ISQS 6347:
Machine Learning

Professor Information:

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Course Materials:

Recommended Textbook:

- (BG) Boehmke, B., and Greenwell, B., Hands-on Machine Learning with R, CRC Press, ISBN: 978-3-138-49568-5
- (L) Lantz, Brett, Machine Learning with R, 2nd Ed., Packt, ISBN: 978-1-78439-390-8
- (S) Shuueli, G., Bruce, P.C., Yahav, I., Patel, N.R., Lichtendahl, K.C., Jr., 2018, Data Mining for Business Analytics, Wiley, ISBN: 978-1-118-87936-8

Technical Requirements

- Internet access - preferably high speed (for accessing Blackboard)
- TTU email
- Microsoft Office (free download from TTU eRaider or Office365.com)
- Microsoft Skype for Business (download from TTU eRaider)
- Adobe Acrobat Reader (download from Adobe.com)
- Flash Player (download from Adobe Adobe Flashplayer)
- Audio and video playing capabilities (for watching/listening to course content)
- Web camera and microphone (for synchronous virtual meetings/creating videos)
- PDF app (scanning of hand-written documentation for graded assignments)
- R
- RStudio

Required Technical Skills:

- Using a word processor
- Using email for communication
- Attaching documents in email
- Using Internet search engines and browsers
- Any additional technical skills students will need
- Using R studio

Course Description:

Data Science is a rapidly growing subject in various fields. It is an intersection field between machine learning and statistics and aims to develop scientific discipline. Data mining is essential in data science and has many applications for business audiences. The objective of this course is to guide data mining algorithms that encompass different analytic processes. It covers the most common data mining tasks and typical data mining techniques. By learning these algorithms, students will master how to deliver predictive models that conduct three major data mining tasks: classification, regression, and clustering. Upon completing this course, students will not only establish a managerial mindset for data mining, but also develop technical skills for most practical needs.

Expected Learning Outcomes:

- Apply fundamentals of business analytics to examine what happened and what is happening.
- Apply the principles of classification technique to solve business problems.
- Evaluate the performance of data analytics.

Course Overview:

This course is 100% online and synchronous meetings are not required. All course contents are posted on Blackboard, including lecture videos, exercises, assignments, and tests. In addition, course information, including the course schedule and syllabus, are posted on Blackboard. The course is structured as a series of ten learning modules (numbered 1-7), and module content will be made available according to the course schedule. All class work is to be submitted via Blackboard using the instructions provided.

Course Outline:

Module 1: Introduction

Module 2: Classification I

Module 3: Classfication II

Module 4: Improving Performance

Module 5: Blackbox Learning

Module 6: Finding Patterns

Module 7: Text Analysis

Communication Plan:

You can expect weekly announcements in Blackboard. You may also find ad-hoc announcements to notify you of other information. Therefore, I strongly encourage you to check announcements regularly. If you have any questions about the course and coursework (such as assignments, tests, etc.), please e-mail me or use "Q&A" discussion board. I plan to answer your questions within 24 hours, Monday-Thursday, or 48 hours, Friday-Sunday. However, responses to your questions may be delayed when I have academic travel, but announcements will be posted to let you know of such circumstances. We may also communicate via SKYPE for Business during my office hours or scheduled appointment.

Area of ISQS, Jerry S. Rawls College of Business Administration
Texas Tech University

Course-Level Assessment of Expected Learning Outcomes

The achievement of students learning outcomes will be assessed through the course's assignments, blog, and tests over the modules.   Students' final grades will be determined through the following coursework:

- Assignments   40%
- Tests (Test 1-30%, Test2-30%)   60%
  Total   100%

The final grade in the course will be determined according to the following scale:

- 90 – 100%   A
- 80 – 89%   B
- 70 – 79%   C
- 60 – 69%   D
- 59% and below   F

Tests:

Students will take two tests. The course schedule on Blackboard shows the details of the tests, including instructions. Each test will be available according to a given timeframe and will therefore require your close attention. For example, Test 1 will open on Feburary 10, and you can take the test any time after the module opens; however, you should complete the test by Feburary 11.

Once you have started the test, you **MUST** complete it in the given time frame; once the time frame has passed, the test will be **CLOSED**. *No make-up* exams will be available, and *no exceptions* will be allowed. Technical difficulties, for example, network, computer, or software issues, are your responsibility; no exceptions will be given due to technical difficulties. Therefore, it is recommended that you complete tests a few minutes before the time frames end because uploading answers can sometimes take more than a minute. If there is technical difficulties, submitting tests directly to me via e-mail is **ONLY** accepted in **the given time frame**. Test scores will be posted in Blackboard once tests have been completed.

All answers of the test should be created on your own. The following rules regarding submitting your tests must be followed strictly:

- Plagiarism will immediately result in a score of **0 for the test**. Your answers to the test should be created on your own. Please make proper citations for material borrowed from other sources, including magazines, public websites, academic journals, etc. If any improper material is discovered, the assignment will be reported to the university (Office of Student Conduct) for further investigation.

Test scores will be posted on Blackboard once tests have been completed.

Assignments:

Students are required to complete six assignments; one in each module with the exception of Module 1. (Please note that, because there is no Assignment in Module 1, the Assignment numbers do not match the Module numbers.) These are individual tasks designed to be completed during the modules and uploaded to Blackboard. Unfinished, inaccurate, or otherwise non-functioning applications should not be submitted, but will receive grades of 0 if they are.   Similar to tests, you can start assignments anytime after modules open; however, you must complete them by their due dates according to the schedule shown in Blackboard.

