

**THE UNIVERSITY OF TEXAS AT EL PASO**  
**Woody L. Hunt College of Business**  
Department of Accounting and Information Systems

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**CIS 3330 – Analytic Programming Tools**  
Course Syllabus, Fall 2024

**Class Hours:** Tuesdays and Thursdays 9:00 - 10:20 AM at CoBA 321  
**Office Hours:** Tuesdays and Thursdays 1:00 - 4:10 PM (or by appointment)

**Course Description**

This course is designed to teach students the fundamentals of programming, data structures, algorithmic analysis, and business problem solving. Students will learn programming concepts and analytical tools for solving business problems using Python. The course will cover practical examples of how to use data structures and algorithms to solve business problems. Additionally, this course teaches how to do data wrangling and analysis. This analytic programming course relies on basic inferential statistical knowledge and requires students to spend a significant number of hours developing, debugging, and improving code.

**Learning Objectives**

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

- Develop a foundation on basic programming and analytical concepts
- Analyze and visualize algorithms implemented in code
- Solve problems by thinking algorithmically and implementing code
- Load, manipulate, and perform data analysis
- Apply machine learning algorithms to identify patterns and make predictions

**UTEP EDGE – Experiences**



**LEARNING COMMUNITIES**  
Build friendships, gain academic support, and connect ideas across linked classes by joining a learning community



**CREATIVE ACTIVITIES**  
Showcase your creative abilities through experiences that highlight your talents



**RESEARCH & SCHOLARLY ACTIVITIES**  
Team-up with faculty to gain experience and make intellectual and creative contributions to your field



**STUDENT LEADERSHIP**  
Develop professional values by assuming leadership roles in your campus experiences

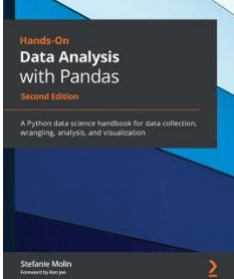

## UTEP EDGE – Advantages

|   |  |   |  |
|---|--|---|--|
|  <p><b>COMMUNICATION</b><br/>Reach mutual understanding through effective exchange of information, ideas, and feelings</p>           |  <p><b>CONFIDENCE</b><br/>Be self-assured through appreciating your own talents, abilities, skills, and qualities</p> |  <p><b>CRITICAL THINKING</b><br/>Analyze and evaluate issues in order to solve problems and develop informed opinions</p> |  <p><b>GLOBAL AWARENESS</b><br/>Understand and appreciate people, cultures, and ideas from around the world that impact our community</p> |
|  <p><b>LEADERSHIP</b><br/>Step up, think, and act critically and creatively to bring others together to accomplish a common task</p> |  <p><b>PROBLEM SOLVING</b><br/>Find solutions to difficult or complex issues</p>                                      |  <p><b>SOCIAL RESPONSIBILITY</b><br/>Act ethically and responsibly for the benefit of society and the public good</p>     |  <p><b>TEAMWORK</b><br/>Participate as an effective, efficient member of a group in order to meet a common goal</p>                       |





## Required books

|   |  |
|---|--|
|   | <p>Schniederjans, M., Schniederjans, D., &amp; Starkey, C. (2014). Business Analytics Principles, Concepts, and Applications: What, Why, and How (1st ed.). Pearson Education, Limited.<br/>Available for free at UTEP library<br/><a href="https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_askewsholts_vlebooks_9780133552249">https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_askewsholts_vlebooks_9780133552249</a></p> |
|  | <p>Hodeghatta, U. R., &amp; Nayak, U. (2023). Practical Business Analytics Using R and Python : Solve Business Problems Using a Data-driven Approach (2nd ed. 2023).<br/>Available for free at UTEP library<br/><a href="https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991023113849307051">https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991023113849307051</a></p>  |
|  | <p>Severance, Charles R. Python for everybody. Charles Severance, 2009.<br/>Available for free at the author’s website. <a href="https://www.py4e.com/book">https://www.py4e.com/book</a></p>  |

