Appl Data Analytics Acct II, ACCT 7374/5397

Fall 2023 Syllabus - DRAFT

Part 1: Course Information

Instructor Information

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Course Description

This course will build a practical foundation for data analytics by introducing students to tools and techniques to complete common tasks in accountancy and business in general. It will enable students to obtain, explore, and analyze data sets. Students will learn to develop data analytic scripts by using the Python programming language and the standard data analytic Python modules, including Pandas and NumPy. Students will also learn how to obtain text data embedded within websites or documents and how to analyze text data.

Course Structure

This course will meet on a weekly basis in the **face-to-face** format. Each week your instructor will present and discuss the concepts in the module via presentation slides or demonstration and allow time for student coding practice during class time.

The course is comprised of the following elements:

- **Jupyter Notebook Lectures.** Each module has Jupyter Notebook lectures that are like interactive textbooks. You will be able to read about the key concepts and ideas as well as observe examples of how to use the code.
- **Readings**. Additional readings, data sets, and code and application files may be required for some modules. The additional readings provided are helpful for expanding your knowledge of the lessons.
- **Programming Assignments**. Every module has one Jupyter Notebook programming assignment file. Each file contains instructions on what to program, cells where you will enter code, and cells that will automatically give your feedback on your code.
- **Case Studies**. The course will tackle case studies that employ the concepts of several modules.
- **Final Project**. Each student will tackle a data analysis project for a question they propose and present exploratory data analysis and a machine learning algorithm.

Textbook & Course Materials

No Required Text. Recommended References & Other Readings will be made available in Blackboard and/or within the Jupyter Notebooks

Technology Requirements

This course uses a learning management system called Blackboard to post assignment details, announcements, and provide collaborative opportunities. The course will also use Microsoft Teams to record class lectures and provide collaborative opportunities. Below are the minimum technology requirements to be successful in this course:

- Supported operating system (e.g. Windows/PC or Apple/MAC computer)
- Stable internet connection
- CougarNet Login credentials http://accessuh.uh.edu
- Email account (UH alias or personal)
- Microsoft Office 365
- Supported internet browsers
- Python and Jupyter Notebooks. Several prepackaged Python distributions are available, Anaconda is recommended.

The learning notebooks in this course are designed to use data files stored locally, in the data directory, which is expected to exist in the home directory of the current user. For example, on a Mac OSX computer with a username Joe, the directory /Users/Joe/data.

Part 2: Course Objectives

Learning Outcomes

Upon successful completion of this course, you will be able to:

- Articulate the importance of data analytics in the accountancy profession and understand analytic issues and topics in accounting
- Write effective basic data analytic scripts by using the Python programming language
- Analyze text data and time series data
- Run and interpret fundamental data analytic tasks in Python including descriptive statistics, data visualizations, and regression.

Assessment Measures

Each module includes a quiz that tests basic mastery of the lesson contents, and a programming assignment that evaluated synthesis of the lesson contents. There will be two case-studies that span multiple weeks to cover several topics and a final exam/project.

Part 3: Grading

This course follows all UH grade regulations, policies, and standards as stated in the student handbook.

Evaluation (tentative):

- Module assignments: 60%
- Case studies: 20%
- Final exam/project: 20%

Part 4: Topics Outline/Schedule (Tentative)

Week	Date	Module/Topic	Contents	Learning Objectives
1		**Introduction**	Introduce the course Discuss specific examples of how analytics is being employed by accounting firms and why accounting students should learn to write computer programs.	By the end of the intro, you should be able to: • Appreciate the importance of data analytics in accountancy • Articulate how accounting students can benefit from learning to write computer programs
		Module 1 - Foundations	This module serves as the introduction to the course content and the Jupyter notebooks. • Installing Python, Anaconda, and Jupyter • How to create, edit, and run notebooks • How to write Markdown-formatted documents	By the end of this module, you should be able to: • Work effectively with a Jupyter notebook • Write basic Markdown-encoded documents.
2		**Module 2 - Introduction to Python**	This module focuses on the basic features in the Python programming language that underlie most data analytics programs (or scripts). • How to create variables, basic data types and mathematical operators • How to document programs with comments. • Learn about functions and how they can simplify developing and maintaining computer programs. • How to create and call functions in Python. • How Boolean and logical operators can be used to control the flow of a Python program by using conditional statements.	By the end of this module, you should be able to: • Write simple Python scripts • Effectively create and use variables of different data types in a Python program • Apply Boolean and logical operators within conditional statements in a Python program.
3		**Module 3 - File I/O**	This module introduces how to read data into Python. • Learn how to read and write data to a file from within a Python program.	By the end of this module, you should be able to: • Read and write data to files from within a Python script • Read and write data to standard text-based file formats

