# BUSA 537: Advanced Analytics

## COURSE SYLLABUS: Fall 2020 02W

**Instructor:** Dr. Bo Han, Associate Professor of Business Analytics

**Office Hours:** Online appointment only.
**Email Address:** bo.han@tamuc.edu
**Phone Number:** 903-886-5692
**Fax Number:** 903-886-5693
**Preferred Form of Communication:** Email.
**Response Time:** I will reply everyone's emails within 24 hours.

**Class Time:** This is an online class. All learning materials have been uploaded to the online college. They can be accessed 24/7.

# COURSE INFORMATION

**Required Textbook**

**R for Everyone: Advanced Analytics and Graphics**
by Jared P. Lander
ISBN: 978-0-321-88803-7

**Recommended Textbook** (Not required, but highly recommended)
**Introductory Econometrics: A Modern Approach (4th Edition)**
by Jeffrey M. Wooldridge
ISBN: 978-0324660548

**Please make sure to install Firefox and use it to download the data sets from the online learning system.**

**Special note for classes during pandemic**
This is an online class. You are NOT required to present on campus. All learning materials such as lecture videos and PowerPoint slides have been uploaded to myleo online. You can study this course at your own pace during this semester. However, please attend the virtual meeting at **6:15 PM on August 31**, so that I can introduce the class layouts to you. If you can't attend the meeting online, that's fine. You can watch the recorded video. A user guide of how to join in the meeting virtually will be emailed before August 31.

# COURSE DESCRIPTION

This course is designed to introduce the following advanced business analytics knowledge to students:

1. **Business analytics by using advanced statistics models**
2. **Statistics model implementation in the R software**

This course teaches graduate students the process of implementing advanced statistics models such as linear models and text mining in the R software. Fundamental statistics knowledge is required before taking this class. The pre-requisite courses include ECO 578, MKT 572, and BUSA 542. Students who plan to take BUSA 537 without credits from pre-requisite courses should get the department approval before registration.

**Student Learning Outcomes**

1. Students should be able to use the statistical models introduced in this class to resolve analytical questions assigned during this semester.
2. Students should be familiar to the R software interface and the data modeling processes in the software.
3. Students should be able to interpret the implications of data analysis results to business operations.

# GRADING

**Assignments (A Maximum of 40 Points)**

4 assignments will be given during the semester. You can get a maximum of 10 points for each assignment. Please see the submission deadlines in the tentative class calendar at the end of this syllabus. Please note assignments are very important to your final grade! Please be sure to complete and submit every assignment by the deadline.

**Exams (A Maximum of 60 Points)**

Two exams will be given during the semester. You can get a maximum of 30 points for each exam. Each exam will be open for one week in the online learning system. You can choose any time during the one-week period to take the online exam. Once you start the exam, you have three hours to complete the exam. You can't pause or retake the exam once it is started. The exam dates are:

- Exam 1 will be open from 10 AM on October 5 to 6PM on October 12, 2020.
- Exam 2 will be open from 10 AM on December 2 to 6PM on December 9.

**Final Grade**

At the end of this semester, if your total point is between 90 and 100, you will get an A; if it's between 80 and 89, you will get a B, and so on. **Please note that the actual points will be used to calculate your final grade.** No percentage or curving will be used in this class.

| Points | Grade |
|---|---|
| 90-100 | A |
| 80-89 | B |
| 70-79 | C |
| 60-69 | D |
| below 60 | F |

**Bonus points**

You can participate in the instructor assigned activities to get a maximum of 3 points for bonus in this semester.

# TECHNOLOGY REQUIREMENTS

The following information is provided to assist you in successfully using technology to complete the assignments and class activities:

For the class exercises and assignments, you need the R software. If you don't have the software, please refer to page 1 to 33 of the textbook to download and install the software on your computer. Please do NOT install the R Studio software, because all tutorials are developed according to the R software, not R Studio. The R software is a cross-platform system. Thus, it can be installed on Windows PC, Apple Mac desktop and laptop, and the Linux system.

You cannot install the R software on any smart phone, iPad, or tablet PC.

It is the best practice to use Firefox to access to the online class. This is applicable to both PC and Mac users. Please download either one if you don't have any of these Web browsers.

# COMMUNICATION AND SUPPORT

If you ask me questions by emails, I will reply you in 24 hours. However, I usually answer them much faster than this.

**If you have questions in software operations, please be sure to include the screenshots of the issues in the emails.**

All assignment due dates, project deadlines, and exam time are central time in the United States.

# COURSE AND UNIVERSITY PROCEDURES/POLICIES

## Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

## University Specific Procedures

### Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: Netiquette
http://www.albion.com/netiquette/corerules.html

### TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

### Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

**ADA Statement**

## Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**
Texas A&M University-Commerce
Gee Library- Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: Rebecca.Tuerk@tamuc.edu
Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

**Nondiscrimination Notice**

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

**Campus Concealed Carry Statement**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

# COURSE OUTLINE / TENTATIVE CALENDAR

| Date | Unit | Topic | Activities |
|---|---|---|---|
| Aug 24 – Aug 30 | Unit 1 | Class Introduction<br>Chapter 1 to 3: Introduction to R | Install R software on your computer |
| Aug 31 – Sep 6 | Unit 2 | Chapter 4: Basics of R<br>Chapter 5: Advanced Data Structure<br>Chapter 6: Reading Data into R | |
| Sep 7 - 13 | Unit 3 | Chapter 7: Statistical Graphics | |
| Sep 14 - 20 | Unit 4 | Chapter 8: Write R Functions<br>Chapter 9: Control Statements | |
| Sep 21 - 27 | Unit 5 | Chapter 11: Group Manipulation<br>Chapter 12: Data Reshaping | |
| Sep 28 – Oct 4 | Unit 6 | Chapter 14: Probability Distribution<br>Chapter 15: Basic Statistics | Assignment 1 and Assignment 2 are due by 6 PM on Sep 30. |
| Oct 5 - 12 | Exam 1 Review | **Review and Exam 1** | Exam 1 will be open from 10 AM on October 5 to 6PM on October 12. |
| Oct 12 - 18 | Unit 7 | Chapter 16: Linear Models | |
| Oct 19 - 25 | Unit 8 | Chapter 17 Generalized Linear Models | |
| Oct 26 – Nov 1 | Unit 9 | Chapter 18 Model Diagnostics | |

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| Nov 2 - 8 | Unit 10 | Chapter 20 Nonlinear Models (Decision Trees)<br><br>Receiver Operating Characteristic (ROC) Curve Analysis<br><br>Cross Validation | |
| Nov 9 - 15 | Unit 11 | Chapter 21 Part 1: Time Series and Autocorrelation | |
| Nov 16 - 22 | Unit 11 | Chapter 21 Part 2: Time Series GARCH Model | |
| Nov 23 - 29 | | Thanksgiving Holiday. No Class. | |
| Nov 30 – Dec 11 | Exam 2 Review | **Review & Exam 2** | Exam 2 will be open from 10 AM on December 2 to 6PM on December 9.<br><br>Assignment 3 & 4 are both due by 6 PM on December 8. |

* Because data analysis in R is experiencing a rapid development, I may frequently add new materials to the weekly links in the online learning system. If I add new materials, please learn them, even though they may not be listed in the tentative schedule above.