



CSCI 556 (01B) Data Analysis & Visualization

COURSE SYLLABUS: SPRING 2024

(Revision date: December 21, 2023)

INSTRUCTOR INFORMATION

Instructor: Jino Kim, Ph.D.

Office Location: CS/JOUR 217

Office Hours: Appointment-based

- Mon Noon-3PM
- Wed 10:30AM-12:30PM
- Wed 2:00PM-3:00PM

University Email Address: jino.kim@tamuc.edu

COURSE INFORMATION

Textbook(s):

- Practical Statistics for Data Scientists (50 Essential Concepts), 1st Edition, ISBN 10: 1491952962 / ISBN 13: 9781491952962

Software Required:

- Weka (<http://old-www.cms.waikato.ac.nz/~ml/weka/>)

Optional Texts and/or Materials:

- Data Mining: Practical Machine Learning Tools and Techniques, 4th Edition. ISBN-13: 978-0128042915, ISBN-10: 0128042915

Course Description

Modern data sets are growing exponentially both in size and complexity. Extracting meaningful information from these data requires not only programming skills, but also understanding the analysis methods, mathematical models and visualization tools that help to condense large amounts of information into a comprehensible story. This course will introduce standard data analysis and modeling methods, including correlation functions, linear regression, clustering, classification, as well as fundamental statistical and probabilistic concepts. With the data analysis functions, relevant visualization tools will be introduced for helping data explorations and analysis.

The syllabus/schedule are subject to change.

Student Learning Outcomes (Should be measurable; observable; use action verbs)

1. The student will gain detailed knowledge about the goal and techniques of the data analysis and visualization process.
2. The student will understand the steps in characterizing and understanding data.
3. The student will be able to build prediction models based on training data (supervised learning).
4. The student will be able to build models for data that has no labeled training data available (unsupervised learning).
5. The student will be able to use software applications for data analysis and visualization.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

- Basic knowledge of computer and operating systems
- Basic knowledge of data structure, algorithms, and statistics/probability

Instructional Methods

- Recorded lecture with presentation slides
- Utilization of an open-source data analysis and visualization tool: WEKA (<http://old-www.cms.waikato.ac.nz/~ml/weka/>)

Student Responsibilities or Tips for Success in the Course

- *Participation*: Class attendance (mandatory) with active participation of class activities.
- *Assignments*: Following the given instruction is important. On-time submission of assignments encouraged.
- *Exams*: Well prepared for exams (with an ability to answer questions within the given exam time); The exams will be paper-based, closed-book/note tests.

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GRADING (Tentative)

Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89.999%

C = 70%-79.999%

D = 60%-69.999%

F = 59% or Below

Weights of the assessments in the calculation of the final letter grade:

Components	Weight	Remarks
Assignments	30%	Three assignments; (Refer to the assignment policy below for details)
Exams	60%	Two regular exams and one make-up exam (cumulative); (Refer to the exam policy below for details)
Class participation	10%	Class attendance and activities

Attendance Policy:

This is an in-person section and attending the class is mandatorily required. More than three absences (for any reason) may result in a failing grade. Two tardies will be counted as one absence.

Assignment Policy:

The deadline for the assignment can be extended with a 15% penalty per day, up to two days (48 hours). Any submission later than 48 hours after the deadline will not be accepted and graded. One lowest assignment score will be discarded from the final grade calculation.

No extension/resubmission will be allowed.

Exam Policy:

This course basically has two exams (Exam 1 and Exam 2). Optionally, you can take Exam 3 as a make-up exam in the Finals week. Exam 3 is a cumulative test. In case that you take Exam 3: The lower score from Exam 1 and Exam 2 will be discarded, and then Exam 3 score will be combined for the final grade calculation (i.e., exam score = $(\max(\text{Exam 1 score}, \text{Exam 2 score}) + \text{Exam 3 score})/2$).

No additional make-up exam will be given for any event.

Academic Misconduct:

The violation of academic integrity (including cheating and plagiarism) may cause a zero point on that work. Subsequent misconducts may result in a failing grade with the official filing of the case.

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TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool

https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

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Interaction with Instructor Statement

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific 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/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:

<https://www.britannica.com/topic/netiquette>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedures 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](#)

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[Undergraduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

[Graduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf>

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

Students with Disabilities-- ADA Statement

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

Velma K. Waters Library Rm 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@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

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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.

A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

AI use policy [Draft 2, May 25, 2023]

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If

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no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

Department or Accrediting Agency Required Content

COURSE OUTLINE / CALENDAR

Course schedule: The schedule may be subject to change.

WEEK NO.	CONTENT	READING
1	Introduction and Weka	--
2	Exploratory data analysis	Ch1
3	Data and sampling distributions	Ch2
4	Input: concepts, instances, attributes	--
5	Output: knowledge representation	--
6	Regression and prediction	Ch4
7	Exam 1	--
8	Classification (Part 1)	Ch5
9	Classification (Part 2)	Ch5
10	Statistical machine learning (Part 1)	Ch6
11	Statistical machine learning (Part 2)	Ch6
12	Unsupervised learning	Ch7
13	Feature selection and data projection	--
14	Exam 2	--

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15	Advanced topics and course review	--
16	Exam 3	--

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