

**DSBA/MBAD 6211 U01**  
**Advanced Business Analytics**  
**UNC Charlotte**  
**Spring 2017**

**Instructor:** Dr. Reza Mousavi  
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**Class Hours:** Monday 12:30-3:15 pm

**Classroom:** Center City 801  
**Office Hours:** Tuesday 12:00-2:00 pm in my office, right before class in Center City, or by appointment  
**Website:** Canvas

**Course Description**

This course is designed to help students apply advanced business analytics techniques to explore and analyze various types of data. Furthermore, the course will help the students to determine which data science techniques will be appropriate in solving a variety of problems and to be able to compare those techniques to determine the best solution.

Specific topics covered in this course include:

- 1- Advanced classification methods such as neural networks, random forest, gradient boosting machines
- 2- Model evaluation
- 3- Text analytics including text processing, sentiment analysis, and topic modeling
- 4- Big data and parallel processing
- 5- Clustering methods
- 6- Statistical methods such as time series analysis and survival analysis

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 data scientists/ analysts, business managers, information professionals, 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 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.

At the end of the semester, the students should be:

- 1- Familiar with a variety of advanced analytics methods and at least one big data technology
- 2- Determine which analytical methods are appropriate for processing data
- 3- Apply and compare a variety of analytical methods to data
- 4- Extract useful, previously unknown information from the data
- 5- Effectively communicate the results to other with no data science background

This course will take a case approach, complemented by lectures, seminar style discussion, outside speakers, and lab work. This course will use statistical software SAS, and open source solutions R and Python for hands-on experimentation with various analytics techniques.

### **Course Materials**

Handouts, power-point slides, assignments, and additional helpful resources (software tutorials) will be posted on Canvas. You can print the posted material and bring them to class. Please note that I will not provide printed copies of the posted materials in the class.

Software: SAS Enterprise Guide, SAS Enterprise Miner, SAS Forecast Studio, R, and Python. The codes in R and Python will be provided to the students. The students are encouraged to bring their own machine to the class. SAS solutions are available through Citrix (please refer to <https://citrix.uncc.edu/>). R and Python can be downloaded and installed from <https://www.r-project.org> and <https://www.continuum.io/downloads>. The students can use their preferred analytical tool to work on their assignments/ projects.

### **Grading**

| <b>Component</b>                   | <b>Percentage</b> |
|------------------------------------|-------------------|
| Two exams (2 @ 25%)                | 50%               |
| Group project                      | 25%               |
| Assignments (4 @ 5%)               | 20%               |
| Class Participation and Attendance | 5%                |
| Total                              | 100%              |

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

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 should be submitted **on Canvas before midnight on the due date**. Assignments submitted after the due date will be considered late. Each student is allowed to submit only one assignment late throughout the semester. The late assignment should be submitted on or before the day of final exam. For the second, third, or fourth late assignments, 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 individual 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 this 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.

No more than 2 teams could work on the same dataset. The topic selection is first come, first served.

Along with the group project, there will be another group effort on the Hackathon Day (tentatively in Week 14). The students are encouraged to work in new self-organizing groups to compete against other teams. All teams work on the same analytical problem. The participation is mandatory but the grade is a 5% bonus grade. This means that each member of the winning groups will receive 5% extra points added to the final grade but others will not lose any points. The details about the Hackathon Day will be released throughout the semester.

## **Class Policies**

### **Attendance and Participation Policy**

5% of the final grade is allocated to participation and attendance. The students are highly encouraged to contribute to the ongoing discussions. Sharing personal experiences related to data science and business analytics, managerial insights, theoretical opinions, ... are all desirable. 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. Calculators and computers are prohibited during examinations and quizzes, unless specified. Laptop-size computers may be used in class only for course related activities. **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).

**Tentative Class Schedule**

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

| <b>Week</b> | <b>Date</b> | <b>Topics</b>   | <b>Due Dates</b>                         |
|-------------|-------------|---|--|
| Week 1      | Jan 9       | <ul style="list-style-type: none"> <li>• Course Introduction</li> <li>• Overview of Business Analytics</li> </ul> |  |
| Week 2      | Jan 16      | MLK Day. No Class!  |  |
| Week 3      | Jan 23      | <ul style="list-style-type: none"> <li>• Software Basics</li> </ul>   |  |
| Week 4      | Jan 30      | <ul style="list-style-type: none"> <li>• Advanced Classification Methods 1</li> </ul>                             | Group formation due,<br>Assignment 1 due |
| Week 5      | Feb 6       | <ul style="list-style-type: none"> <li>• Advanced Classification Methods 2</li> </ul>                             |  |
| Week 6      | Feb 13      | <ul style="list-style-type: none"> <li>• Model Evaluation/ Guest Speaker</li> </ul>                               | Project topic due                        |
| Week 7      | Feb 20      | <ul style="list-style-type: none"> <li>• Advanced Text Analytics</li> </ul>                                       | Assignment 2 due                         |
| Week 8      | Feb 27      | <ul style="list-style-type: none"> <li>• Midterm</li> </ul>   |  |
| Week 9      | Mar 6       | <ul style="list-style-type: none"> <li>• Big Data &amp; Parallel Processing</li> </ul>                            | Project phase 1 report due               |
| Week 10     | Mar 13      | <ul style="list-style-type: none"> <li>• Advanced Clustering Methods</li> </ul>                                   | Assignment 3 due                         |
| Week 11     | Mar 20      | <ul style="list-style-type: none"> <li>• Feature Selection Methods</li> </ul>                                     |  |
| Week 12     | Mar 27      | <ul style="list-style-type: none"> <li>• Survival Analysis</li> </ul>   | Project phase 2 report due               |
| Week 13     | Apr 3       | <ul style="list-style-type: none"> <li>• Time Series Analysis</li> </ul>  | Assignment 4 due                         |
| Week 14     | Apr 10      | <ul style="list-style-type: none"> <li>• Hackathon Day!</li> </ul>  |  |
| Week 15     | Apr 24      | <ul style="list-style-type: none"> <li>• Guest Speaker/ Course Wrap-up</li> </ul>                                 | Project final report due                 |
| Week 16     | May 1       | <ul style="list-style-type: none"> <li>• Group Project Presentations</li> </ul>                                   |  |