

INFO 3221 – 001-002
Programming for Business Analytics
Fall 2022

INSTRUCTOR: Dr. Sungjune Park

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OFFICE HOURS: Tue 4:30 pm – 5:30 pm (Center City),
Wed 3:00pm – 5:00pm (Main Campus or via Zoom), and
by appointment via Zoom

LOCATION: Friday 339

COURSE DESCRIPTION

INFO 3221. Programming for Business Analytics. (3) Prerequisites: INFO 2130 with a grade of C or above or permission of BISOM department. A study of fundamental programming constructs and concepts required for solving data analytics problems. Emphasizes the use of widely adopted industry platforms such as Python and R to extract, transform, and make use of business data.

LEARNING OBJECTIVES

“Business analytics” is a field which deals extensively with structured and unstructured data to build predictive models and visualizations to drive business decisions and actions. This class will focus on how to write code in R and Python to extract, modify and prepare the data for analyses and to perform simple data analyses. The class will emphasize hands-on learning. You should be prepared to write programming code and use programming logic to solve data-driven problems.

The specific learning objectives are as follows:

- Understand data representations in R and Python (data types and structures)
- Read a variety of data files in R and Python (data frames)
- Reformat and process data files in R and Python
- Subset, slice, and modify data files in R and Python (data wrangling)
- Create visualizations in R (ggplot2)
- Write programs and functions in R and Python

REQUIRED MATERIALS AND RESOURCES

Textbook: There are **no required textbooks** to purchase for this class. All required readings will be posted as documents or web links on Canvas. Since the best way to learn R and Python is through hands-on problem solving, the instructor will post

problem sets on various topics and these problems sets are considered part of your course materials.

Hardware: You are also expected to have a personal computer/laptop (<https://belkcollege.charlotte.edu/laptop-policy>) in order to work your practice problems and assignments while you are not in the lab. Your personal computer/laptop should be capable of installing and running R, R-Studio, and Anaconda.

Software: This class will use **R & R-Studio** for R and **Jupyter Notebook (or Jupyter Lab)** for Python. You are strongly encouraged to install these software packages on your personal machine.

Datacamp

For class preparations, you will be required to complete the whole or part of the chapters in selected R/Python courses in Datacamp (<https://www.datacamp.com/>), a free interactive learning platform for R, Python, and more. You are encouraged to take more courses or try more chapters even if they are not part of the class assignments.

Gradescope

We will be using Gradescope this term, which allows us to provide fast and accurate feedback on your work. Homework will be submitted through Gradescope, and homework and exam grades will be returned through Gradescope. As soon as grades are posted, you will be notified immediately so that you can log in and see your feedback. You may also submit regrade requests if you feel we have made a mistake. Note that Gradescope has a tool that **checks code similarity**, which can be used to detect academic integrity issues. When code similarity is high, you may not earn credit until you fully explain how your code works.

The Gradescope site can be accessed from the Canvas link, but you may directly access gradescope using your NinerNET credentials (<https://spaces.charlotte.edu/pages/viewpage.action?pagelid=139625320>)

GRADING

<i>Component</i>	<i>Points</i>
Exams (2)	200
Assignments	200
In-class assignments and quizzes	60
Class Participation/Attendance	40
Total	500

Final letter grades will be based on the following scale.

A: 450 and above, B: 400-449, C: 350-399, D: 300-349, F: 299 and below.

EXAMS

The exams mostly include problem solving with R and Python and will be administered in class with closed book and notes, but you are given access to R/Python documentations. Exams will be auto-graded with Gradescope, and all regrade requests should be submitted within 5 days of the posting of the exam grades (except for the optional final exam). No grade reviews or grade changes will be done beyond this 5-day period.

Makeup exams

In the event that a student anticipates missing an exam, she/he must provide appropriate supporting documents at least 24 hours before the exam to the instructor to request a make-up exam. The instructor will review all requests and authorize, at his discretion, eligible students to take makeup exams. A student who misses an exam without prior approval, possibly due to unexpected situation on the exam day, should contact the instructor within 12 hours of the exam start date/time and provide appropriate supporting documentation to be eligible for the makeup exam. It is the student's responsibility to be aware of and follow the make-up exam policies and no special accommodations will be made for any exceptions.

