

I. Course Information:

Title: Statistical Computing

Course #: BANA 6043

Credit Hours: 2

Term: Fall 2022 (2nd half)

Prerequisites: N/A

II. Course Description:

Welcome to ***Statistical Computing with Python!*** This course provides an intensive, hands-on introduction to statistical computing and data science with the Python programming language. You will gain foundational skills in managing data structures, performing data wrangling, computing, and visualizing statistical relationships, managing various environments conducive for statistical analysis, and performing machine learning modeling. Most importantly, since this course only has time to introduce foundational skills, much emphasis is placed on giving you a mental model of Python's data science ecosystem, so you know how, when, and where to continue advancing your statistical computing capabilities.

III. Student Learning Outcomes:

This course will guide you through the statistical computing and data science process along with give you a solid foundation of the basics of working with data in Python. My goal is to teach you how to easily analyze your data so you can spend more time focused on understanding the context of your statistical computing results. Upon successfully completing this course, you will:

- Have a mental model of the Python data science ecosystem: libraries, capabilities, vocabulary, and widely-available Python resources.
- Have the ability to use Python within both interactive (Jupyter, REPL) and non-interactive (scripts) environments.
- Be able to perform core data wrangling activities: importing data, reshaping data, transforming data, and exporting data.
- Be able to compute descriptive statistics and visualize key patterns and relationships with your data.
- Be exposed to modeling via scikit-learn and discuss the fundamentals of building models in Python.
- Have the resources and understanding to continue advancing your statistical computing capabilities.

...all with Python!

IV. Instructor Information:

Name: Dr. Brad Boehmke

Title: Assistant Professor - Educator

Office Information: Linder Hall 3412B

Email: boehmkbc@ucmail.uc.edu

Office Hours: By appointment (Via Zoom)

Communication Policy: Students are encouraged to contact me anytime via email or phone. A response will be given within 36-48 hours except on weekends.

V. Course Materials

The bulk of the classroom material will be provided via this [free online book](#), the recorded lectures, and any additional resources provided via Canvas. In some cases, there may be additional recommended readings, all of which are readily available online.

VI. Commitment to Inclusion

The University of Cincinnati embraces diversity and inclusion as core values that empower individuals to transform their lives and achieve their highest potential. Our university recognizes a very broad and inclusive concept of diversity that includes commonly recognized considerations such as race, ethnicity, gender, age, disability status, socioeconomic status, gender identity and expression, sexual identity, sexual orientation, religion, and regional or national origin. Diversity in all forms is something we, at the University of Cincinnati, welcome, foster, and prize. Honest attempts to understand the perspectives of others facilitates learning and we will always strive to achieve this goal.

As your instructor, I am committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If there are aspects of the design, instruction, and/or experiences within this course that result in barriers to your inclusion, participation, or the accurate assessment of your performance and achievement, please let me know.

V. Link to Pace:



This course aligns with PACE, the Lindner College of Business platform for developing the *total* business professional.

P – Professionalism

- Enhance oral & written **communication**, express ideas clearly, logically and persuasively.
- Develop and practice **teamwork** skills through group projects and exercises.
- Practice professional habits of punctuality, preparation, respect and participation.

A – Academics

- Develop foundational knowledge of core ***business functions*** and their interactions within firms.
- Begin applying functional and cross-functional knowledge ***to critically analyze business problems***; for example applying techniques for business plan development.

C – Character

- Learn and apply ***leadership*** techniques for project management (plan, brief, execute, debrief).
- Build an understanding and initial skills of ***managing diversity***, including understanding cultural differences, and challenges and opportunities of global business.
- Understand importance of ***ethics and social responsibility*** in business and personal settings.

E – Engagement

- Build understanding of importance and practices of ***networking*** through interactions with business professionals and guest speakers.
- Develop awareness and appreciation of ***involvement*** in social organizations, community service, and professional group opportunities.

VI. Instructional Methods:

This course utilizes the Canvas learning management system to provide student-centered online learning that will enhance the teaching and learning process. You can access Canvas by going to the [Canopy home page](#) and clicking on the Canvas login button. You will be automatically enrolled in a Canvas 101 course that will introduce you to the basics of how to use Canvas – you’ll see that course when you log in.

