DAAN862: Analytics Programming in Python

DAAN 862: Analytics Programming in Python

This course will explore the development of analytics systems and the application of best practices and established software design principles using the Python programming language and its several toolkits. Students will manipulate, analyze and visualize complex data sets and implement statistical, machine learning, information visualization, and text analysis through popular Python toolkits to gain insight into their data.

Overview

This course will employ the Python programming language and its several toolkits for manipulating, analyzing, and visualizing complex data sets. Students will apply statistical, machine learning, information visualization, and text analysis techniques through popular python toolkits such as Pandas, Matplotlib, Scikit-Learn, and NLTK to gain insight into their data.

Prerequisites

Students need to have taken **SWENG545** and **IE575** before taking this course.

Course Objectives

The objective of this course is to provide hands-on experience with data reading, cleaning, processing and visualization techniques using Python programming language and its tookits.

After successfully completing this course, students will be able to demonstrate:

- Understanding of the Python programming language and its development environment.
- The ability to manipulate, analyze, and visualize complex data sets using the Python language.
- Knowledge of the best practices and principles of software design in analytics systems.

Contact Information

All course-related e-mail should go through Canvas's course mail function (Canvas Inbox). Using Canvas to contact me ensures that I will read your message and respond to you in a timely manner.

Required Course Materials

Textbooks:

- Book 1: ISBN: 978-1491957660 Wes Mckinney, Python for Data Analysis, 2nd edition, 2017
- Book 2: ISBN: 978-1788299879 Gavin Hackeling, Mastering Machine Learning with scikit-learn, 2nd edition, 2017.
- Book 3: ISBN: 978-1484223871 Dipanjan Sarkar, Text Analytics with Python, 2016

Open Source Software:

Anaconda Spyder: https://www.anaconda.com/download/ (https://www.anaconda.com/download/)
You may purchase course materials from MBS Direct (the bookstore used by Penn State's World Campus). For pricing and ordering information, please see the MBS Direct website (http://bookstore.mbsdirect.net/psude.htm) . MBS Direct can also be contacted at 1-800-325-3252. Materials will be available at MBS Direct approximately three weeks before the course begins. Alternatively, you may obtain these texts from other favorite bookstores. Be sure you purchase the edition/publication date listed. For pricing and ordering information, please see the MBS Direct website (http://bookstore.mbsdirect.net/psude.htm) . MBS Direct can also be contacted at 1-800-325-3252.

Materials will be available at MBS Direct approximately three weeks before the course begins. It is very important that you purchase the correct materials. If your course requires one or more textbooks, you must have exactly the correct text required (edition and year).

Library Resources

Many of the University Library resources can be utilized from a distance. Through the Libraries website, you can

- access magazine, journal, and newspaper articles online using library databases;
- borrow materials and have them delivered to your doorstep — or even your desktop;

- get research help via e-mail, chat, or phone using the Ask a Librarian service (https://libraries.psu.edu/ask) ;
- and much more.

You can view the Online Students' Library Guide (http://guides.libraries.psu.edu/onlinestudentlibraryguide) for more information.

You must have an active Penn State Access Account to take full advantage of the Libraries' resources and services. Once you have a Penn State account, you will automatically be registered with the library within 24–48 hours. If you would like to determine whether your registration has been completed, visit the Libraries home page (https://libraries.psu.edu/world) , click on **Library Accounts**, and then click on **My Library Account**.

Course Requirements and Grading

Students will be evaluated on their understanding of the course material by completing eleven (11) weekly assignments that evaluate their understanding of and ability to apply material contained in the lectures and reading assignments. One cumulative final exam will evaluate their knowledge of the Python language and program design principles, Final grades will be calculated as follows:

Assignment Type	Quantity	Points	Percent of Grade
Lesson Assignments	11	100 (each)	75%
Final Exam	1	100	25%

There will be 11 assignments and a final project.

- All assignment and the final project should be solved by Python instead of other software.
- Please submit a Word or pdf file for all assignments and the final project.
- All assignment and the final project should be completed independently without collaboration with other students.

- You will have a week to finish each assignment, and they are due at 11:59 PM Eastern time on the date specified.
- Late submission will not be accepted unless the instructor has given permission prior to the due date.

Grading Scale:

Grading Points	Grading Type
93 - 100	A
90 - 92	A-
87 - 89	B+
84 - 86	B
80 - 83	B-
77 - 79	C+
70 - 76	C
60 - 69	D
0 - 60	F

Course Schedule

Note: If you are planning to graduate this semester, please communicate your intent to graduate to your instructor. This will alert your instructor to the need to submit your final grade in time to meet the published graduation deadlines. For more information about graduation policies and deadlines, please go to the Graduation Information (http://student.worldcampus.psu.edu/courses/graduation) on the My Penn State Online Student Portal.

