INFO 3236-091: BUSINESS ANALYTICS

Belk College of Business, The University of North Carolina at Charlotte

Class Website: Canvas will be the website and primary communication channel for all information about this course. Go to http://canvas.uncc.edu and login with your Ninernet credentials.

Instructor: Dr. Dongsong Zhang, Belk Distinguished Professor
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Class time: Wednesday, 5:30pm-8:15pm
Classroom: Friday 339
Office hours: Wednesday 11-noon (one of the offices inside 713 @Center City) and 3:30pm-5:30pm (Friday building 363A @main campus) (By appointment at other times)
TA: Ms. Haomin Sheng <hsheng1@uncc.edu>

Catalog Description INFO 3236. Business Analytics (3) Prerequisites: Junior or senior standing; and MIS, OSCM, Economics, or Marketing major or minor in good standing; or permission of department. This course covers various data mining and business intelligence methods, such as rule-based systems, decision trees, logistic regression, and clustering. In addition, this course also covers online analytical processing (OLAP) and statistical analysis as well as issues relating to modeling, storing, securing, and sharing the organizational data resources.

Learning objectives "Business analytics" refers to the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions (Davenport and Harris, 2007, Competing on Analytics: The New Science of Winning). This class will provide the conceptual foundations of business analytics and an overview of several analytics techniques and software tools.

The specific learning objectives are as follows:
1. To develop an understanding of business intelligence, analytics and decision support.
2. To understand the principles of data management for analytics.
3. To understand different data mining and analytics tools and techniques (e.g., decision trees, logistic regression, cluster analysis) for solving business problems.
4. To understand when and how to apply the learned analytics techniques to real-world business problems.
5. To understand the ethical and privacy issues when practicing business analytics.

Course Materials & Software

1. Reading Materials: There is no required text book for this class. All reading materials will be posted or linked by the instructor on the Canvas class page (The materials related to each lecture will be posted at least 24 hours in advance). Those materials may include, but not limited to,

handouts, notes, power-point slides, and research articles, etc. You can print the posted material and bring them to class. Please note that the instructor will **not** provide printed copies of any of the posted materials.

2. Software: This class will use SAS Enterprise Guide and SAS Enterprise Miner Workstation software. They are installed in the Friday building student labs. Please check the availability of those software programs in other student labs on campus if you plan to work outside the Friday building. You can also download the software to your personal computer from software.uncc.edu.

Class Format

This course will use in-class lectures as the primary learning format. Lectures will typically take the form of presentation of theoretical materials and class discussion. We will also use this time to demonstrate how to use SAS Enterprise Guide and Miner for data analytics. **I strongly encourage students to actively participate in class discussion**. Such participation brings additional perspectives to classroom discussion, enables more effective knowledge sharing, and makes the lectures more interesting. Any class-related questions are encouraged.

We should all show mutual respect for each other in the learning process during lectures. In this context, mutual respect includes beginning and concluding the class on time, turning off cell phone ringers and beepers, not using computer/cell phones for anything irrelevant to the course, and allowing all students of the class to participate in a dialogue without interruption or distraction. Adopting these practices can help us minimize disruption to class discussion and dialogue and maximize the value of the class for all students.

Grading

Components	Percentages	Group/Individual
Mid-term and Final exams	50%	Individual
Homework (4)	16%	Individual
Quizzes (3)	9%	Individual
Course group project	18%	Group
In-class topic presentation	2%	Group
Attendance/Course participation	5%	Individual

Final letter grades (General guideline): A: >=90; B:>=80 and <90; C: >= 70 and <80; D: >=60 and <70; and F: <60

Grading reflects students' course performance. If students have questions about a grade of an exam or a homework, please talk to the instructor within one week after the grade is released. Students may meet with the instructor to get feedback regarding their course performance at any time during the semester. While I will always correct mistakes in the arithmetic computation of grades, final letter grades are not negotiable and I will not entertain any requests for changing final letter grades. In general, **no late deliverables will be accepted** unless the student gets extension from the instructor **in advance** due to legitimate reasons.

