Instructor: Dr. Xue Guo  
Office: 353C Friday  
Phone: 704-687-7621  
Email: xguo9@uncc.edu  
Class Hours: Tuesday 5:30-8:15 pm

Classroom: Zoom/Center City 601  
Office Hours: Tuesday 1:00-3:00 PM (online), or by appointment  
Website: Canvas

Course Description
This course is designed to help students apply business analytics techniques to explore and analyze various types of data, so they can find subtle and non-trivial relationships that are understandable, useful, and executable to business owners. Managers in various functional areas can exploit valuable insights gained via fact-based decision-making to achieve competitive advantages. This course uses a case approach and R is the main analytical tool.

Specific topics covered in this course include  
1. Predictive modeling (e.g., decision trees, neural network, SVM, random forest),  
2. Model Evaluation,  
3. Dimension reduction and feature selection,  
4. Survival analyses,  
5. Text analytics,  
6. Time series analysis & forecasting,  
7. Advanced clustering methods

We will have a case-based approach throughout the semester. The materials including power point presentations, cases, articles, and other readings will be uploaded to Canvas or shared in class by the instructor.

Learning Objectives
This course aims at business managers, information professionals, data analysts, as well as general audience who are interested in applying data analytics techniques to discover non-trivial relationships and to summarize data in novel ways that are understandable, useful, and executable to business owners.

This course will examine principles, ideas, and data analytics tools underlying the current practice of data mining. Specifically, students will understand basics of predictive modeling, experimentation, survival analyses, text mining, forecasting, and social network analytics. By understanding business analytics at the practical and non-highly-mathematical level, students will be able to translate information into decisions and convert information about past performance
into reliable forecasts.

This course will develop understanding of practical applicability of analytics methods in a variety of business scenarios. This course will not just describe/explain the end results, but also discuss the process of formulating/refining business objectives, data selection, data preparation, model selection and evaluation that lead to the results. The students will learn how to formulate analytic tasks in support of business objectives, how to define successful projects, and how to evaluate utility of existing and potential applications of discussed technologies in practice.

This course includes lectures, seminar style discussion, and lab work. This course will use statistical software R for hands-on experimentation with various analytics techniques.

**Course Materials**

Handouts, power-point slides, assignments, and additional helpful resources will be posted on Canvas.

Software: R/R Studio

Recommended references:

- If you are not familiar with R, please refer to *R for Data Science*, by Garrett Grolemund and Hadley Wickham. Freely available at [https://r4ds.had.co.nz/](https://r4ds.had.co.nz/).
- *An Introduction to Statistical Learning with Applications in R*, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. Freely available at: [http://faculty.marshall.usc.edu/gareth-james/ISL/](http://faculty.marshall.usc.edu/gareth-james/ISL/)

**Grading**

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Two exams (2 @ 25%)</td>
<td>50%</td>
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<tr>
<td>Group project</td>
<td>25%</td>
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<tr>
<td>Assignments (4 @ 5%)</td>
<td>20%</td>
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<tr>
<td>Participation (5%)</td>
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<tr>
<td><strong>Total</strong></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. **Unlike previous semesters, there are no planned grading exceptions due to COVID-19.**
Exams
Exams are open book and notes. 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 (a rare case and requires documentation), the student will be given a make-up exam.

Assignments
Students need to complete four individual assignments during the course of the semester. These assignments will be submitted on Canvas before 11:59PM on the due date. Assignments submitted after the due date will be considered late. A penalty of 20% of the assignment value per day (including weekends) is assessed on late assignments beginning on the due date.

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 at a minimum in a grade of zero for the assignment with a possibility for further disciplinary action.

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.

Group Project
Students will form a group of 4-5 members to complete a business analytics project. Details will be made available via Canvas. If possible, all teams should be comprised of students from different disciplines/backgrounds, so please keep this in mind when selecting your team members. I reserve the right to arrange/rearrange team assignments.

If a group member does not contribute, the rest of the members may, after a consensus agreement, ask him/her to leave the group and notify the instructor. The maximum project grade for students not belonging to a group will be 80. If necessary, peer reviews will be factored into the grade.