ASSIGNMENTS AND QUIZZES

Each student must develop his or her own solutions to the assigned homework. Although students are encouraged to work together by asking questions and answers on Piazza for homework assignments. A student must not use or copy (by any means) another's work (or portions of it) and represent it as his/her own. Such collaboration constitutes cheating and/or plagiarism.

Late homework submissions are strongly discouraged because class activities and new assignments build on previous assignments. In the case of a late submission on the same day, 20% of the points earned from the submission will be deducted. After the due date, the late homework may be accepted, but with a 50% penalty. Once the grade is posted or a week has passed after the due date, whichever comes first, you will receive a 0 for the late assignment.

WORKLOAD

Learning programming is not something that you can put off until the night before the exam, and the programming knowledge is built only by spending enough time with hands-on exercises. Put in as much time as necessary to get familiar with tools and programming skills in order to succeed in this class. I expect that you will spend **6 hours per week** on average outside of class time for assigned readings, assignments, discussions, and exam preparations.

The class materials and resources are given ahead of time for your active learning of R and Python. I will be using the class time mostly to fill in any gaps that may not be addressed with your self-paced learning with these resources. Class participation is thus very important and will be counted toward your grade.

ATTENDANCE AND CLASS PARTICIPATION

Students are expected to attend every class and remain in class for the duration of the session. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular class attendance is a student's obligation, as is a responsibility for all the work of class meetings, including tests and written tasks. Any unexcused absence or excessive tardiness will result in a loss of participation points.

CLASS DELIVERY METHOD

Students who enroll in face-to-face classes are expected to participate in person. Students who believe they need disability accommodations in their face-to-face classes should contact the Office of Disability Services at 704-687-0040 or disability@uncc.edu.

Only in extremely rare situations may a faculty member alter course delivery and only after they have provided appropriate justification that has been reviewed and approved by the dean. Faculty do not have the authority to make course format changes informally without consultation with their dean.

There will be **no live streaming or recordings** of classes unless the delivery format completely switches to online delivery mode.

To protect the privacy of other students, students are not permitted to make their own recordings of class sessions or to share or distribute University recordings of class sessions. Students with specific electronic recording accommodations authorized by the Office of Disability Services may record classes; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited. See University Policy 402, Student Education Records (FERPA).

CLASS CONDUCT

Disruptive behavior in class distracts from the ability of others to profit from their in-class experience. Such disruptive behavior includes arriving late, leaving early, cell-phone interruptions, checking e-mail, surfing the net during the class, spending class time working on assignments for other classes, side conversations between two or more students during lecture, unnecessary comments that add no value to class, and any activities that negatively impact the ability of other students to learn and/or listen in class. Such behavior will be considered rude and inappropriate and will not be tolerated.

I will take very seriously any distraction caused by violating the above policies. Any member of the class should feel free to let me know if any behavior of fellow student(s) is distracting her/his learning experience. Such complaints will be treated as confidential but will help me to take appropriate action to provide a positive learning environment in the class.

Since it is my responsibility to provide an environment that is conducive to learning for everyone in the class, **I will deduct all participation points from the grade of any student who chooses to repeatedly distract others or create other disruptions. In particularly egregious cases, I will have the student permanently removed from the class and deduct up to a maximum of 15% of the final grade. To attend or not to attend is your decision to make, but once you decide to attend my class, you should refrain from any disruptive behavior during the class.**

ACADEMIC INTEGRITY

THE UNC CHARLOTTE CODE OF STUDENT ACADEMIC INTEGRITY governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists the applicable penalties. The following is a list of prohibited conduct in that *Code* as violating these standards: A) Cheating; B) Fabrication and Falsification; C) Multiple Submission; D) Plagiarism; E) Abuse of Academic Materials; and F) Complicity in Academic Dishonesty. For more detail and clarification on these items and academic integrity, students are strongly advised to read the current "UNCC undergraduate and graduate catalog."