Class participation not only includes class attendance, but also the contribution to class discussion. Students are expected to attend every class and strongly encouraged to actively engage in class discussion, such as asking/answering questions and sharing real-life experiences related to the course material. Missing classes will result in points deducted from class participation.

Exams: There will be a mid-term and a final exam. Both exams will be closed book and closed notes. The exams may include true-false and multiple-choice questions, short essay-type questions, and problem solving with SAS software. The exams may contain material discussed in the class but not included in the PowerPoint slides or handouts. All exam grades will be posted on Canvas. The instructor will keep all exams after grading. However, exam reviews are available during office hours or by appointment. Students requesting a review of their exams should do so within a week after the posting of the exam grades. **No grade reviews or adjustments will be permitted beyond this one-week period.**

In the event that a student has to miss an exam due to emergencies, she/he must request a make-up exam while providing appropriate supporting documents in advance to the instructor. 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, due to an 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. A make-up exam should be arranged within one week after the original exam is given. It is the student's responsibility to be aware of and follow the make-up exam policies. No special accommodations will be made for any exceptions.

Exams take many time and effort to prepare and, as a form of intellectual property, belong to those who create them (i.e., professors). Consequently, students are not allowed to keep them after the exam. **This means that exams cannot be taken out of the classroom during their administration or during their review at a later class meeting.** Students are encouraged to review their exams during office hours or by appointment for study purposes. However, failure to return an exam after taking or reviewing it, removing an exam from the instructor's presence at any time, or recording or copying exam questions in anyway, will be considered theft of intellectual property. Such actions will result in an exam grade of zero and may warrant further disciplinary actions.

Quizzes: During the semester, the instructor will give quizzes and assignments to be completed in class. The quizzes and assignments may cover topics already covered or topics assigned for the day when the quiz/assignment is given. There are **NO MAKE UP** for quizzes, irrespective of the reason for a student missing them. Instead, students will be allowed to drop ONE quiz (missed or lowest grade).

Attendance: Regular attendance is necessary for doing well in this course. It has been a common observation that students who miss more than 2 classes are most likely to end up with a failing grade in this class. When you attend class, it is important to not arrive late or leave early as it is very, very disruptive**.** You are responsible for completing the work from all of the class meetings and for any material covered, announcements made, assignments distributed, and any other type of work you may miss due to the absence from class. Attendance will be taken at random in class

during the semester and will be counted towards your attendance and participation grade. Attendance will also be an important factor in making borderline grade decisions. The **Instructor will not answer questions already covered in the class but missed due to absenteeism.** A student who misses a class is responsible for obtaining any needed information from fellow students.

Tardiness or early departure is highly disruptive and is strongly discouraged in my class. Recurrence of such disruptive behavior will be noted and will lead to deduction of significant grade points and the student being asked to leave the class.

Class conduct

Disruptive behavior in class distracts from the ability of others to benefit from their in-class experience. Such disruptive behavior includes arriving late, leaving early, using cell-phone/smartphones in class without the instructor's explicit permission, surfing the net during the class, side conversations between two or more students during a lecture, unnecessary comments that add no value to class, and any activity that negatively impacts the ability of other students to learn and/or follow in class. Such behavior will be considered inappropriate and **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 engage in disruptive behavior. In particularly egregious and/or recurrent cases, I may have the student permanently removed from the class.

Please do not spend class time working on assignments of other classes, checking e-mails, or surfing the Web. Repeated engagement in such behavior will be reflected in lower grades and may lead to removal from the course.

The Use of Electronic Devices in Class

Cellular phones MUST BE TURNED OFF/SILENCED DURING CLASS and students are strongly discouraged from checking their cell-phone messages when the class is in progress. Use of instant messaging, email or other communication technologies during class time is not allowed. No electronic devices, such as mobile phones and laptops, are allowed during examinations and quizzes, unless specifically allowed by the instructor.

I will take very seriously any disruptive behavior in my class. Students in my class should feel free to let me know if any electronic device usage behavior of fellow student(s) is distracting her/his learning experience. Such complaints will be treated as confidential, but will help me take appropriate actions to make sure that such distractions are eliminated and there is a positive learning environment in the class. Students violating the electronic devices policies will be marked for disruptive behavior and may be asked to leave the classroom. Their grade will also be affected according to the rules of class conduct.