		Module 4 – Data Structures and Iteration	This module introduces two important programming concepts: data structures and iteration. • Learn about built-in data structures including the list, tuple, string, and dictionary. • Learn about functions that increase the efficacy and general applicability of these data structures. • How-to iterate through data using "for" and "while" statements	By the end of this module, you should be able to: • Create and use the Python list, tuple, string, and dictionary data structures • Explain the difference between mutable and immutable data structures and why both types are important • Effectively use iteration to process data in these data structures
4		Module 5 – Programming & Numpy	This module introduces fundamental concepts in Python programming. • Learn about advanced concepts relating to Python functions. • Learn about how to handle errors in code • Learn about the NumPy module, which provides support for fast numerical operations within Python.	By the end of this module, you should be able to: • Apply built-in functions to manipulate data in these data structures. • Use Python's exception-handling mechanism • Work with one-dimensional numerical data by using the NumPy module.
5 6		Module 6 – Pandas Dataframes & Descriptive Statistics	This module introduces fundamental concepts in data analysis. • Learn about the Pandas Python module • Learn about advanced functionality within the Pandas module including reading, writing, masking, grouping, stacking, and sorting. • Learn about descriptive statistics, which can be used to characterize a data set by using a few specific measurements. • How to use a Pandas DataFrame to clean, explore, visualize, and analyze a large, complex data set.	By the end of this module, you should be able to: • Explain the benefits of using the Pandas module for data analysis • Apply advanced features to analyze data more effectively by using a Pandas DataFrame • Compute and interpret descriptive statistics. • Process data in a DataFrame to glean new insights.
7		Module 7 - Introduction to Text Analytics	In this module, you will learn to perform basic text analytics tasks by using Python. • How to perform text processing by using Python • How to use built-in string functions to parse text data.	By the end of this module, you should be able to: • Use Python string functions to find and modify text data • Identify and analyze text-heavy disclosures provided by companies

			• Learn about regular expressions, which can perform fast search-and-replace operations on text data • How to programmatically extract data from a webpage or website	• Understand the potential applications of NLP in different areas of accounting • Perform text analysis on transcripts
8		**Module 8 – Data Preparation & Regression**	In this module, you will learn some data preparation techniques and go beyond correlation to learn how to perform linear regression	By the end of this module, you should be able to: • Use Pandas to employ data preparation techniques like handling missing data. • Perform linear regression in Python • Interpret regression results
9 10		**Module 9 - Introduction to Time Series Data**	This module dives into time and date data • Review how businesses use historical time series data to generate forecasts. • Discuss how to properly handle time and date features within a Python program. • How to separate time series data into constituent, periodic components.	By the end of this module, you should be able to: • Discuss different ways businesses use time-series data to forecast future events • Work effectively with time and date data by using Python • Use the Pandas library to manipulate data sets that include time and date features • Apply Fourier analysis to identify periodic components within a time series data set.

11		**Module 10 – Exploratory Data Analysis & Visualization**	In this module, you will combine skills from previous modules to systematically generate an understanding from a dataset. Furthermore, this module introduces visualization as an important tool for exploring and understanding data. • Discuss basic components of visualizations with an emphasis on how they can be used to convey information. • How to identify and avoid ways that a visualization can mislead or confuse a viewer. • How to create a simple visualization in Python • How to annotate a plot • How to improve the visual aesthetics of a plot by using the seaborn module. • How to explore a one-dimensional data set by using rug plots, box plots, and histograms. • How to make two-dimensional scatter plots in Python and how they can be used to graphically identify a correlation and outlier points.	By the end of this module, you should be able to: • Be familiar with the CRISP-DM • Generate exploratory data analysis • Understand the basic concepts in conveying information visually • Identify and avoid visualization techniques that can mislead viewers • Create basic visualizations by using Python and the matplotlib module • Visually explore one-dimensional data by using Python and the seaborn module. • Explain how different plotting components can be used to convey information visually • Display and interpret two-dimensional data by using Python.
12		**Module 11 – Introduction to Machine Learning Algorithms**	In this module, you will be exposed to the basic concepts for building supervised and unsupervised machine learning algorithms.	By the end of this module, you should be able to: • Understand modeling with Scikit-Learn • Be familiar with Classification, Regression and Clustering algorithm applications
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14		**Module 12 - Automation**	This module will help you automate data analyses and repetitive tasks using code	By the end of this module, you should be able to: • Problem-solve data tasks with Python
15		**Final Project Presentations**		
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Part 5: Course Policies

Attend Class

Students are expected to attend all class sessions as listed on the course calendar. Lectures are offered simultaneous virtually so students can join from home. In the event of a missed class, please refer to class recording.

