INFO 3221
Programming for Business Analytics
UNC Charlotte

Instructor: Dr. Reza Mousavi
Office: 353C Friday
Phone: 704-687-7621
Email: reza.mousavi@uncc.edu
Classroom: Friday 339

Office Hours: Wednesday 9:30 am-11:30 am and 12:30 pm to 2:30 pm, any other time by appointment
Website: Canvas

Course Description

According to a recently published article about the best places to work, R and Python are among the most sought-after skills in today’s job market.\(^1\) Companies such as Alphabet (Google’s parent company), Facebook, Deloitte, Uber, and Apple have been looking for candidates equipped with R and Python programming skills. Nowadays, it is essential for those who seek a career path in business analytics and data science to be proficient in writing programs in R and Python. Hence, this course, as one of the essential courses in the business analytics major, is developed to teach the students how to use R and Python to work on typical analytical tasks.

This course will spend equal amount of time on R and Python programming languages. For each programming language, we learn about the environment of the software, data representations, data processing, visualizations, and data analysis. Throughout the semester, we cover many tutorials and work on a variety of data sets to learn and practice R and Python programming skills.

Learning Objectives

Upon completion of this course, students should be able to:

- 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 and Python (ggplot2 and matplotlib)
- Run statistical and machine learning analysis in R and Python (caret and scikit-learn)

Course Materials

There is no additional textbook for this course. The course materials will be shared by the instructor. Access to a personal computer outside of class time is required.

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\(^1\) Please read the full article here: [https://www.linkedin.com/pulse/top-companies-2019-where-us-wants-work-now-daniel-roth](https://www.linkedin.com/pulse/top-companies-2019-where-us-wants-work-now-daniel-roth)
Grading

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Participation</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Class Participation &amp; Attendance</td>
<td>Individual</td>
<td>5%</td>
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<tr>
<td>Individual Assignments (4×10%)</td>
<td>Individual</td>
<td>40%</td>
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<tr>
<td>Quizzes</td>
<td>Individual</td>
<td>15%</td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>Individual</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>Individual</td>
<td>20%</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100%</strong></td>
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Final letter grade will be calculated based on the following scale:

- **A**: 90 and above; **B**: 80-89.9; **C**: 70-79.9; **D**: 60-69.9; **E**: 59.9 and below.

The course grades are posted on Canvas for informational purposes only. The official overall grade is computed and kept in the instructor’s grade book.

Exams

Questions on the exams will be taken from the assigned readings of texts, class lectures, and assignments. If the answer to an exam question is disputed, the student should submit a written appeal, citing the source to the instructor. The instructor will take these appeals into account during grading.

Exams are a form of intellectual property belonging to those who create them. Consequently, exams must remain in my possession or under my control at all times. This means that exams may not be taken out of the room or copied. Students are encouraged to review their exams during office hours or by appointment. However, failure to return an exam after taking or reviewing it or removing an exam from my presence at any time or copying an exam will be considered theft of intellectual property. Such action will result in an exam grade of zero and may warrant further disciplinary action.

Missed Exams:

In the event that the excuse is approved before the exam date (requires documentation), the student will be given a make-up exam.

Assignments

The best way to become familiar with business analytics concepts is by using them. To aid in your learning there will be individual assignments in this class. These assignments will be submitted on
Canvas before midnight (Eastern time) on the due date. Each student is allowed to submit only one late assignment throughout the semester. The late assignment should be submitted on or before the day of the final exam. For all of the other late assignments, a penalty of 10% of the assignment value per day (including weekends) is applied.

You must complete each assignment on your own. Any sharing between students will be considered a violation of the Academic Integrity Code and will result in a grade of zero for the assignment with a possibility for further disciplinary action (per instructions provided by the BISOM department, Belk College of Business, or University of North Carolina-Charlotte).

All changes in assignments or schedules will be posted on Canvas. It is your responsibility to keep up with the changes that are posted on Canvas.

Class Policies

Attendance and Participation Policy:
Attendance and participation are required, and tardiness or early departure is disruptive and is, of course, discouraged. Students will be held responsible for any material covered, announcements made, assignments passed out, and any other type of work that they may miss during any absence from class. Up to 2 missed sessions will be allowed upon instructor’s approval in non-emergency cases.

Class Behavior Policy:
Inappropriate behavior distracts from the ability of others to profit from their in-class experience. Such behavior includes arriving late, leaving early, talking, surfing the net, and so on. Rude and inappropriate behavior will not be tolerated. Since it is my responsibility to provide an environment that is conducive to learning for everyone in the class, I will deduct points from the grade of any student who chooses to repeatedly distract others. In particularly egregious cases, I will have the student permanently removed from the class. Under no circumstances will students be permitted to spend their lab time working on assignments for other classes, checking e-mail, surfing the Web, or printing out homework. Attempts to engage in such behavior will be reflected in lower grades and may lead to removal from the course.

