

Department of Decision and Information Science

BZAN 6357 – Business Analytics Frameworks and Methods

Fall 2021

Professor:

Dr. Xiao Ma (“Xiao” is pronounced as /sh-ih-ow/)

Email: xma@central.uh.edu

Office: Melcher #280H

Office phone:

Office hours: (By Appointment only; send request via email to set up a meeting)

TA (TA unavailable; backup desktops with SAS available in Melcher Hall student computer lab & in #131):

TA Office:

TBA

Email:

Office hours:

The information contained in this course syllabus is subject to change anytime. Students are expected to be aware of any additional course policies presented by the Professor during the course.

Prerequisite:

Completion of BZAN 6310/6320/6352 (or equivalent statistics course) with a grade of “B” or better.

Completion of BZAN 6351 with a grade of “B” or better.

Required Reading:

1. Sebastian Raschka and Vahid Mirjalili, *Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow 2*, 3rd Edition, Packt, 2019. ISBN: 978-1-78995-575-0. (either hardcopy or e-book)
2. Daniel T. Larose and Chantal D. Larose, *Discovering Knowledge in Data: An Introduction to Data Mining*, 2nd Edition, Wiley, 2014. ISBN: 978-0-470-90874-7. (either hardcopy or e-book)

Recommended Reading:

Articles and reading materials to be posted on Blackboard and/or announced in class.

Required Computing Resources:

Use your own machine (laptop, notepad, surface, remote desktop) as your best computing resource.

Course Description

This course uncovers the inner workings of the most popular data science models, including supervised and unsupervised learning. Students will understand and learn how to build models from scratch using open-source programming tools. Students learn the concepts and models in a business decision-making context. A team-based course project will facilitate experiential learning.

Teaching Methods

1. Lectures and Discussions with some hands-on time: Important material from the text and outside sources will be covered in class. This coverage will be mostly in the form of hands-on problem solving. Students should plan to take careful notes on topics that are presented by the Professor.

Complementary to the new screencasts to be produced and made available throughout the semester, technical recordings from previous semester(s) hosted on YouTube are also available via Blackboard.

2. Assignments: Problems and readings are routinely assigned to help support and supplement material found in the text. Assignments must be turned in on time to receive the maximum points possible.
3. Exams: Exams / quizzes will be open book/note and will test assigned readings and hands-on skills. Review sheets will be provided in advance to the exam day. The final exam will not be cumulative, but may require a good understanding of some fundamental concepts covered in previous exam(s). All relevant concepts and points will be noted on the review sheets.
4. “Flipped classroom”: This course will operate in a “flipped classroom” style – students watch videos, read textbooks and materials, and practice hands-on exercises before attending online lectures in a weekly cycle. In a “flipped classroom,” students lead the weekly learning cycle. Professor provides deeper explanations and lead focused (group) discussions on challenging concepts. Professor demonstrates complex hands-on skills and provides additional explanations and tips.
5. Expectations for the students: Because students lead the weekly learning cycle, and lectures will only focus on the contents that need more explanation and discussion, students are expected to be well prepared for each week’s lecture. They are expected to watch videos, read textbooks and materials, and practice hands-on exercises before attending online lectures. At the very minimum, students should watch the required videos and know which part(s) of the textbook(s) that the week’s lecture will discuss.
6. Course “Timeline”: Much like a detailed course schedule with clearly marked tasks and timestamps, a course “Timeline” will be provided by the Professor to guide the path of to-dos in this course throughout the semester. The course “Timeline” will specify which videos to watch, what book section(s) to read, what questions to think about during self-learning, and if relevant, what hands-on exercises to practice.
7. Blackboard: Most materials will be distributed on the Internet, using the class website *Blackboard* application. It is assumed that students know how to access the content on Blackboard.
8. Announcements regarding the class such as schedule changes, assignments, projects, and so on will be made in class during the first 10 minutes as well as on Blackboard. You are responsible for being “in attendance” **ON TIME** to hear the announcements and for monitoring the class website.
9. Contacting the Professor and/or Teaching Assistant (TA): Email will be the most productive channel of communication to resolve the vast majority of inquiries. If a TA is available to this course (dictated on the cover page), when emailing your question and replying any follow-up message, you must include both your Professor and your TA as the recipients, using the “Reply All” function of the email service, in order to make us maximally informed about the recent development of the resolution process. If you only included the Professor or the TA as the only recipient of your email, it is not guaranteed your inquiry will be answered, and you will be responsible for any negative consequence (e.g. late submission penalty for being stuck on a problem needing the Professor’s and/or the TA’s help).

The best email address to reach the Professor and/or the TA are included on the cover page of syllabus.