Course Group Project

Students need to complete a course group project by using the learned data analytics techniques and SAS Enterprise Guide/Miner to analyze a business dataset, which will be

provided to students at the end of September.

Students should create project teams on their own no later than 11pm on September 11. Each group should consist of **4 members**. Once a group is formed, each group member is expected to contribute to the course group project and in-class group topic presentation actively and equally.

At the end of the semester, after the final project is completed, each student will be asked to fill out a questionnaire about the performance of each of her/his group members (in the scale of 1~10, with 10 being the full participation/contribution), which will be due by 11pm on December 4, 2019. Students can send the filled questionnaire by email. If I do not receive this feedback from a student, then I will assume that he/she has given full participation points all of his/her group members. The final grade for individual group members who have received unsatisfactory participation feedback will be decided as follows.

The feedback received from the group for each team member will be averaged. If only some group members give feedback and others don't, then I will assume a participation grade of 10 for the non-reporting members. Students whose receive an average participation score of less than 2 out of 10 will get a ZERO for the project, irrespective of the final project grade for the group. Students who receive average feedback score >=2 and <8 will receive (**original group grade * average feedback score + 1/ 10**). Students who receive average feedback score >=8 will receive 100% of the original group grade. The feedback policy will be applicable only to the group project.

Quality of Work

The expectation is that all your submitted work will be of **professional quality** both in terms of **content and presentation**.

- Spelling, grammar, punctuation, clarity of expression, and presentation will count in every piece of work you do for this course. If you have trouble with spelling, grammar or punctuation, have someone proofread your package.
- Your grade will be based on what you say or write and how you present it. It becomes difficult to read for content if the mechanics are sloppy, and a superior job may not be recognized as such if presented in an error-laden package.
- Good ideas sloppily expressed will receive mediocre grades, as will flashy presentations that lack content.
- Students whose native language is not English must meet the same quality of writing and presentations expected of all students.

All work submitted for evaluation (including group and individual work) must be clearly marked with a title and names of students responsible for the work. The question being answered should be spelled out or identified so the instructor knows what is being answered. Work submitted online must have all files named appropriately so that the instructor can easily understand what the file represents. The instructor will not spend time going through all your files in order to find your

submitted work. Work that does not have proper identifications as described above may automatically get a deduction of 10% of the assigned grade for that work.

Instructor's help for homework and project

As you practice various sample problems in this class, you will invariably encounter programs that do not work. It is your responsibility to pay attention to discussions in class related to debugging. If you are not able to identify the errors when practicing the sample problems, I will be happy to go through your work with you and help you identify the problems. I can provide any amount of help with the examples and practice problems. But **I cannot provide any help with your homework assignments or your group project. Specifically, I cannot take a look at your homework or project before the submission in order to identify/correct bugs/errors or to judge how well the work meets the requirements**.

Team Work

For group activities, each team is responsible for organizing itself, dividing up the work, and deciding how relative contributions should be measured. It is your responsibility to **promptly** inform the instructor of any dysfunctional team dynamics and to solicit his help.

All team members must

- participate in all team activities,
- strive to maintain positive working relationships with their team members,
- assist team members to resolve issues relating to group work, and
- freely express their ideas, thoughts, comments, and constructive criticisms to their team members, me, and the class.

It is the responsibility of the team to ensure that all team members understand all concepts related to the completed projects and presentations. The instructor may ask questions about any completed project to any team member and any incomplete or unsatisfactory answers will affect the team grade. *The instructor may announce additional measures to obtain feedback on group member contributions and institute appropriate grade penalty for lack of participation. However, this grade penalty will be limited to the course-work that is group-based.*

Extra Credits

Extra-credit opportunities, if any, will be the instructor's decision and such opportunities will be presented to the whole class instead of individual students only. Regardless, no extra-credit opportunities will be given after **December 4, 2019**.

Incomplete grade policy

An "incomplete" is not based on a student's failure to complete a given 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, the student's work to date, and before the interruption, should be passing, and the student should provide proper written proof (e.g., a doctor's note), in order to get an 'I' grade.

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.