Electronic Devices in Class:
Use of cellular phones, pagers, music players, radios, and similar devices are prohibited in the classroom and laboratory facilities. Cellular phones MUST BE TURNED OFF DURING CLASS, except in cases of medical emergencies. Pagers must be set to vibrate, rather than beep. Calculators and computers are prohibited during examinations and quizzes, unless specified. Laptop-size computers may
be used in lecture for the purpose of taking notes. **Use of instant messaging, email, social media, or other types of communications during class time is prohibited.** Use of computing devices for purposes other than those required for the purposes of the class topic are prohibited. This includes use of laptops, lab computers, phones or other devices for Internet browsing, game playing, reading news, texting, chatting, and other activities not required for the class.

**Grade Appeals Policy:**
If you believe that the grade you received on an assignment or an exam was in error or unfair, you can appeal to the professor **in writing within 7 calendar days after the grades are posted.** The appeal should clearly state the reasons why you believe the grade to be unfair or the nature of the error. Overdue appeals will not be considered.

**Academic Integrity:**
As a program that helps to create business and government leaders, the College of Business has an obligation to ensure academic integrity is of the highest standards. Standards of academic integrity will be enforced in this course. University regulations will be strictly enforced in all cases of academic irregularities, cheating or plagiarism or any variations thereof. Students assume full responsibility for the content and integrity of the academic work they submit. The guiding principle of academic integrity shall be that a student's submitted work, examinations, reports, and projects must be his/her own work.

All UNCC students have the responsibility to be familiar with and to observe the requirements of The **UNCC Code of Student Academic Integrity** (see the Catalog and also [http://integrity.uncc.edu/](http://integrity.uncc.edu/)). This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism of written materials and software projects, abuse of academic materials (such as library books on reserve), and **complicity in academic dishonesty** (helping others to violate the code). Additional examples of violation of the Code include:

- Representing the work of others as your own.
- Using or obtaining unauthorized assistance in any academic work.
- Giving unauthorized assistance to other students.
- Modifying, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit.
- Misrepresenting the content of submitted work.

Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them. For this course, it is permissible to assist classmates in general discussions about the homework. General advice and interaction are encouraged. Each person, however, must develop his or her own solutions to the assigned homework and laboratory exercises.
Students may not "work together" on graded assignments. Such collaboration constitutes cheating, unless it is a group assignment. A student may not use or copy (by any means) another's work (or portions of it) and represent it as his/her own. If you need help on an assignment, contact your instructor or the TA, not other classmates. Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course.

Students who violate the code can be punished to the extent of being permanently expelled from UNCC and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you are unclear about whether a particular situation may constitute an honor code violation, you should meet me to discuss the situation. Feel free to discuss the definition of cheating and/or plagiarism with me if you are unclear on these terms or have questions about the acceptability of a particular type of action. The instructor may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

**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 at Fretwell 230.

**Diversity:**
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.

**Incomplete Grade Policy:**
Receiving a grade of incomplete ("I") 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 only 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 case, for a student to receive an 'I' grade, the student's work to date should be passing, he/she must have completed a
significant portion of the course, and the student must provide proper written proof (e.g., a doctor's note) of the extenuating circumstances.

**Course Changes Policy:**
The instructor reserves the right to make any necessary changes to the course content, schedule, and policies. Changes will be announced in class and will also be posted online.

**Religious Accommodation for Students Policy:**
The instructor will observe University Policy 409 (https://legal.uncc.edu/policies/up-409) on matters of religious accommodation. Please note that the procedure prescribed by this policy requires a notice to the instructor prior to the census date of the semester (typically the tenth day of instruction).
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<thead>
<tr>
<th>Class</th>
<th>Topic</th>
<th>Relevant Materials</th>
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<tr>
<td>Day 1</td>
<td>Course Overview</td>
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<tr>
<td>Day 2</td>
<td>Introduction to R, R-Studio and Software Setup</td>
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<td>Day 3</td>
<td>Data Representations in R (Vectors, Strings, Factors, &amp; Data Frames)</td>
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<td>Day 4</td>
<td>Reading Data from Files</td>
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<td>Days 5,6</td>
<td>Data Selection and Slicing in R</td>
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<td>Days 7,8,9</td>
<td>Data Cleaning and Preparation in R</td>
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<td>Days 10,11</td>
<td>Data Visualization in R</td>
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<td>Day 12</td>
<td>R Recap</td>
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<td>Day 13</td>
<td>Midterm Exam</td>
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<tr>
<td>Day 14</td>
<td>Introduction to Python, Jupyter and Software Setup</td>
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<td>Day 15</td>
<td>Python Variables and Data Structures (Scalar variables, Tuples, Lists, and Dictionaries)</td>
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<td>Day 16</td>
<td>Python Functions</td>
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<td>Day 17</td>
<td>Python NumPy Package</td>
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<td>Day 18</td>
<td>Python Pandas and Data Frames</td>
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<tr>
<td>Day 19</td>
<td>Reading Data from Files</td>
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<tr>
<td>Days 20,21</td>
<td>Data Selection and Slicing in Python pandas</td>
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<td>Days 22,23</td>
<td>Data Cleaning and Preparation in Python</td>
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<td>Day 24</td>
<td>Data Visualization in Python</td>
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<tr>
<td>Day 25</td>
<td>Final Exam</td>
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Tentative Class Schedule

*** This tentative schedule is subject to change ***