Syllabus for DSI-5070

Programming 2: Python

COURSE DESCRIPTION

In this online course, "Python for Analytics," you'll learn everything you need to get you started using Python for data analysis. We'll review basic Python skills and data structures, move on to how to load data from different sources, rearrange and aggregate it, and finally how to analyze and visualize it to create high-quality products.

About Python: Python is a general-purpose programming language that's powerful, easy to learn, and fast to code. It has a mature and growing ecosystem of open-source tools for mathematics and data analysis, and it is rapidly becoming the language of choice for scientists and researchers of all stripes. Python code can be written like a traditional program to execute an entire series of instructions at once; it can also be executed line by line or block by block, making it perfect for working with data interactively.

COURSE TOPICS

- Getting started with Python
- Data handling and strings
- Python and pandas
- Visualization

COURSE OBJECTIVES

After completing this course, you should be able to:

CO1 Understand basic concepts in computer programming via Python: file formats, basic Python syntax, using text editors to write code, reading in files, using symbols and assignments, and iterating simple loops.

CO2 Be able to install Python; construct conditional statements and loops; work with strings, lists, and dictionaries (in addition to variables); read and write data; use Pandas for data analysis; group, aggregate, merge, and join; handle time series and data frames; use matplotlib for visualization and to create format and output figures.

COURSE MATERIALS

You will need the following materials to complete your coursework. Some course materials may be free, open source, or available from other providers. You can access free or open-source materials by clicking the links provided below or in the module details documents. To purchase course materials, please visit the University's textbook supplier.

Required Textbooks and Software

- No text is required; all materials will be provided online.

A suggested textbook for reference is

- McKinney, W. (2022). *Python for data analysis: Data wrangling with pandas, NumPy, and Jupyter (3rd ed.)*. O'Reilly Media, Inc.
  ISBN-13: 978-1098104030

You must have a copy of Python for the course. Visit the Python Project page for a link to information on obtaining a free copy, including installation instructions.

- Installation will be covered in the first module of the course. You should try installing Python as soon as you can, so that any issues you encounter can be addressed early.

COURSE STRUCTURE

Programming 2: Python is a three-credit, online course consisting of six modules. Modules include an overview, topics, learning objectives, study materials, and activities. Module titles are listed below.

- **Module 1: Welcome and Introductions**
  Install Python; initial reading assignment; review final project

- **Module 2: Getting Started with Python**
  Using the Jupyter notebook; Python basics: variables, conditionals, loops; data structures: lists and dictionaries

- **Module 3: Data Handling and Strings**
  Reading data into memory; working with strings; catching exceptions to deal with bad data; writing the data back out again

- **Module 4: Python and Pandas**
  Using Pandas; the Python data analysis library; series and data frames; grouping, aggregating,

and applying; merging and joining

- **Module 5: Visualization**
  Matplotlib; figures and subplots; labeling and arranging figures; outputting graphics

- **Module 6: Final Project**
  Work on the final project; submit draft; incorporate feedback

ASSESSMENT METHODS

For your formal work in the course, you are required to participate in online discussion forums, complete written assignments, and complete a final project. See below for details.

Consult the Course Calendar for due dates.

Promoting Originality

One or more of your course activities may utilize a tool designed to promote original work and evaluate your submissions for plagiarism. More information about this tool is available in this document.

💬 *Discussion Forums*

In addition to an ungraded Introductions Forum, you are required to participate in **four** graded online class discussions.

Communication with your mentor and among fellow students is a critical component of online learning. Participation in online class discussions involves two distinct activities: an initial response to a discussion question and at least two subsequent comments on classmates' responses.

All of these responses must be substantial. Meaningful participation is relevant to the content, adds value, and advances the discussion. Comments such as "I agree" and "ditto" are not considered value-adding participation. Therefore, when you agree or disagree with a classmate or your mentor, state *and support* your position.

You will be evaluated on the quality and quantity of your participation, including your use of relevant course information to support your point of view, and your awareness of and responses to the postings of your classmates. Remember, these are discussions: responses and comments should be properly proofread and edited, mature, and respectful.

📋 *Assignments*

You are required to complete **four** assignments. The written assignments are on a variety of topics associated with the course modules.