Class Schedule & Changes

The preliminary schedule for this class is shown below. Please note that the class schedule may change during the semester without adversely affecting the learning objectives. Please always refer to the latest class schedule and announcements posted on the Canvas class page or shared during the class.

Table 1: Tentative Course Schedule

Date	Topic	Tentative Deliverable Due Dates
8/21	Course overview and introduction to business analytics	
8/28	Fundamental statistical concepts	
9/4	Data Management with SAS Enterprise Guide	
9/11	Decision trees	Homework 1
9/18	Decision Trees with SAS Enterprise Miner	Quiz 1
9/25	Logistic regression	Homework 2
10/2	Logistic regression with SAS Enterprise Miner	
10/9	Cluster Analysis	Homework 3, Quiz 2
10/16	**Mid-term Exam**	
10/23	Cluster Analysis with SAS Enterprise Miner	
10/30	Data warehouse and Association Rule Mining	Homework 4
11/6	Introduction to AI and artificial neural networks & an Invited guest talk	Quiz 3
11/13	Artificial neural networks	
11/20	Recommender systems	
11/27	**No class (the Thanksgiving holiday)**	
12/4	Group project presentations	Project report
12/11	**Final exam, starting at 5pm**	

Note: all deliverables, unless notified otherwise, will be due at 5:30pm on the due dates

Table 2. In-class Group Topic Presentation Schedule:

Dates	Topic
9/18	Decision Tree (1)
9/25	Decision Tree (1)
10/2	Regression Analysis (2)
10/30	Cluster Analysis (1)
11/6	Association Rule Mining (1)
11/13	Association Rule Mining (1)
11/20	Artificial Neural Network (1)

In order to make class discussion more interesting and closely tied to research and/or real-world practice, each course project group is required to select a refereed journal paper or a real-world case study related to one of the topics listed in Table 2 and presents the paper to the class on the corresponding designated date. Specific requirements of this in-class group topic presentation are as follows:

- Each group, once determining the preferred presentation topic/date, should first go to the discussion forum on the Canvas site and respond to the thread of the selected topic/date by including the names of all group members, indicating that the group has signed up for presenting a paper or case study on that topic. It will be on a first come, first serve basis.
- Each group should search the related literature and select 4~5 relevant journal papers or case studies on the selected topic to Dr. Zhang for approval one week prior to the scheduled presentation date. Dr. Zhang will provide suggestions on which one seems better for the course, or may ask for more alternatives if none of the candidate studies seems appropriate.
- Each group will present one and only one paper on the topic selected from the above list. The presentation should be prepared in the Microsoft PowerPoint;
- Each presentation will last about 20 minutes, including 3 minutes for possible question-answering. Your presentations should **NOT** repeat the basic concepts that have already been discussed in the prior lectures;
- Each presentation should consist of a good-quality, real-world applications or case studies that involve the use of selected technique. Those paper and case studies should be obtained from peer-reviewed **journal papers** or industry reports, preferably those that were **published after year 2015**.
- Either one or multiple group members can present, up to your choice;
- Each group should upload .ppt slides into the discussion forum (under the signed-up date/topic thread) on course Canvas site at least 24 hours before the presentation.

Academic Integrity/Honesty

Students have the responsibility to know and observe the requirements of The UNC Charlotte Code of Student Academic Integrity available online at http://legal.uncc.edu/policies/up-407. This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism (which includes viewing others work without instructor permission), abuse of academic materials, and complicity in academic dishonesty. ***This forbidding includes sharing/copying work between individuals or teams without permission of instructors.*** Any special requirements or permission regarding academic integrity in this course will be stated by the instructor, and are binding on the students. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense 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 failing. Students are expected to report cases of academic dishonesty to the course instructor.

For this class, peer advice and interactions are allowed when discussing non-graded work. Each student, however, must develop her/his own solutions to any graded assignment or lab exercises. Students may not collaborate on graded assignments or lab exercises, unless explicitly permitted by

the instructor to work in groups. Collaborations, where not explicitly permitted by instructor, constitutes cheating. A student may not use or copy (by any means) another's work (or portions of it) and represent it as his/her own.

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.

Wish everyone a successful semester!