. Approximately half of class time will be devoted to exercises. The final hour of each class will be reserved for students to work on their class projects. Students are encouraged to discuss their projects with the instructor and each other during this time.

**Course Objectives**

At the end of this class, students will be able to confidently design and implement medium-to-large-scale Python applications with emphasis on testing and validation, making use of advanced language features.

# Course Website

All material presented in class will be available on the program’s GitHub repository, reachable at

<https://github.com/UWPCE-PythonCert/Python300-SystemDevelopmentWithPython>

# Instructor

Joseph Sheedy: [joseph.sheedy@gmail.com](mailto:joseph.sheedy@gmail.com)

# Course Textbook(s)/Resource Materials

There are a number of excellent Python texts, but this course will make direct use of primary sources of documentation from <http://docs.python.org> and related web sites.

# Technology Requirements

Students will require a laptop with the following software packages installed:

* Python 2.6 or 2.7
* SQLite or MySQL/PostgreSQL
* C/C++
* <http://cython.org>
* <http://swig.org/>

Network access is highly recommended. You may work in your preferred development environment or text editor.

Alternatively, students may use a network-connected netbook or tablet to connect to a server with the appropriate software components installed.

# Assessment Criteria & Course Expectations

Students are required to attend 80% of the classes and participate in the exercises. It is recommended that students work on the exercises in pairs.

Students will be evaluated based on completion of a project of their own choosing, subject to the approval of their manager (project selection is due by the second lecture, 09/24). Projects may be by individual or small groups. Group projects will be scaled up according to the size of the group. Emphasis will be on use of advanced Python features for testing.

# Schedule

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| --- | --- | --- | --- |
| **Week** | **Date** | **Topic** | **Notes/References** |
| 1 | 9/17 | Unit Testing I | unittest, nose, pytest  <http://docs.python.org/2/library/unittest.html>  <https://nose.readthedocs.org/en/latest/>  <http://pytest.org/latest/contents.html> |
| 2 | 9/24 | Unit Testing II  Decorators | decorators for testing/debugging  closures  rolling your own decorators  **project proposals due**  <http://wiki.python.org/moin/PythonDecorators> |
| 3 | 10/1 | Debugging | pdb  tracing  <http://docs.python.org/2/library/pdb.html> |
| 4 | 10/8 | Relational Databases  (SQL) | DB API  SQLite, MySQL, Postgres  **high-level design due**  <http://www.python.org/dev/peps/pep-0249/> |
| 5 | 10/15 | Advanced OO | mixins, super(), \_\_new\_\_, metaclasses, properties  <http://docs.python.org/2/reference/datamodel.html> |
| 6 | 10/22 | Extensions  (leveraging C libraries) | C API, ctypes, cython, SWIG  **test plans due**  <http://docs.python.org/2/extending/extending.html>  <http://docs.python.org/2/library/ctypes.html>  <http://docs.cython.org/>  <http://www.swig.org/> |
| 7 | 10/29 | Threading & Multiprocessing | threading/multiprocessing  distributed processing  <http://docs.python.org/2/library/threading.html>  <http://docs.python.org/2/library/multiprocessing.html> |
| 8 | 11/5 | Profiling & Performance Tuning | **projects due**  <http://docs.python.org/2/library/profile.html> |
| 9 | 11/12 | Student Presentations |  |
| 10 | 11/19 | Student Presentations (cont.) |  |