

DSBA 6100-U01 - Big Data Analytics for Competitive Advantage
(Cross listed as MBAD7090-U01/U90)

Fall 2019

Instructor: Dr. Dongsong Zhang, UNCC

Class location: University Center City room 606

Class time: 12:00pm – 2:45pm, Wednesday

Instructor: Dr. Dongsong Zhang, Belk Endowed Chair Professor of Business Analytics, UNCC

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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>

Course Description

This course provides an introduction to big data analytics as a strategic resource in creating competitive advantages for businesses. The course focuses on understanding the basic concepts and techniques and integrating the knowledge of analytics tools with an understanding of how companies could leverage data analytics to gain strategic advantage. An emphasis is placed on developing the ability to think critically about complex problems/questions in real world data science and business analytics (DSBA) challenges.

Course Objectives

1. Understand the role of big data analytics in organizational strategy and how organizations can leverage useful data/information to gain competitive advantage and acquire insights.
2. Gain an introductory knowledge of the data science and business analytics tools that are useful in extracting intelligence and value from data.
3. Apply big data analytics tools to analyze business opportunities and threats.
4. Use business cases/examples, develop data-driven strategies that enhance stakeholder relationships, open new market opportunities, and/or better position the organization for competitive advantage during industry transition.
5. Effectively communicate the findings from data analytics to a business audience.

This class is **not** about learning or mastering Hadoop or Python programming, etc. As such, you will not be taught any programming language or Hadoop coding in this class. Rather, the focus is on an awareness of issues, tools, and techniques of big data analytics and how they can be leveraged to address business opportunities and problems. SAS Enterprise Guide and Miner will be covered at a level appropriate for doing data preparation and modeling. More importantly, this course is designed to emphasize critical thinking and business problem-solving with big data.

Instructional Method

This course will take a lecture/discussion/guest talk approach. Lectures will typically take the form of presentation of theoretical materials and class discussion. Students will be introduced to several analytics topics and tools through business cases and problems. Students should bring laptops with them to class for hands-on exercises. There will be two invited speakers from the industry to give guest talks. In addition, students are expected to present recent research papers and/or business case studies on real-world business problems solved by big 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 before, during, or after the class are welcome.

I expect that we 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, and allowing all students of the class to participate in 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.

Credit Hours

This is a 3 credit hour course. Thus, the course has been designed to require on average about 10 hours/week (about 3 hours outside of class for every 1 credit hour) between readings, quizzes, assignments, and project work. Of course, the hours may be more or less than indicated above depending on the actual deliverables due. If a student has limited backgrounds in certain topics, they might need to spend additional time to keep up with other students in the course.

Reading Materials

Details of weekly reading materials for this class will be posted on Canvas.

Required Readings (NO PURCHASE REQUIRED):

We will cover material from selective chapters of the following book (available as free e-book from UNCC Atkin's Library website)

"Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing, and Presenting Data" by EMC Education Services, John Wiley & Sons, 2015. [Atkins Library free Ebook]

Required Readings: All students are required to purchase a course-packet consisting of 2 business cases from Harvard Business Publishing. Please go to this link <https://hbsp.harvard.edu/import/653937> and follow the instructions to purchase the course pack. You may have to register at the above link in order to access the course pack. The total cost for the course pack is \$8.50 before tax. This is the only course material purchase expected for this class.

Other supplementary Readings: The instructor may recommend some useful books or articles that will enhance your understanding of the area of data science and business analytics. However, exams, homework, quizzes, and other class work will not be assigned from these recommended books, unless the instructor posts power points from these materials for class discussion and designates the power points as study materials.

Grading

The course grades will be determined based on students' performance in the following deliverables:

Components	Individual or Group based	Total Points
Assignments (4*5%)	Individual	20
Exams (2)	Individual	40
Group project & presentation	Group	25
Quizzes (2*5%)	Individual	10
Class participation	Individual	5

Grading reflects the instructor's objective judgment based on students' course performance. If you have questions about a grade on an exam or an assignment, 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 anytime during the semester. It is important to understand that the grade reflects academic achievement/performance. While I will always be glad to correct mistakes in the arithmetic computation of grades, final letter grades are not negotiable and I will not entertain 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.