VII. Duo Multi-Factor Authentication

To reduce data security risks posed by phishing to students, faculty, and staff, the University implemented two-factor authentication (Duo) across most of its systems, including Canvas. In order to access this class’s course materials in Canvas, all students will need to enroll in Duo multi-factor authentication. [To enroll in Duo multi-factor authentication, please follow these instructions.](#) The Office of Information Security recommends using the Duo Mobile app on your smartphone for the quickest, most user-friendly experience. [Please see the FAQ on this page for a list of alternate options for accessing Duo that do not involve needing a smartphone.](#)

If you do not have access to your phone or other two-factor device, please contact the Lindner IT Service Desk at (513) 556-7159 to obtain a bypass code that will let you log in to Canvas. This code will allow you to log in once.

VIII. Course Communication:

University policy requires that the email set up in Canvas is the primary means of communication. It is advisable that you use your UC email for this purpose and that you check it often. If you choose to change your email in Canvas to a non-UC email it is your responsibility to ensure you check it frequently.

IX. Course and Grading Policies:

Course Structure:

Changes to the syllabus, due dates, course requirements or grading requirements will be made as far in advance as possible. Due dates will be clearly marked in Canvas. All assignments will be submitted via Canvas. When completing discussion board assignments please make sure to abide by the rules of netiquette which are posted under Student Resources in your Canvas site.

Academic Integrity:

As with all Lindner College of Business efforts, in this course you will be held to the highest ethical standards, critical to building character. Ensuring your integrity is vital and ultimately is your responsibility. To help ensure the alignments of incentives, the Lindner College of Business has implemented a “Two Strikes Policy” regarding Academic Integrity that supplements the [UC Student Code of Conduct](#).

- All academic programs at the Lindner College of Business use this “Two Strikes Policy”; Any student who has been found responsible for two cases of academic misconduct may be dismissed from the College.
- All cases of academic misconduct (e.g., copying other students assignments, failure to adequately cite or reference, cheating, plagiarism, falsification, etc.) will be formally reported by faculty; and
- Students will be afforded due process for allegations as outlined in the policy.
**Note to Faculty Member: Please include your proposed sanctions for academic misconduct in your course syllabus.*

Special Needs Policy:

The University of Cincinnati is committed to providing all students with equal access to learning opportunities. [Accessibility Resources](#) is the official campus office that works to arrange for reasonable accommodations for students with identified physical, psychological, or cognitive disability (learning, ADD/ADHD, psychological, visual, hearing, physical, cognitive, medical condition, etc.). If you have a disability which may influence your performance in this course, you must meet with the [Accessibility Resources Office](#) to arrange for reasonable accommodations to ensure an equitable opportunity to meet all the requirements of this course. If you require accommodations due to disability, please contact Accessibility Resources at (513) 556-6823, Campus Location: 210 University Pavilion,

Counseling Services, Clifton Campus:

Students have access to counseling and mental health care through the [University Health Services](#) (UHS), which can provide both psychotherapy and psychiatric services. In addition, students can receive three free professional counseling sessions upon request through the [Counseling and Psychological Services](#) (CAPS). These sessions are not associated with student’s insurance coverage. Students are encouraged to seek assistance for anxiety, depression, trauma/assault, adjustment to college life, interpersonal/relational difficulty, sexuality, family conflict, grief and loss, disordered eating and body image, alcohol and substance abuse, anger management, identity development and issues related to diversity, concerns associated with sexual orientation and spirituality concerns, as well as any other issue or concern. After hours,

students may call UHS at (513) 556-2564 or CAPS Cares at (513) 556-0648. For urgent physician consultation after-hours students may call (513) 584-7777.

