MTHK 5380-110, 80630 MACHINE LEARNING CASE STUDIES
Fall 2022 rev. 08.16.2022
Texas A&M University - Central Texas

COURSE DATES, MODALITY, AND LOCATION
Aug 22, 2022 - Dec 9, 2022
The instructional method is online, and uses the A &M-Central Texas Canvas Learning Management System [https://tamuct.instructure.com/].

INSTRUCTOR AND CONTACT INFORMATION
Instructors: Christopher Thron
Office: All contact is online
Phone, text, and WhatsApp: (585) 204-0314
Email: Please email instructor via Canvas email.
Google Hangouts (for online office hours): chris.thron@gmail.com

Office Hours
Office hours will be decided per students' convenience. The instructor is generally available online from 9 A.M.-1 P.M. and from 4 P.M.-6 P.M. Send an invite to chris.thron@gmail.com, and send an email, phone, or text informing me of your Hangouts email address.

Student-instructor interaction
Aside from the above, the instructor will schedule two regular online sessions per week for discussion and problem-solving. Sessions will be accessed within Canvas, and will be recorded.

Emergency Warning System for Texas A&M University-Central Texas
SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the SafeZone website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps*:*
   1. Download the SafeZone App from your phone store using the link below:
        o   iPhone/iPad: [https://apps.apple.com/app/safezone/id533054756]
        o   Android Phone / Tablet
            [https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp]

2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
3. Complete your profile and accept the terms of service

For updates on COVID information, please monitor the University [website](https://www.tamuct.edu/covid19/)
[https://www.tamuct.edu/covid19/]

COURSE INFORMATION

Course Overview and description: Machine learning can be characterized as computationally-enhanced statistics. As computers continue to become more pervasive and more powerful, machine learning is playing an increasingly important role in science and technology. This class will provide the student with hands-on practical experience in applying machine learning techniques to analyze, model, and draw important conclusions from data from various fields within science and engineering. For the most part examples are drawn from previously published research. Fields represented include biochemistry, meteorology, astronomy, and analysis of social media data.

Student Learning Outcomes (SLO's):
Upon successful completion of MATH 5380, students will be able to:
  a) Explain the capabilities and limitations of machine learning for clustering, classification, estimation, and prediction.
  b) Determine appropriate machine learning techniques to use when analyzing particular datasets for specific purposes;
  c) Design a procedural "pipeline" to effectively analyze data using machine learning
  d) Utilize software to implement the above "pipeline"
  e) Utilize "jackknife" methods to compute error bars
  f) Interpret results obtained by machine learning

COURSE REQUIREMENTS
  • Projects (100%) Students will engage in a series of projects. Different students may be assigned to different projects, as per the students' interests and level of experience.

Grading Criteria Rubric and Conversion

Projects	100% (100 points)	90- 100%= A
		80- 89%= B
		70- 79%= C
		60- 69%= D
TOTAL	100% (100 points)	Below 60 % F

Project rubric:
Each project will be evaluated according to the following aspects:

Introduction—study is well-motivated and placed within context of other work
Methodology—Methods used are rigorously justified
Implementation—Methods are correctly implemented in software. Software is well-organized and clearly documented.
Analysis—Results are correctly interpreted; significant aspects are noted and interpreted.
Conclusions—Appropriate conclusions are drawn, and significant implications for the practical situation at hand are clearly explained.

90%   Minor careless or technical mistakes
80%   Minor procedural error
70%   Major conceptual or procedural error.
60%   Makes beginning steps towards a solution
30%   Some relevant information supplied.

Please note: If your overall grade (on a scale from 0 to 100) is within 1 point of the next highest grade level, I will increase your grade if you have done all of the quizzes. Otherwise you will be graded strictly according to the numbers. That means that if your average is 89.99 and you didn't do all the quizzes, then you still get a B.

COURSE OUTLINE AND CALENDAR
Different students may be involved in different projects. Since this is an exploratory research-oriented class, activities will be decided on a weekly basis, and updated according to the results of the previous week. Projects with promising results may be pursued further, while projects which yield no significant results will be terminated.

INSTRUCTOR GRADING POLICIES
Late work will be accepted <u>only</u> in case of medical or family emergency: in this case, written verification is required, and the maximum makeup grade is 70%. At most 2 late assignments will be accepted.

Appeals: If the student wishes to appeal a grade, he/she must do so *within 1 week* of receiving the graded paper. Students should save all their work to ensure that no clerical errors are made in grade reporting. Periodically during the semester, I will release a complete record of your grades so far in the class. If I have made a recording error, you may bring the paper to me and I will record it correctly.

The following material is generic for all TAMUCT courses, and does not contain specific information for this course.

Important University Dates
See the TAMUCT Academic Calendar: https://www.tamuct.edu/registrar/academic-calendar.html]

TECHNOLOGY REQUIREMENTS AND SUPPORT
Technology Requirements
Home access to a computer or tablet with reliable Internet connection is required. The computer must have full audio-visual capabilities (webcam, speaker/headphone and microphone).

This course will use the A&M-Central Texas Instructure Canvas learning management system. We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer supports any version of Internet Explorer.
Logon to A&M-Central Texas Canvas [https://tamuct.instructure.com/] or access Canvas through the TAMUCT Online link in myCT [https://tamuct.onecampus.com/]. You will log in through our Microsoft portal.

 Username: Your MyCT email address. Password: Your MyCT password

Canvas Support
Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select "Chat with Canvas Support," submit a support request through "Report a Problem," or call the Canvas support line: 1-844-757-0953.
For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

Other Technology Support
For log-in problems, students should contact Help Desk Central
24 hours a day, 7 days a week
 Email: helpdesk@tamu.edu
 Phone: (254) 519-5466
 Web Chat: [http://hdc.tamu.edu]
Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES
Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that

students with a disability receive equal access to the university's programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our Access & Inclusion Canvas page (log-in required) [https://tamuct.instructure.com/courses/717]

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more information regarding the student conduct process, [https://www.tamuct.edu/student-affairs/student-conduct.html].

If you know of potential honor violations by other students, you may submit a referral, [https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Drop Policy

If you discover that you need to drop this class, you must complete the Drop Request Dynamic Form through Warrior Web.

[https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpId=https://eis-prod.ec.tamuct.edu:443/samlsso&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43-f02a4202f612].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar's Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant, experiencing pregnancy-related conditions, and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of

Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit Student Affairs [https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these requirements and guidelines online, please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender–including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University's Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit Tutor Matching Services [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Library & Archives

The University Library & Archives provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 400,000 eBooks and 82,000 journals, in addition to the 96,000 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. Schedule an appointment here

[https://tamuct.libcal.com/appointments/?g=6956]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our [Library website](http://tamuct.libguides.com/index) [http://tamuct.libguides.com/index]

University Writing Center

University Writing Center: Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. The hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and Saturday 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via [WCOnline](https://tamuct.mywconline.com/) [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment wit