

**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 2023

**Class Hours:** Tuesdays and Thursdays 09:00 - 10:20 AM at CoBA 321  
**Office Hours:** Tuesdays and Thursdays 1:00 - 3:00 PM (or by appointment)

### Course Description

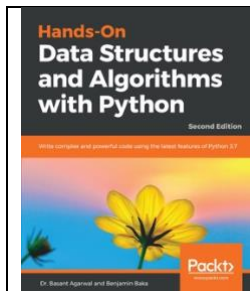
This course is designed to teach students the fundamentals of programming, data structures, algorithmic analysis, and business problem solving. Students will learn programming concepts and analytical tools for solving business problems using Python. The course will cover practical examples of how to 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

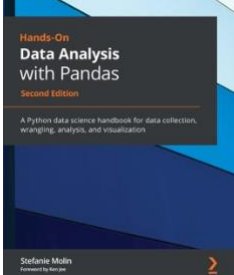
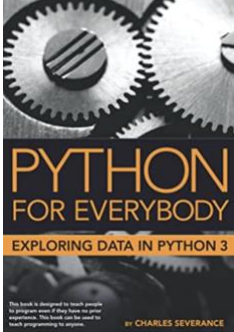
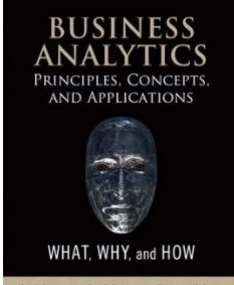
### Required books



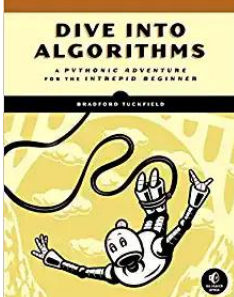

Agarwal, B., & Baka, B. (2018). Hands-On Data Structures and Algorithms with Python (2nd edition). Packt Publishing.

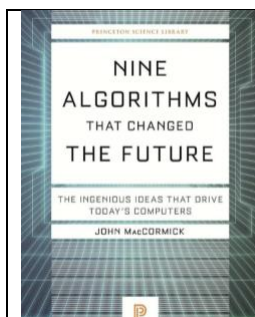
Available for free at UTEP library

[https://utep.primo.exlibrisgroup.com/permalink/01UTEP\\_INST/uk4am/alma991022950344607051](https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022950344607051)

	<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.          Available for free at UTEP library  <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>Severance, Charles R. Python for everybody. Charles Severance, 2009.          Available for free at the author's website. <a href="https://www.py4e.com/book">https://www.py4e.com/book</a></p>
	<p>Schniederjans, M., Schniederjans, D., &amp; Starkey, C. (2014). Business Analytics Principles, Concepts, and Applications: What, Why, and How. Pearson Education, Limited.          Available for free at UTEP library  <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>

## Optional books





	<p>Tuckfield, B. (2021). Dive into algorithms: a pythonic adventure for the intrepid beginner. No Starch Press.          Available for free at UTEP library  <a href="https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022923858107051">https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022923858107051</a></p>
	<p>Aziz, A., Lee, T. H., &amp; Prakash, A. (2019). Elements of programming interviews in Python. EPI.</p>



MacCormick, John. "Nine algorithms that changed the future." *Nine Algorithms That Changed the Future*. Princeton University Press, 2020.  
Available for free at UTEP library

[https://utep.primo.exlibrisgroup.com/permalink/01UTEP\\_INST/1q3tr5t/cdi\\_askewsholts\\_vlebooks\\_9780691209050](https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_askewsholts_vlebooks_9780691209050)

## Required software

 python	Python 3.0 or greater. <a href="https://www.python.org/">https://www.python.org/</a>
	Visual Studio Code. <a href="https://code.visualstudio.com/">https://code.visualstudio.com/</a>
	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>
	GitHub Desktop. <a href="https://desktop.github.com/">https://desktop.github.com/</a>