Title IX:

Title IX is a federal civil rights law that prohibits discrimination on the basis of a person's actual or perceived sex, gender, gender identity, gender expression, or sexual orientation. Title IX also addresses instances of sexual violence, dating or domestic violence, and stalking. If a student discloses a Title IX issue to me, I am required to forward that information to the Title IX Office. The Title IX Office will follow up with the student about how the University can take steps to address the impact on the student and the community. They will also inform the student of their rights and direct them to available resources. The priority is to make sure students are safe and successful here at the University of Cincinnati. Students are not required to talk to anyone in the Title IX Office. Students may also directly report any instances of sex or gender-based discrimination, harassment or violence to the Title IX office at (513) 556-3349. Students who wish to know more about their rights and resources on campus can consult the [Title IX website](#) or contact the Title IX office directly at (513) 556-3349.

[Reports may be filed](#) through the Title IX Office website.

Missed and/or late examinations, quizzes, and graded exercises:

Most graded activities for the course are available for the entire week that they are due so unless you will miss the entire week, there is little flexibility in making them up. However, for extenuating circumstances please contact the professor.

LCB Weather Related and Emergency Protocol:

When inclement weather threatens the safety of the University of Cincinnati community, the Senior Vice President for Administration and Finance may invoke University Rule [3361: 10-55-01](#) and declare an emergency closing. There will be an announcement posted on Canvas and if possible, on the local news channels (TV and radio). Communications related to University closures will also be sent to the student's cell phone number on record through the automatic University emergency text messaging system. Students should notify the University if they change their cell phone number to ensure they will receive these important emergency communications.

The Lindner College of Business will observe the university emergency closing protocol for all on-campus classes. During a university emergency closing, all college offices will be closed.

Students should clarify with their course instructors how the closure will affect assignments and deadlines, and whether class information from the missed session(s) will be posted on Canvas, and/or if the class will meet virtually during the closure.

In the event of inclement weather and the university is closed, the closure will not affect online courses. All course assignments and activities will remain as scheduled in the course syllabus.

Criteria for letter grades:

Your course grades will be based on your performance on the following:

Point Allocation:

Lesson quizzes	20%
Lab assignments	30%
Final project	40%
Engagement	10%
<u>Total</u>	<u>100%</u>

Grading Scale (example)

94% and above = A

90% = A-

87% = B+

83% = B

80% = B-

77% = C+

73% = C

70% = C-

60% = D

Below 60% = F

Description of Learning Activities

Lessons:

- For each lesson you will read and work through a book chapter/tutorial. Short videos will be sprinkled throughout the lessons to further discuss and reinforce lesson concepts. Each lesson will have various “TODO” exercises throughout, along with end-of-lesson exercises. I highly recommend you work through these exercises as they will prepare you for the quizzes, labs, and project work.

Quizzes:

- There will be a short quiz associated with each lesson. These quizzes will be hosted in the course website on Canvas and are designed to reinforce larger lesson concepts. Please check Canvas for due dates for these quizzes.

Labs:

- There will be a lab associated with each module. For these labs you will be guided through a case study step-by-step. The aim is to provide a detailed view on how to manage a variety of complex real-world data; how to convert real problems into data wrangling and analysis problems; and to apply Python to address these problems and extract insights from the data. These labs will be provided via the course website on Canvas and the submission of these labs will also be done through the course website on Canvas. Please check Canvas for due dates for these labs.

Final Project:

- The final project is designed for you to put to work the tools and knowledge that you gain throughout this course. You will be charged with analyzing a real-life data set to

solve a business problem and producing an analytic report along with presenting your findings. This provides you with multiple benefits.

X. Course Schedule:

See Canvas for more details on each module, readings, assignments, and due dates.

Module #:	Topic(s):	Readings, Lectures, & Other Materials	Assignments & Assessments	Due Dates
Module 1:	Starting with the Basics	See Canvas	See Canvas	See Canvas
Module 2:	Python Data Science Ecosystem & DataFrames	See Canvas	See Canvas	See Canvas
Module 3:	Data Wrangling Part 1	See Canvas	See Canvas	See Canvas
Module 4:	Data Wrangling Part 2	See Canvas	See Canvas	See Canvas
Module 5:	Data Visualization	See Canvas	See Canvas	See Canvas
Module 6:	Creating efficient code in Python	See Canvas	See Canvas	See Canvas
Module 7:	Intro to Machine Learning with Scikit-Learn	See Canvas	See Canvas	See Canvas