10. Grading:

1. Homework: 24%

2. Quiz #1 – 15%
3. Quiz #2 – 15%
4. Project: 30%
5. Active Classroom Discussions: 10%
6. Attendance: 6%

Total: 100%

Final course letter grade follows the numeric-letter grade system shown in the table below.

| Raw Score | Letter Grade |
|---------------------|--------------|
| > or = 92 | A |
| > or = 89, but < 92 | A- |
| > or = 86, but < 89 | B+ |
| > or = 83, but < 86 | B |
| > or = 80, but < 83 | B- |
| > or = 77, but < 80 | C+ |
| > or = 74, but < 77 | C |
| > or = 70, but < 74 | C- |
| > or = 67, but < 70 | D+ |
| > or = 63, but < 67 | D |
| > or = 60, but < 63 | D- |
| < 60 | F |

8. **Project Description:** The class project will give you an opportunity to apply most of the techniques you learned in this course. I will make available to you a set of data on which your project is based. The data will be what we consider “big.” You will be required to get an understanding of the variables in your data set. You will use the software applications for the course to perform various analytics techniques on your data. In your project, you will attempt to show how well you can apply the techniques, understand the problems and solve them using appropriate techniques. You will need to interpret all your results. And, provide managerial recommendations to help a stakeholder make good business decisions, which you will also define.

Course Policies:

Late submissions will NOT be accepted!

Cheating or plagiarism will result in severe academic sanction!

Missed Classes: The student is responsible for obtaining material, which may have been distributed in class when he/she was absent. This can be done through contacting a classmate who was present or by contacting the Professor during his office hours or other times. Missed or late exams cannot be made up under any circumstances, unless an official excuse is provided. **Any uncoordinated, unexcused missed exam will result in a score of 0 for that exam.**

Assignments: All assignments are due at the designated time on the due date, as noted in the outline below.

Academic Dishonesty: Plagiarism and cheating are serious offenses and may be punished by failure on exam, paper or project; failure in course; and or expulsion from the University. For more information, refer to the "Academic Honesty Policy" accessible here (<http://www.uh.edu/provost/policies/honesty/>). The University of Houston Academic Honesty Policy is strictly enforced by the C. T. Bauer College of Business. No violations of this policy will be tolerated in this course. Students are expected to be familiar with this policy.

Need for Assistance: If you have any condition, such as a physical or learning disability, which will make it difficult for you to carry out the work as outlined in this document, or which will require academic accommodations, please notify me as soon as possible. I will recommend that you contact the Center for Students with Disabilities. The contact person is Justin Dart in the CSD building #568, room 110. The numbers for the CSD office are Ph: 713-743-5400; TDD: 713-749-1527; Fax: 713-743-5396 or email: uhcsd@central.uh.edu. Also available to you is *Counseling and Psychological Services (CAPS)*, which can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. In addition, there is no appointment necessary for the "Let's Talk" program, which is a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html.

Inclement Weather or Technical Problems

In case of inclement weather or technological problems that prevent the University from providing access to course materials you may contact the Professor by phone via the numbers given above or send the Professor an email inquiry. In addition, the Professor will notify students as soon as possible in such instances and provide instructions on how the course will proceed.

Tentative Lecture Outline

(see next page)

This outline is tentative. The order in which these topics are covered can change in the event of unexpected class disruptions.

Note! This outline is very brief and does not list the dates and details of various self-learning tasks. For a guided “path” through learning this course, use the course “Timeline” posted on Blackboard.

| (week #) | Topic | Due |
|----------|---|--|
| (1) | Course Overview | Screening test due TBA midnight |
| (2) | Module 1: Data science warm-ups | |
| (3) | Module 2: Over-fitting | Homework 1 due TBA midnight |
| (4) | Module 3: Logistic regression | |
| (5) | Module 3: Logistic regression (<i>cont'd</i>) | Homework 2 due TBA midnight |
| (6) | Module 4: Neural networks | |
| (7) | Quiz #1 | Quiz 1 covers until neural networks |
| (8) | Module 4: Neural networks (<i>cont'd</i>) | |
| (9) | Module 4: Neural networks (<i>cont'd</i>) | |
| (10) | Model evaluation: Reflect upon Modules 1-4 | Homework 3 due TBA midnight |
| (11) | Module 5: Unstructured data science | |
| (12) | Module 5: Unstructured data science (<i>cont'd</i>) | |
| (13) | Module 5: Unstructured data science (<i>cont'd</i>) | Homework 4 due TBA midnight |
| | – Thanksgiving Holiday (No Class) | |
| (14) | Closing Remarks | Course Project Deliverables Due TBA midnight |
| (15) | Quiz #2 | Quiz 2 is <u>not</u> cumulative but requires a good understanding of prior modules |
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