## 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. These assignments have the goal of testing the preparation that students have before each lecture. All CASAs are due one hour before the lecture. Only students that attend in person or present a formal justification for their absence will receive credit for CASA submissions.
2. Coding assignments (CODE)
  - i. Coding is essential for this class. Students will be assigned a coding assignment after each class session. Coding assignments will only be available 48 hours after each class session, and they will be evaluated in full grade if they run without errors. 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 worst, plagiarizing code from others, is prohibited. Students should be able to explain how their code works and why code similarities appear. Students that fail to explain and justify their code authorship will receive a zero on the assignment and will be reported to the Honor Code System.
3. Exams (EXAM)
  - i. There will be two learning assessments. 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 the option to submitting 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. Both the report and the code should be meticulously detailed, affording the instructor the means to faithfully replicate the analysis. Failure to submit necessary information to replicate the report and/or the use of plagiarized code will result the grade of zero and a report to the Honor Code System.

### **Evaluation**

Class assignments – 15 points for each assignment (24 CASA assignments)

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

Exams – 100 points (2 Exams)

Final Project – 140 points

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. The optional checkpoint for the final project will count as extra credit on this course.

### **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 integrity is an extremely serious matter. All students are expected to comply with University rules and regulations on academic integrity and honesty. Disciplinary sanctions may be imposed for violations of these rules and regulations. If you have questions or are unclear about

what constitutes academic misconduct on an assignment, please speak with me. I take the honor code very seriously in the course.

### ***Tentative Course Outline***

<b>Module 1: Fundamentals of programming for data analytics</b>	
Week #1	
08/29 - Session 0	Introduction to CIS 3330
08/31 - Session 1	Variables, statements, operators, and expressions
Week #2	
09/05 – Session 2	Basic data types (Integer, float, string) and data structures (lists, tuples)
09/07 – Session 3	Arithmetic and string basic operations
Week #3	
09/12 – Session 4	Conditional code execution (if, match, while)
09/14 – Session 5	Built-in, type conversion, math, and customized functions
Week #4	
09/19 – Session 6	Iteration code execution (for, while)
09/21 – Session 7	Read and write plain text and comma separated files
Week #5	
09/26 – Session 8	Read and write files using Pandas – Part 1
09/28 – Session 9	Read and write files using Pandas – Part 2
Week #6	
10/03 – Session 10	Data structures and analysis of algorithms (Big-O)
10/05 – Session 11	Search algorithms (linear, binary)
Week #7	
10/10 – Session 12	Sorting algorithms (bubble, selection)
10/12 – Session 13	Sorting algorithms with recursion (bubble, merge)
<b>Module 2: Fundamentals of statistics and programing for data analytics</b>	
Week #8	
10/17 – Session 14	Exam 1 - Review
10/19 – Session 15	Introduction to data analytics
Week #9	
10/24 – Session 16	Statistical foundations review (descriptive statistics and data sampling)
10/26 – Session 17	Statistical foundations review (data distributions and data scaling)
Week #10	
10/31 – Session 18	Quantifying relationships (covariance and correlations)
11/02 – Session 19	Exploratory data analysis
Week #11	
11/07 – Session 20	Introduction to machine learning (concepts)
11/09 – Session 21	Introduction to machine learning (applications)
Week #12	
11/14 – Session 22	Exam 2 - Review
11/16 – Session 23	Data analysis of textual data

<b>Module 3: Analytical tools and applications</b>	
Week #13	
11/21 – Session 24	Data retrieval and analysis using web parsing techniques
11/23 – Session 25	Thanksgiving break
Week #14	
11/28 – Session 26	Data retrieval and analysis using application programming interfaces
11/30 – Session 27	Storytelling on data analytics projects
Week #15	
12/05 – Session 28	Data visualizations
12/07 – Session 29	Final Project – Review Day
Final Project	Submission due 12/12 11:00 PM

**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.