Complete Assignments

All assignments for this course will be submitted electronically through Canvas unless otherwise instructed. Assignments must be submitted by the given deadline. In certain situations, assignment extensions beyond those normally allowed in a course is a reasonable accommodation.

Build Rapport

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that they can help you find a solution.

Understand When You May Drop This Course

You are responsible for making arrangements to drop the course if you wish to do so. If you wish to drop the course, complete the online process at my.uh.edu before the deadline. Your instructor cannot drop you for any reason. Pay attention to the deadline and check your course enrollment status on My UH to make sure your drop has been processed. Visit Dropping and Withdrawing from Course Enrollment for more information.

Incomplete Policy

Under emergency/special circumstances, a student may petition for an incomplete grade. An incomplete will only be assigned in extreme circumstances. All incomplete course assignments must be completed within 6 months.

Review the catalog for conditions under which an incomplete may be granted.

Commit to Integrity

As a student in this course and at this university you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

Academic Honesty Policy

All University of Houston community members are expected to contribute to an atmosphere of the highest possible ethical standards. As such, students have the responsibility to know and adhere to the University of Houston policies for academic honesty and the Bauer College Code of Ethics and Professional Conduct. The faculty of ACCT 3371 supports the policy and code and expects that students, T.A.'s and faculty will conduct themselves in all aspects of the academic process according to the standards therein.

- **What constitutes an Academic Honesty violation?**
  - Categories of "academic dishonesty" can be found within the UH Academic Honesty Policy.
  - All work submitted for quizzes and exams must be yours. Any reference material used must be properly cited.

- For assignments and projects, work that includes copied and pasted code or information is not acceptable; all code or ideas included in your submissions must be your own effort. Any reference material used must be properly cited.
- Complicity in academic dishonesty may be applicable to all students in study or social media groups who observe or fail to report academic honesty violations.
- If you have any doubts or questions on whether something constitutes academic misconduct, please do not hesitate to contact me.

- **What are the penalties for Academic Integrity violations?**
  - Because honesty and integrity are such important factors in the professional community, failure to perform within the bounds of these ethical standards is sufficient grounds for a sanction. Any form of academic dishonesty will be penalized with a failing grade (i.e., zero points) for the <u>module</u>, or <u>examination</u> in which the infringement occurred and a notation indicating an academic integrity infraction in your academic record.
  - Additionally, any established violation in this course may result in course failure regardless of violation level and could escalate to suspension or expulsion per the policy.

Part 6: Course Accessibility and Assistance

Reasonable Academic Adjustments/Auxiliary Aids

The University of Houston complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for disabled students. In accordance with Section 504 and ADA guidelines, UH strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please contact the Justin Dart Jr. Student Accessibility Center (formerly the Justin Dart, Jr. Center for Students with DisABILITIES).

Counseling and Psychological Services

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps/) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. Also, there is <u>no appointment necessary</u> for the "Let's Talk" program, which is a drop-in consultation service at convenient locations and hours around campus. https://uh.edu/caps/outreach/lets-talk/. Due to COVID-19, check the website for updates.

CoogsCARE

Encountering challenges during your semester? CoogsCARE is an online resource hub for students who may be seeking some sort of emergency assistance during their time at the University of Houston. Be it food or housing insecurity, transportation difficulties, or academic struggles – this website seeks to bridge the gap for campus and community resources that can have a direct on YOU being successful! Visit the CoogsCARE website to learn more about how you can take advantage of it today!

Support Services

Student assistance for Blackboard can be found by visiting http://www.uh.edu/blackboard/help/, calling 713-743-1411, or emailing support@uh.edu. Software or hardware can be purchased at the UH Bookstore or UH CougarByte Discount website (http://www.cougarbyte.com/). Additional UH computer labs are available all over campus. Learn more by visiting http://www.uh.edu/infotech/services/facilities-equipment/comp-labs/

Syllabus Changes

Your instructor is continually looking to improve this course and may encounter some issues requiring changes to be made sooner rather than later. As such, this syllabus is subject to change. Your instructor appreciates your input and asks that you have patience as adjustments are made to this course. Expanding access is a constant pedagogical practice.