

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, Spring 2024

Class Hours: Mondays and Wednesdays 10:30 - 11:50 AM at CoBA 320
Office Hours: Mondays and Wednesdays 1:00 - 3:00 PM (or by appointment)

Course Description

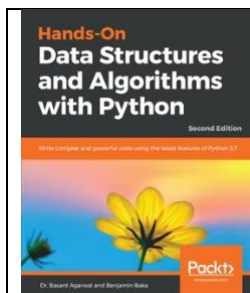
This course is designed to teach students the fundamentals of programming, data structures, algorithmic analysis, and business problem solving. Students will learn programming concepts and analytical tools for solving business problems using Python. The course will cover practical examples of how to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

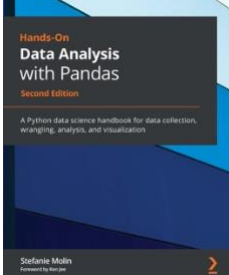
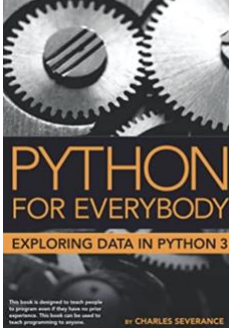
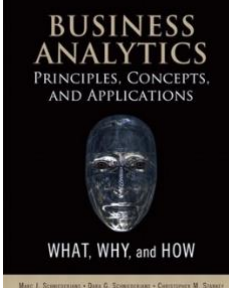
Required books



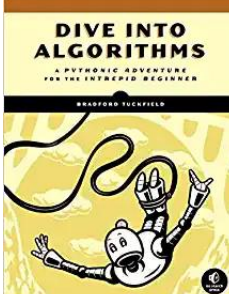

Agarwal, B., & Baka, B. (2018). Hands-On Data Structures and Algorithms with Python (2nd edition). Packt Publishing.

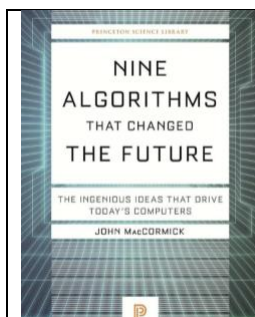
Available for free at UTEP library

https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022950344607051

	<p>Molin, S., & 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 https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_proquest_ebookcentral_EBC6579305</p>
	<p>Severance, Charles R. Python for everybody. Charles Severance, 2009. Available for free at the author's website. https://www.py4e.com/book</p>
	<p>Schniederjans, M., Schniederjans, D., & Starkey, C. (2014). Business Analytics Principles, Concepts, and Applications: What, Why, and How. Pearson Education, Limited. Available for free at UTEP library https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/1q3tr5t/cdi_askewsholts_vlebooks_9780133552249</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 https://utep.primo.exlibrisgroup.com/permalink/01UTEP_INST/uk4am/alma991022923858107051</p>
	<p>Aziz, A., Lee, T. H., & 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

Required software

 python	Python 3.0 or greater. https://www.python.org/
	Visual Studio Code. https://code.visualstudio.com/
	Git. https://git-scm.com/book/en/v2/Getting-Started-Installing-Git
	GitHub Desktop. https://desktop.github.com/

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 for 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. 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.
 - 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 on 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 faithfully 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 (24 CASA assignments)

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

Exams – 100 points (2 Exams)

Final Project – 140 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, 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.

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

Module 1: Fundamentals of programming for data analytics	
Week #1	
01/17 - Session 0	Introduction to CIS 3330
Week #2	
01/22 - Session 1	Variables, statements, operators, and expressions
01/24 - Session 2	Basic data types, data structures, and conditional statements
Week #3	
01/29 – Session 3	Arithmetic and string basic operations
01/31 – Session 4	Conditional code execution
Week #4	
02/05 – Session 5	Built-in, type conversion, math, and customized functions
02/07 – Session 6	Read and write plain text and comma separated files
Week #5	
02/12 – Session 7	Read and write files using Pandas – Part 1
02/14 – Session 8	Read and write files using Pandas – Part 2
Week #6	
02/19 – Session 9	Data structures and analysis of algorithms (Big-O) – Part 1
02/21 – Session 10	Data structures and analysis of algorithms (Big-O) – Part 2
Week #7	
02/26 – Session 11	Search algorithms
02/28 – Session 12	Sorting algorithms

Module 2: Fundamentals of statistics and programing for data analytics	
Week #8	
03/04 – Session 13	Exam 1 - Review
03/06 – Session 14	Introduction to data analytics
Week #9	
03/11 – Session 15	Spring Break
03/13 – Session 16	Spring Break
Week #10	
03/18 – Session 17	Statistical foundations review (descriptive statistics and data sampling)
03/20 – Session 18	Statistical foundations review (data distributions and data scaling)
Week #11	
03/25 – Session 19	Quantifying relationships (covariance and correlations)
03/27 – Session 20	Exploratory data analysis
Week #12	
04/01 – Session 21	Introduction to machine learning (concepts)
04/03 – Session 22	Introduction to machine learning (applications)
Week #13	
04/08 – Session 23	Data analysis of textual data
04/10 – Session 24	Final Project Proposal - Presentations
Module 3: Analytical tools and applications	
Week #14	
04/15 – Session 25	Exam 2 - Review
04/17 – Session 26	Storytelling on data analytics projects
Week #15	
04/22 – Session 25	Data retrieval and analysis using web parsing techniques
04/24 – Session 26	Data retrieval and analysis using application programming interfaces
Week #16	
04/29 – Session 27	Ethical use of analytical tools and applications
05/01 – Session 28	Final Project – Review Day
Final Project	Submission due 05/10 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.