The following rules regarding assignment submission must be followed strictly:

- Plagiarism will immediately result in a score of **0 for the assignment**. Your answers to the assignment should be created your own. Please make proper citations for material borrowed from other sources, including magazines, public websites, academic journals, etc. If any improper material is discovered, the assignment will be reported to the university (Office of Student Conduct) for further investigation.
- Assignments should be uploaded to Blackboard. Assignment file names should appear exactly as requested in the instructions. Failure to do this will result in loss of **10** points.
- Late submissions:
  - Late by 1 day – **10** points will be deducted.
  - Late by 2 days – **20** points will be deducted.
  - Late by 3 days – **30** points will be deducted.
- Feedback on each assignment will be given as needed.

Blog:

This course will use a blog to enhance various aspects of social learning. Blogs encourage us to express our ideas. The blog in this class will enable you to respond to one another's thoughts. It consists of two different elements: blog entries and blog comments. Each of you need to select the blog title, and create a blog entry that demonstrates your ideas about the question. You can comment on others' ideas. To provide your comments, you need to select the blog title and select a user's name from the list in the sidebar. The entry will open in the content frame, and you will provide your comment below the entry.

TTU Statements:

Illness Absence Policy

If at any time during this semester you feel ill, in the interest of your own health and safety as well as the health and safety of your instructors and classmates, you are encouraged *not* to attend face-to-face class meetings or events. Please review the steps outlined below that you should follow to ensure your absence for illness will be excused. These steps also apply to not participating in synchronous online class meetings if you feel too ill to do so and missing specified assignment due dates in asynchronous online classes because of illness.

1. If you are ill and think the symptoms might be COVID-19-related:
   a. Call Student Health Services at 806.743.2848 or your health care provider. After hours and on weekends contact TTU COVID-19 Helpline at [TBA].

      b. Self-report as soon as possible using the [Dean of Students COVID-19 webpage](). This website has specific directions about how to upload documentation from a medical provider and what will happen if your illness renders you unable to participate in classes for more than one week.

      c. If your illness is determined to be COVID-19-related, all remaining documentation and communication will be handled through the Office of the Dean of Students, including notification of your instructors of the period of time you may be absent from and may return to classes.

      d. If your illness is determined not to be COVID-19-related, please follow steps 2.a-d below.

2. If you are ill and can attribute your symptoms to something other than COVID-19:

      a. If your illness renders you unable to attend face-to-face classes, participate in synchronous online classes, or miss specified assignment due dates in asynchronous online classes, you are encouraged to visit with either Student Health Services at 806.743.2848 or your health care provider. Note that Student Health Services and your own and other health care providers may arrange virtual visits.

      b. During the health provider visit, request a "return to school" note;

      c. E-mail the instructor a picture of that note;

      d. Return to class by the next class period after the date indicated on your note.

Following the steps outlined above helps to keep your instructors informed about your absences and ensures your absence or missing an assignment due date because of illness will be marked excused. You will still be responsible to complete within a week of returning to class any assignments, quizzes, or exams you miss because of illness.

Positive Test Policy

Be prepared to review protocol and point students to sources of information so they will know what to expect should a member of the class have a positive case of COVID-19.

Accommodation Requests from High-Risk Students Returning to Campus

Texas Tech University is taking considerable measures to provide effective social distancing and sanitation protocols as we prepare to return to campus in the Fall. We need to be mindful that, because of underlying health conditions, some students will be at higher risk for COVID-19. Other students, although healthy themselves, might live with someone who has compromising health conditions. Students in one or both of these two categories might request accommodations or alternatives to fulfill course requirements to avoid potential exposure to the virus.

The Office of the Provost authorizes instructors of record (IoRs), in coordination with their department chairs, academic advisors, and academic associate deans, with the flexibility necessary to make instructional accommodations for students to avoid exposure to COVID-19. Accommodations might include, as examples, alternatives to face-to-face group assignments, remote learning such as online instruction or off-site activities, changing to an online section of the same course or to an independent study with the same learning objectives as the original course, or approval of a substitute course that is offered online and can fulfill the same degree requirements of the original course.

Keep in mind the following criteria when considering making an accommodation for a student: (1) whether the requested accommodation would make a substantive alteration of the course material or objectives; (2) whether the accommodation provides an equally effective alternative to the original objectives or activities of the class; and (3) whether the accommodation can be uniformly applied should more than one student request it. If the IoR can satisfactorily address these three requirements for accommodation, and is comfortable providing it, then it is appropriate to do so. If the IOR feels unable to provide accommodation that satisfies these three criteria or is unsure how the requested accommodation can be provided, the IoR is encouraged to contact their academic associate dean's office for guidance. Students should also be advised to follow the steps for reporting illness-related absences outlined on the Dean of Students COVID-19 webpage.

ADA Statement (**Op 34.22**)

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as possible to make necessary arrangements. Students must present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services office in 335 West Hall or call 806-742-2405.

Academic Integrity (**OP 34.12**)

Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior.   Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University ("University") Quality Enhancement Plan, Academic Integrity Task Force, 2010]

Students must turn in original work; they should submit assignments created by themselves during the current semester and for ISQS 5331 purposes only. They should not share their work with other students for any reason. Students should complete online exams independently. Students suspected of academic dishonesty will be reported to the Office of Student Conduct. If found responsible, students will be subject to course and university disciplinary sanctions ranging from failing grades on specific assignments to expulsion from the university.

Religious Holy Day (**OP 34.19**)

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Safety

Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Students should report incidents to the Student Resolution Center at (806) 742-SAFE or online at depts.ttu.edu/titleix.