Exams will be taken in the regular classroom during the specified exam period. If medical emergencies occur that prevent a student from attending an exam, the student is required to provide a doctor's letter to the instructor. Make-up exams will NOT be granted except under extreme circumstances, and will only be granted when a student and the instructor reach an agreement IN ADVANCE. To be fair to other students, the questions in a make-up exam may be different from those in the original exam. No late students will be allowed to take the exam if there are any other students who have already finished the exam and left the classroom.

There will be four *assignments* in this course. They are related to the content of specific topics and case studies. The major objective of assignments is to help you better understand the concepts discussed in the class. Each assignment will be due one week after it is released and will be collected at the beginning of the class on its due date. Please note that in general, **no late assignments will be accepted**.

There will be two short *quizzes* on topics covered in the class, which will be announced in the class in advance. Each quiz will take 20 minutes. If one arrives late during a quiz, he/she can immediately start working on it, but no time extension will be made. **Make-up quizzes will not be granted in general**.

Class participation includes not just attendance, but more importantly, the contribution to the class discussion. Students are expected to attend every class and arrive before the class starts. I strongly

encouraged to actively engage in class discussion, such as asking questions and sharing their real-life experiences related to the course material. Missing a class without legitimate reasons may result in losing a point for class participation. If a student misses a class due to work or other reasons, it is their responsibility to get notes from peers; instructors do not hold extra repeat class sessions.

Group Projects Overview

Students are expected to form 3-member course group project teams on their own no later than Sept. 10 to complete a course group project. Considering that students have diverse background, experience, and interest, you have two project options to choose from: one is a hands-on data analytics project, and another one is a research paper project. Each team is required to submit a project proposal on Oct. 1, a progress report on Nov. 13, and a final project report/paper on Dec. 4. All groups will present their course projects in the class of Dec. 4, which contributes 10% to their group project grades.

For the Type I project, a project team is expected to perform a data analytics project that uses SAS Enterprise Guide and Miner or other analytics tool(s) that the instructor approves in advance. The project should include data preprocessing and analytics. The final report should include an introduction to the business problem/opportunity that the project is aimed to address, description of the data, analytics techniques used, major findings/results (including some screenshots of outcomes), and discussion on business implications and recommendations based on the findings.

For the Type II project, a project team is expected to conduct a state-of-the-art literature review and write a research paper on a selective major issue related to big data analytics in business. Each team is expected to read at least 30 relevant refereed papers published in academic journals and conference proceedings (No more than 10 conference papers in total), or real-world big data analytics case studies (excluding the ones we discussed in the class), published after 2014. You can categorize those papers into several categories based on certain criteria and introduce them while using some best papers/studies as examples. More importantly, in the final project report, there should be **a section to discuss limitations of existing studies/big data analytics cases and propose potential solutions** to address those limitations and/or new research issues.

Each student should actively and equally participate in the project. At the end of the semester, individual students' group project grade will be determined based on not only the group project score, but also the level of their contributions to the project.

There are four deadlines related to the course group project:

- 1) Midnight of Sept. 10: the deadline for creating your project group. Students are welcome to discuss with the instructor in advance about the fitness and scope of the potential proposal(s) that they consider. Each project team should post group information (i.e., full names of all team members) in the discussion forum on course Canvas website, under a selected in-class presentation topic/date. Please note that in general, once a group is formed, no group switching is allowed. In order to help better understand subject matters discussed in the class and share the knowledge, each team, in addition to the final course project presentation, will give a presentation on a topic selected from the list shown in Table 2 presented later in this syllabus.

Teams are expected to present **one recent relevant paper or report** (either a real-world data analytics project or case study), and present them in the class for 20 minutes. **There will be one group only to present at each specified date.** Therefore, the selection of the presentation topics/dates will be on a first come, first serve basis.

- 2) Oct. 1, noon: Each team should submit a 3~4 page project proposal (1.5 line-spacing, 12 Font size), which should explain the nature of the target business problem, why it is worthwhile to be investigated/analyzed, the objectives of the project, and the tentative work plan. The proposals will be collected at the beginning of the class. They, along with instructor's feedback and suggestions, will be returned to you in the following week.
- 3) Nov. 6: progress report: write 3~4 pages in a word document to summarize what you have done so far, including references you have read, and what are remaining tasks. This deliverable should be sent to the instructor by email only. Students should expect to receive feedback and suggestions from the instructor within 48 hours. This report is mandatory but will not be graded because its main goal is to make sure that a group's project is on the right track and in the proper status. Failing to submit this report will result in a loss of 10% project grade.
- 4) Dec. 4, : Final project report
By now, you should have the literature review done. Please write a 20-page project report (excluding references) that includes citations and references. The format of references should be either in IEEE or APA format, whichever your team prefers.