## Optional books

|  |   |
|--|---|
|   | <p>Agarwal, B., &amp; Baka, B. (2018). Hands-On Data Structures and Algorithms with Python (2nd edition). Packt Publishing.<br/>Available for free at UTEP library<br/><a href="https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022950344607051">https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022950344607051</a></p>  |
|   | <p>Molin, S., &amp; Jee, K. (2021). Hands-On Data Analysis with Pandas: A Python Data Science Handbook for Data Collection, Wrangling, Analysis, and Visualization. Packt Publishing, Limited.<br/>Available for free at UTEP library<br/><a href="https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_proquest_ebookcentral_EBC6579305">https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_proquest_ebookcentral_EBC6579305</a></p> |
|  | <p>Aziz, A., Lee, T. H., &amp; Prakash, A. (2019). Elements of programming interviews in Python. EPI.</p>   |

## Required software

|   |   |
|---|---|
|  | <p>Python 3.0 or greater. <a href="https://www.python.org/">https://www.python.org/</a></p>   |
|  | <p>Visual Studio Code. <a href="https://code.visualstudio.com/">https://code.visualstudio.com/</a></p>  |
|  | <p>Git. <a href="https://git-scm.com/book/en/v2/Getting-Started-Installing-Git">https://git-scm.com/book/en/v2/Getting-Started-Installing-Git</a></p> |
|  | <p>GitHub Desktop. <a href="https://desktop.github.com/">https://desktop.github.com/</a></p>  |

## Teaching methods

1. Class assignments (CASA)
  - i. It is important for students to come prepared to class and engage in each session. Therefore, before each lecture, students will be assigned a CASA assignment. The goal of these assignments is to test the students' preparation for each lecture. All CASAs are due one hour before the lecture. Only students who attend in person or

present a formal justification for their absence will receive credit for CASA submissions.

2. Coding assignments (CODE)
  - i. Coding and debugging are essential for this class. Coding assignments that do not run or run with errors will automatically receive a 50% grade penalty.
  - ii. Students are allowed to consult their notes, books, classmates, or the internet to complete coding assignments. However, copying code blindly, or worse, plagiarizing code from others, is prohibited.
  - iii. Students should be able to explain how their code works and why code similarities can appear. Students who fail to explain or justify their code authorship will receive a zero on the assignment and will be reported to the Office of Student Conduct and Conflict Resolution (OSCCR).
3. Exams (EXAM)
  - i. There will be two learning assessments in this class. A review session will be held before each exam. It is recommended that you review the exam material before each review session so you can actively participate in review sessions. Exams in this class are comprehensive and will require students to code.
4. Final Project (FINAL)
  - i. The final assessment of the course is an analytical project. Students will have to submit two checkpoints to ask questions about their project. The final project requires students to submit a report and all the code used to obtain the analytics included in the report. The report and the code should be meticulously detailed, affording the instructor the means to replicate the analysis. Failure to submit the necessary information to replicate the report and/or the use of plagiarized code will result in a grade of zero and a report to the Office of Student Conduct and Conflict Resolution (OSCCR).

## Evaluation

Class assignments – 15 points for each assignment (20 CASA assignments)

Coding assignments – 30 points for each assignment (10 CODE assignments)

Exams – 100 points (2 Exams)

Final Project – 200 points (2 checkpoints and 1 final project submission)

| A   | B   | C   | D   | F    |
|-----|-----|-----|-----|------|
| 900 | 800 | 700 | 600 | <600 |

## Late assignments

Late assignments will be awarded 20% less credit per day late. Make-up assignments, class assignments, discussions, checkpoints, and presentations will not be given.

## Extra credit

The course incorporates extra credit opportunities in assignments, in-class activities, and discussions to promote students' engagement inside and outside the classroom.

### **Email Procedure**

Please include “CIS 3330” in the subject line of all emails to the instructor to ensure that they are properly filtered. It would be helpful if the subject line also included a brief statement of need, for example: “CIS 3330 – Request for Appointment.” Please read the following link about emailing a professor for some helpful suggestions (e.g., please start with a greeting including my name and a signature including your name): <http://www.wikihow.com/Email-a-Professor>.

### **Accommodations**

If you need special accommodations due to a disability, as recognized by the Americans with Disabilities Act, please contact The Center for Accommodations and Support Services (CASS) at 747-5148 or email at [cass@utep.edu](mailto:cass@utep.edu), or visit their office located at UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).

### **Academic integrity**

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones’ own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

### **Acceptable use of Artificial Intelligence (AI)**

The use of AI technologies or automated tools, particularly generative AI such as ChatGPT or DALL-E, **is only allowed with proper attribution given for its use.**

Students must properly cite and give full credit to the program used upon submission of every relevant assignment. For example, programming code generated using AI can only be used if the student understands its functionality. Additionally, all students must disclose the use of AI by including a citation, like the one below:

Chat-GPT(version). Date of query (year/month/day). “Text of your query.” Generated using OpenAI Chat-GPT. <https://chat.openai.com/>

**Copying and pasting blindly code directly from AI is strictly prohibited.** Students who plagiarize code will be reported to the Office of Student Conduct and Conflict Resolution (OSCCR).