Formal instruction will end on the last day of class. Provided that you have an active Penn State Access Account user ID and password, you will continue to be able to access the course materials for one year from the day the course began (with the exception of library reserves).

Technical Requirements

Technical Requirements

Operating System	Penn State's LMS, Canvas, supports most recent versions of Microsoft Windows and Apple Mac operating systems. To determine if your operating system is supported, please review the Canvas Computer Specifications (https://community.canvaslms.com/docs/DOC-2059) .
Hardware	For a list of required computer hardware specifications and internet speed, please review the Canvas Computer Specifications (https://community.canvaslms.com/docs/DOC-2059) .
Browser	Canvas supports the last two versions of every major browser release. We highly recommend updating to the newest version of whatever browser you are using as well as the most up-to-date Flash plug-in. To determine if your browser is supported, please review the list of Canvas Supported Browsers (https://community.canvaslms.com/docs/DOC-1284) . **Note**: Cookies, Java, and JavaScript must be enabled. Pop-up blockers should be configured to permit new windows from Penn State websites.
Plug-ins	Adobe Reader [Download from Adobe (https://get.adobe.com/reader/)] Flash Player [Download from Adobe (https://helpx.adobe.com/flash-player.html)] Java [Download from Oracle (http://www.java.com/en/download/testjava.jsp)] - The Java plug-in is required for screen sharing in Conferences. Please note that some browsers do not support Java.
Additional Software	All Penn State students have access to Microsoft Office 365 (https://student.worldcampus.psu.edu/a-z-index/office-365) , including Microsoft Office applications such as Word, Excel, and PowerPoint.
Printer	Access to graphics-capable printer
DVD-ROM	Required
Sound Card, Microphone, and Speakers	Required

Monitor	Capable of at least 1024 x 768 resolution
Mobile Device	The Canvas mobile app is available for versions of iOS and Android. To determine if your device is capable of using the Canvas Mobile App, please review the Canvas Mobile App Requirements (https://community.canvaslms.com/docs/DOC-1542) .

If you need technical assistance at any point during the course, please contact the HelpDesk (http://student.worldcampus.psu.edu/student-services/helpdesk) .

For registration, advising, disability services, help with materials, exams, general problem solving, visit World Campus Student Services (http://student.worldcampus.psu.edu/student-services) !

Academic Integrity

1. Students are responsible for online course content, taking notes, obtaining other materials provided by the instructor, taking tests (if applicable), and completing assignments as scheduled by the instructor. As a general rule, students should plan on logging into the course at least three times per week and spending at least three hours per course credit per week on the course, e.g., if the course is three credits, the student should plan on spending at least 9-12 hours per week on the course, just as they would in a residence course.
2. Students are responsible for keeping track of changes in the course syllabus made by the instructor throughout the semester.
3. Students are responsible for monitoring their grades.
4. Students must contact their instructor (and teammates when working on any collaborative learning assignments) as soon as possible if they anticipate missing long periods of online time due to events such as chronic illnesses, death in the family, business travel, or other appropriate events. The instructor will determine the minimal log on time and participation required in order to meet course responsibilities. In the event of other unforeseen conflicts, the instructor and student will arrive at a solution together.
    a. Requests for taking exams or submitting assignments after the due dates require documentation of events such as illness, family emergency, or a business-sanctioned activity.
    b. Conflicts with dates on which examinations or assignments are scheduled must be discussed with the instructor or TA (teaching assistant) prior to the date of the

examination or assignment.

5. Students are responsible for following appropriate netiquette (network etiquette) when communicating with their instructor and classmates. For reference:
    a. Tips for Being a Successful World Campus Student (http://student.worldcampus.psu.edu/academic-support-resources/strategies-to-improve-online-learning)
    b. Email and Communication Strategies (http://student.worldcampus.psu.edu/a-z-index/email-communication-strategies)
6. Behaviors that disrupt other students' learning are not acceptable and will be addressed by the instructor.
7. For severe and chronic problems with student disruptive behavior, the following will be applied for resolution:
    a. Senate Committee on Student Life policy on managing classroom disruptions: Office of Student Conduct (http://studentaffairs.psu.edu/conduct/)
    b. Penn State Principles (http://www.psu.edu/ur/pdf/principles.pdf)

Accommodating Disabilities
Additional Policies

For information about additional policies regarding Penn State Access Accounts; credit by examination; course tuition, fees, and refund schedules; and drops and withdrawals, please see the World Campus Student Policies (http://student.worldcampus.psu.edu/a-z-index) website.