The instructor may use a questionnaire to obtain feedback on individual group member contributions to the project and institute appropriate grade penalty for potential lack of participation.

Extra Credit Opportunities

Extra credit opportunities, if any, will be offered to the entire class. However, it is strongly encouraged that students do not rely on extra credit to improve their grades as we may end up with very few or no extra credit opportunities in the semester. No extra credit opportunities will be offered after Nov. 20. Most importantly, no extra credit will be offered to an individual student for the purpose of improving her/his grades because it would be unfair to other students.

Civility

The University strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. We celebrate diversity that is beneficial to both employers and society at large. Students are strongly encouraged to be respectful and courteous towards others when sharing their views during class discussions.

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.

Academic Integrity/Honesty

Students have the responsibility to know and observe the requirements of [The UNC Charlotte Code of Student Academic Integrity](http://legal.uncc.edu/policies/up-407) 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.

Inclement Weather

University Policy Statement #13 states the University is open unless the Chancellor announces that the University is closed. The inclement weather hotline number to call is 704-786-2877. ***In the event of inclement weather, please check your email in the morning of class.***

Other Information

Students are responsible for all announcements made in class and on the class online resources. Students should check the online class resources available on Canvas throughout the semester. The instructors may send occasional emails or announcements with important information to the class. It is the students’ responsibility to make sure that their email addresses are accurate and checked regularly.

The instructors will only discuss grades with students in person (i.e., not via telephone or e-mail) and only with the student him/herself (not with parents, spouses, etc.).

Table 1. Topics and Tentative Schedule (as of 8/21/2019)

Dates	Theme/Topic of Discussion (Supplementary reading materials will be posted on Canvas)	Tentative Due dates
21-Aug	Class overview (Syllabus), Software Introduction to Big Data and Big Data Analytics	
28-Aug	Big Data Use Cases in Business: Drivers and Challenges	
4-Sep	Data Sourcing and Management: The Acquisition, Collection, and Storage of Big Data	
11-Sep	Data Wrangling: Cleaning and Transforming Data management via SAS Enterprise Guide	Quiz 1

18-Sep	Data Visualization and Exploration	Homework 1 (SAS Enterprise Guide)
25-Sep	A Survey of Predictive Models: Decision Tree and Logistic Regression Guest talk #1, Dr. Sudeshna Banerjee, Bank of America	
2-Oct	Building a DT/LR model with SAS Miner; Exam review	Homework 2 (Case study #1)
9-Oct	Mid-term Exam	
16-Oct	A Survey of Predictive Models: Neural Networks	Homework 3 (Predictive Modeling w/ SAS Miner)
23-Oct	A Survey of Clustering and Association Models Guest talk #2, Dr. Tim Lowe, Premier Inc.	
30-Oct	Clustering with SAS Miner; Introduction to Text Analytics	
6-Nov	Text Analytics	Quiz 2
13-Nov	Social Network Analysis	
20-Nov	Big Data Ethics and Privacy Issues Case Study 2: Predicting Consumer Tastes with Big Data at Gap	Homework 4 (Case study #2)
27-Nov	Thanksgiving Break – No Class	
4-Dec	Group Project Presentations	
11-Dec	Final Exam	

Note: This schedule is subject to change during the semester depending on the course progress. Always refer to the latest class schedule change announced in the class. Also, unless explicitly specified otherwise, all the deliverables are due at noon on the due dates.

Table 2. In-class Group Presentations

Date	Theme/Topic of Discussion
18-Sep	A Research Paper on Big Data Visualization
2-Oct	A Research Paper on Predictive Modeling for Business Improvement
13-Nov	A Research Paper on Text analytics or Social Media Analysis
20-Nov	A Research Paper on Ethics and Privacy Issues and Solutions in Smart Health