Class Policies
Attendance and Participation Policy
5% of the final grade is allocated to case reading discussions and class attendance. The students are required to read the case studies before the class and are highly encouraged to contribute to the case discussions in class. Other contributions to the class, including sharing personal experiences related to data science and business analytics, managerial insights, theoretical opinions, ... are all desirable as well. 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 nonemergency cases.

Laptop Requirement
Students are required to have their own personal laptop computer. The policy and the minimum system requirements are found at the link https://belkcollege.uncc.edu/laptop-policy. In particular, students in DSBA/MBAD 6211 must have working webcam and microphone, and install R in their laptop.

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 or other communication technologies 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, IM 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/). 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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**COVID-19 Related Information**

**Niner Nation Cares**
All students must follow the updates and instructions related to Springl semester reopening posted on http://ninernationcares.uncc.edu. For your own health and safety and that of your
friends and families, make sure to adhere to the health and safety guidelines posted on the above links. Please do not treat these guidelines lightly.

Absences Related to COVID-19

Do not come to class if you are sick: Please protect your health and the health of others by staying home. Contact your healthcare provider if you believe you are ill.

If you are sick: If you test positive or are evaluated by a healthcare provider for symptoms of COVID-19, complete this form to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.

If you have been exposed to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, complete this form to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.

To return to class after being absent due to a COVID-19 diagnosis or due to a period of self-quarantine, students should submit an online request form to Student Assistance and Support Services (SASS). Supporting documentation can be attached directly to the request form and should be from a student's health care provider or the Student Health Center, clearly indicating the dates of absences and the date the student is able to return to class. Instructors will be notified of such absences.

If you are absent from class as a result of a COVID-19 diagnosis or quarantine, please notify your instructor immediately and seek instructions to help you continue to make progress in the course. The specific instructions for this situation will be provided on a case-by-case basis. The final decision for approval of all absences and missed work is determined by the instructor.

Belk College statement on diversity
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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 (counselingcenter.uncc.edu, 7-0311); or (2) Student Health Center (studenthealth.uncc.edu, 7-7400). Additional information about your options is also available at titleix.uncc.edu under the “Students” tab.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy and the policy on Responsible Use of University Computing and Electronic Communication Resources. Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

**University’s statement on 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.
# Tentative Class Schedule

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

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Due Dates</th>
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| Week 1| Jan 11 (Zoom) | • Course Introduction  
       | • Overview of Business Analytics  
       | • Brief Software Recap |                                |
| Week 2| Jan 18 (Zoom) | • Predictive Modeling—Logistic Regression and Model Evaluation | Group formation due |
| Week 3| Jan 25 | • Predictive Modeling—Trees and Neural Net |                                |
| Week 4| Feb 1 | • Predictive Modeling—Trees and Neural Net  
       | • Advanced Predictive Modeling—SVM and Ensemble methods | Project topic due |
| Week 5| Feb 8 | • Advanced Predictive Modeling—SVM and Ensemble methods | Assignment 1 due |
| Week 6| Feb 15 | • Dimension Reduction  
       | • Experimentation in Data Science | Assignment 2 due |
| Week 7| Feb 22 | • Phase 1 Group Project | Phase 1 Group Project |
| Week 8| Mar 1 | • Midterm Exam |                                |
| Week 9| Mar 8 | • Spring Break – No Class |                                |
| Week 10| Mar 15 | • Survival Analysis |                                |
| Week 11| Mar 22 | • Text Mining |                                |
| Week 12| Mar 29 | • Text Mining |                                |
| Week 13| Apr 5 | • Text Mining  
       | • Forecasting |                                |
| Week 14| Apr 12 | • Forecasting | Assignment 3 due |
| Week 15| Apr 19 | • Forecasting |                                |
| Week 16| Apr 26 | • Clustering Analysis | Assignment 4 due |
| Week 17| May 3 | • Final Group Presentation |                                |
| TBD  |      | • Final Exam |                                |