## Tentative Course Outline

| <b>Module 1: Fundamentals of programming for data analytics</b>                |   |
|--|---|
| Week #1  |   |
| 08/27 - Session 0  | Introduction to CIS 3330  |
| 08/29 - Session 1  | Variables, statements, operators, and expressions                         |
| Week #2  |   |
| 09/03 - Session 2  | Basic data types, data structures, and conditional statements             |
| 09/05 - Session 3  | Arithmetic and string basic operations                                    |
| 09/08 - CODE 1   | Variables, statements, operators, and expressions                         |
| Week #3  |   |
| 09/10 – Session 4  | Conditional code execution  |
| 09/12 – Session 5  | Built-in, type conversion, math, and customized functions                 |
| 09/15 - CODE 2   | Guessing Game   |
| Week #4  |   |
| 09/17 – Session 6  | Read and write plain text and comma separated files                       |
| 09/19 – Session 7  | Read and write files using Pandas – Part 1                                |
| 09/22 - CODE 3   | Reading files and counting words  |
| Week #5  |   |
| 09/24 – Session 8  | Read and write files using Pandas – Part 2                                |
| 09/26 – Session 9  | Data structures and analysis of algorithms (Big-O) – Part 1               |
| 09/29 - CODE 4   | Reading the Big Mac index   |
| Week #6  |   |
| 10/01 – Session 10   | Data structures and analysis of algorithms (Big-O) – Part 2               |
| 10/03 – Session 11   | Search algorithms   |
| 10/06 - CODE 5   | Pandas practice   |
| Week #7  |   |
| 10/08 – Session 11   | Sorting algorithms  |
| 10/10 – Session 12   | Exam 1 - Review   |
| <b>Module 2: Fundamentals of statistics and programming for data analytics</b> |   |
| Week #8  |   |
| 10/15 – Session 13   | Introduction to data analytics  |
| 10/17 – Session 14   | Statistical foundations review (descriptive statistics and data sampling) |
| 10/20 - CODE 6   | Descriptive Analytics   |
| Week #9  |   |

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|--|--|
| 10/22 – Session 15                                 | Statistical foundations review (data distributions and data scaling) |
| 10/24 – Session 16                                 | Quantifying relationships (covariance and correlations)              |
| 10/27 - CODE 7                                     | Airline Delays   |
| Week #10   |  |
| 10/29 – Session 17                                 | Exploratory data analysis  |
| 10/31 – Session 18                                 | Introduction to machine learning (concepts)                          |
| 11/03 - CODE 8                                     | Correlations and ANOVA   |
| Week #11   |  |
| 11/05 – Session 19                                 | Introduction to machine learning (applications)                      |
| 11/07 – Session 20                                 | Data analysis of textual data  |
| 11/10 - CODE 9                                     | Titanic Survival   |
| Week #12   |  |
| 11/12 – Session 21                                 | Final Project Proposal - Presentations                               |
| 11/14 – Session 22                                 | Final Project Proposal - Presentations                               |
| 11/17 - Final Project                              | Checkpoint A   |
| Week #13   |  |
| 11/19 – Session 23                                 | Exam 2 - Review  |
| 11/21 – Session 24                                 | Final Project Proposal - Discussion                                  |
| 11/24 - CODE 10                                    | Text Analytics   |
| <b>Module 3: Analytical tools and applications</b> |  |
| Week #14   |  |
| 11/26 – Session 25                                 | Storytelling on data analytics projects                              |
| 11/28 – No session                                 | Thanksgiving break   |
| Week #15   |  |
| 12/03 – Session 26                                 | Ethical use of analytical tools and applications                     |
| 12/05 – Session 27                                 | Final Project – Checkpoint B   |
| 12/10 - Final Project                              | Final Project Submission   |

**Important Notes:**

1. In addition to the announced office hours, students may stop by my office at any time (or email me) to ask questions.
2. Students should demonstrate that they have done code troubleshooting/debugging before requesting assistance from the instructor.
3. If you have any trouble with the class, please get help ASAP. Do not let the problems build up.
4. This syllabus is tentative.