📋 *Final Project*

You are required to complete a final project that incorporates concepts and skills from throughout the course. There will be several weeks leading up to the submission of the final project where you are expected to work on the project and receive feedback from your mentor.

Part 1: Assemble Data and Strategy

Assemble the data needed to work on the project, formulate a strategy for completing the project, make sure you understand the questions, and address questions to your mentor. The last point is essential—even if you think you understand exactly how you are to proceed, you need to outline your strategy with your mentor.

Part 2: Initial Draft

Prepare an initial submission with your analysis that is substantially complete. You may raise additional questions with your mentor at this point to seek guidance. You must in any case share your work with your mentor.

Part 3: Final Submission

Incorporate guidance and complete final submission. Taking the guidance from your mentor into account, prepare and submit your final submission.

GRADING AND EVALUATION

Your grade in the course will be determined as follows:

- **Discussion forums (4)**—10%
- **Assignments (4)**—40%
- **Final project**—50%
    - Part 1: Assemble Data and Strategy—10%
    - Part 2: Initial Draft—10%
    - Part 3: Final Submission—30%

All activities will receive a numerical grade of 0–100. You will receive a score of 0 for any work not submitted. Your final grade in the course will be a letter grade. Letter grade equivalents for numerical grades are as follows:

A	= 93–100	B	= 83–87
A–	= 90–92	C	= 73–82
B+	= 88–89	F	= Below 73

To receive credit for the course, you must earn a letter grade of C or higher on the weighted average of all assigned course work (e.g., assignments, discussion postings, projects). Graduate students must maintain a B average overall to remain in good academic standing.

STRATEGIES FOR SUCCESS

First Steps to Success

To succeed in this course, take the following first steps:

- Read carefully the entire Syllabus, making sure that all aspects of the course are clear to you and that you have all the materials required for the course.
- Take time to read the entire Online Student Handbook. The Handbook answers many questions about how to proceed through the course, and how to get the most from your educational experience at Thomas Edison State University.
- Familiarize yourself with the learning management systems environment—how to navigate it and what the various course areas contain. If you know what to expect as you navigate the course, you can better pace yourself and complete the work on time.
- If you are not familiar with web-based learning be sure to review the processes for posting responses online and submitting assignments before class begins.

Study Tips

Consider the following study tips for success:

- To stay on track throughout the course, begin each week by consulting the Course Calendar. The Course Calendar provides an overview of the course and indicates due dates for submitting assignments, posting discussions, and scheduling and taking examinations.
- Check Announcements regularly for new course information.

Using AI Ethically: A Guide for TESU Students

TESU's Academic Code of Conduct permits student AI use in support of their writing and research process--not as a replacement for original writing. Document AI use with an acknowledgment statement at the end of each assignment, noting the tools and prompts used. Cite any AI-generated content on the References page. Please review Using AI Ethically: A Guide for TESU Students for more detailed information.

COMMITMENT TO DIVERSITY, EQUITY, AND INCLUSION

Thomas Edison State University recognizes, values, and relies upon the diversity of our community. We strive to provide equitable, inclusive learning experiences that embrace our students' backgrounds, identities, experiences, abilities, and expertise.

ACCESSIBILITY AND ACCOMMODATIONS

Thomas Edison State University adheres to the Americans with Disabilities Act (ADA, 1990; ADAAA, 2008) and Section 504 of the Rehabilitation Act of 1973. The Office of Student Accessibility Services (OSAS) oversees requests for academic accommodations related to disabilities; a student who is pregnant, postpartum, or a student parenting a newborn who is not the birth parent [as covered under NJSA18A]; and students requesting academic accommodation for a short-term/temporary illness and/or injury. Information can be found on the Office of Student Accessibility Services webpage and questions can be sent to ADA@tesu.edu.

ACADEMIC POLICIES

To ensure success in all your academic endeavors and coursework at Thomas Edison State University, familiarize yourself with all administrative and academic policies including those related to academic integrity, course late submissions, course extensions, and grading policies.

For more, see:

- University-wide policies
- Undergraduate academic policies
- Undergraduate course policies
- Graduate academic policies
- Graduate course policies
- Nursing student policies
- Nursing graduate student policies
- International student policies
- Academic code of conduct