Ownership of Course Materials

The lectures and course materials provided by the instructor including presentations, tests, quizzes, exams, videos, outlines, and similar materials are protected by copyright. The instructor is the exclusive owner of copyright in those materials instructor creates. You are encouraged to take notes and make copies of course materials for your own educational use. However, you may not, nor you may knowingly allow others to reproduce or distribute course materials publicly without instructor's express written consent. This includes providing materials to commercial course material suppliers such as **CourseHero**, **Chegg**, etc. and other similar services as well as publicly posting to **GitHub**, **PasteBin**, **BitBucket**, or any other code sharing site. Students who publicly distribute or display or help others publicly distribute or display copies or modified copies of the instructor's materials may be in violation of [University Policy - 406, the Code of Student Responsibility](#).

More on Code Similarity

The algorithm for calculating code similarity is smart enough to ignore code that is similar across a majority of assignments and primarily detects similarities across a few

submissions. High code similarity may occur by accident due to shared lectures and classroom discussions. If it does, however, a significant portion of the class will have the same accident, which will not increase one's similarity score. In contrast, changing variable names, adding white spaces/new lines, and inserting/changing comments will increase one's similarity score and make the submission more suspicious.

INCOMPLETE GRADE POLICY

The incomplete is not based solely on a student's failure to complete work or as a means of raising his/her grade by doing additional work after the grade report time. An incomplete grade can be given when a student has a serious medical problem or other extenuating circumstance that legitimately prevents completion of required work by the due date. In any cases, the student's work to date should be passing, and the student should provide proper written proof (e.g., a doctor's note), in order to get an 'I' grade.

Title IX REPORTING EXPECTATIONS

UNC Charlotte is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC Charlotte has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with civil protective orders, and more.

Please be aware that all UNC Charlotte employees, including faculty members, are expected to relay any information or reports of sexual misconduct they receive to the Title IX Coordinator. This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I am expected to [report the information to the Title IX Coordinator](#). Although I am expected to report the situation, you will still have options about how your case will be handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

If you wish to speak to someone confidentially, you can contact the following on-campus resources, who are not required to report the incident to the Title IX Coordinator: (1) University Counseling Center (caps.charlotte.edu, 7-0311); or (2) Student Health Center (studenthealth.charlotte.edu, 7-7400). Additional information about your options is also available at civilrights.charlotte.edu under the "Students" tab.

DISABILITY ACCOMMODATIONS

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability

Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office in Fretwell 230.

COURSE SCHEDULE

The Instructor reserves the right to change the course contents and schedule. The up-to-date course schedule is available on **Canvas**. Important announcements, specific policies regarding exams, etc. are also available on Canvas. It is the student's responsibility to be aware of any changes in the course schedule, course contents, and course policies by visiting Canvas regularly.

The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Tentative Course Schedule

Class	Topic
8/23	Course Overview
8/25	Introduction to R, R-Studio and Software Setup
8/30,9/1, 9/6	Data Types and Data Representations in R
9/8	Reading Data from Files
9/13, 9/15	Data Selection and Slicing in R
9/20, 9/27, 9/29	Data Cleaning and Preparation in R
10/4	Data Visualization in R
10/6	R Recap
10/13	Exam 1
10/18	Introduction to Python, Jupyter and Software Setup
10/20	Python Variables and Data Structures (Scalar variables, Tuples, Lists, and Dictionaries)
10/25	Python Functions
10/27	Python NumPy Package
11/1	Python Pandas and Data Frames
11/3	Reading Data from Files
11/8, 11/10	Data Selection and Slicing in Python Pandas
11/15, 11/17, 11/22	Data Cleaning and Preparation in Python
11/29	Data Visualization in Python
12/1	Python Recap
12/6	Exam 2
12/13, 12/15	Optional Final Exam (can replace either Exam 1 or Exam 2) Section 001: Dec 15, 11am – 1:30pm Section 002: Dec 13, 2pm – 4:30pm