

Texas Tech University
Department of Computer Science

Course Name: Special Topics on Machine Learning
Course Number: CS5331/4331

Class time: 2:00-2:50 pm on MWF
Instructor: Victor S. Sheng
Office: EC 211H
Email: victor.sheng@ttu.edu
Office hours: 2:50 – 5:50 pm on F

TA: **TBD**
Office hours: **TBD**
Email: **TBD**

Course Description:

Machine learning is rapidly emerging as a critical research area in computer science and beyond. This course addresses the basic concepts and issues related to machine learning, providing a wide array of topics of concern for research and practice in the information fields. The legal, policy and economic issues that arise in the use of sensitive information are also discussed.

Course Goal:

The goal is to provide theoretical foundations and state of art algorithms in data mining for developing intelligent solutions to real-life problems. Furthermore, course aims at stimulating research interests and building up research skills of graduate students in data mining and its applications on real world problems.

Objectives:

At the end of this course, students will be able to:

- Understand the strengths and limitations of well-known machine learning techniques.
- Identify promising business applications of machine learning.
- Manage, participate and develop machine learning projects for real world applications.
- Perform research on the frontier machine learning topics.
- Develop research skills.

Textbook(s):

There is no prescribed textbook. There is a list of seminal papers everyone needs to read.

References:

- Machine Learning. Tom M. Mitchell, McGraw-Hill, 1997.
- Other handouts and selected papers.

Course Grade:

- **Class participation (10%):** Students are expected to actively participate in class discussions.
- **Class Attendance (10%):** Regular class attendance is expected at all times. If a student is absent no more than three class meetings s/he will have 10% added to the final grade. After the third absence s/he will have 1% deducted for each absence from the final grade.
- **Class presentation (30%):** Students are also expected to read selected papers on certain research topics of their interests. They will also be expected to make several presentations in the class.
- **Course Project (50%):** There will be a semester project for each student. The semester project will involve cutting edge research on machine learning. Students will be expected to write a 10-page IEEE double column format paper. There are two stages to finish the project.
 - Midterm report and presentation (20%): Students will submit a midterm report (minimum four pages in the IEEE double column format) with preliminary results in the middle of the semester, where the report is worth 10% and the presentation is worth another 10% of overall grade.
 - Final report and presentation (30%): Students will submit a final paper (10 pages in IEEE double column format) based on their research at the end of the term and make a presentation, where the paper is worth 20%, and the final presentation is worth 10% of overall grade.

Your course grade shall be based on the weights specified in the following table.

Component	FINAL Grade
Participation	10%
Attendance	10%
Class presentation	30%
Midterm report	10%
Midterm presentation	10%
Final report	20%
Final presentation	10%

The numeric score will be translated to a letter grade at the end of the semester according to the table below at the discretion of the instructor.

Numeric Score	Letter Grade
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 - 59	F

Course Schedule:

This schedule is tentative and may be changed depending on the student's comprehension of the material and time.

Week 1: Introduction to machine learning
Week 2-3: Cost-sensitive learning
Week 4-5: Active learning Crowdsourcing
Week 6-7: Crowdsourcing
Week 8-16: Advanced research topics in machine learning, such as security and intrusion detection, privacy preserving data mining, anomaly detection and analytics, etc.

Ethical Conduct:

Exam, assignments, quizzes, and projects are subject to the university academic integrity (See attached and Student Handbook: http://www.studentaffairs.ttu.edu/publications/student_handbook0405.pdf) and the statement of academic conduct for engineering students (included in the last page of the syllabus). Plagiarism and academic irregularities will not be tolerated. Cheating on homework or quizzes will result in a zero on the corresponding assignment/quiz and an F in the course for repeated cheating. Cheating on an exam or project will result in an F for the course. All incidents of academic dishonesty will be reported to the Office of Student Conduct which may add additional consequences. Consequences of dishonesty can be severe and may include expulsion from the university.

Classroom Civility:

All violations of classroom civility will be reported to the Student Judicial Programs. The Texas Tech University Catalog states: "Students are expected to assist in maintaining a classroom environment that is conducive to learning." In order to ensure that all students gain from time spent in class, **students are prohibited from engaging in any form of distraction**, e.g., reading newspapers (or other articles), working on other courses, and using cell-phones or laptops for calls or messages. If you indulge in any such inappropriate behavior (without explicit consent of the instructor), you will (at the very least) be asked to leave the classroom.

Student with Disabilities:

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

Illness Based 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.
 - b. Self-report as soon as possible using the Office of the Dean of Students website. 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.ad 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.

Statement of Academic Conduct for Engineering Students

College of Engineering, Texas Tech University

Preamble

The College's primary goal is to educate students to fill leadership roles as professionals aware of technology and its economic and political role in the world. Therefore, we strive to produce technically competent graduates who solve problems, are able to communicate and work well with others; are sensitive to the needs of society, are well-educated in the humanities as well as in the engineering disciplines, and maintain a high-level of ethical and professional conduct.

Policy

The College of Engineering fully subscribes to the Code of Student Conduct as published in the Texas Tech University's "Student Affairs Handbook." The Handbook states the following:

"The University is strongly committed to upholding standards of academic integrity. These standards require that students never present the work of others as their own.

Any student found to have committed the following academic misconduct is subject to the disciplinary sanctions outlined in Part IX, Section D "Disciplinary Sanctions":

1. Cheating

This violation includes, but is not limited to: (1) use of any unauthorized assistance or assisting others in taking quizzes, tests, or examinations; (2) dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignment(s); (3) the acquisition, without permission, of tests or other academic material belonging to a member of the University faculty or staff; (4) alteration of grade records; (5) bribing or attempting to bribe a faculty member to alter a grade.

2. Plagiarism

This violation includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also included the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

3. Instructor Responsibilities

The instructor in a course is responsible for initiating action in cases where there is an admitted act or convincing evidence of academic misconduct. Before taking such action, the instructor should attempt to discuss the matter with the student(s). If the suspected misconduct involved a final exam, the instructor should submit a grade of X until a reasonable attempt can be made to contact the student(s), after the end of the semester.

4. Instructor Sanctions

If academic misconduct is determined by the instructor, a failing grade shall be assigned to either the assignment in question or to the course grade. When a student is given a failing grade in a course as a result of academic misconduct, the instructor shall report in writing to the instructor's department chairperson the facts of the case and the action to be taken against the student. The chairperson shall provide a copy to the student, to his or her Academic Dean and to the Dean of Students Office.

5. Grade Appeal Procedure

The Grade Appeal Procedure (Part V, Section A) may be used to appeal a failing course grade, but not a failing grade given for a class assignment. The disciplinary penalty or grade of F shall not be implemented until the disciplinary procedures or grade appeal process has been exhausted. A student may continue the academic class and course work until a final decision is made."

6. Repeated Academic Dishonesty

In cases of repeated violations, either the instructor (through his or her department chairperson and/or Academic Dean's Office) or the Academic Dean may refer the case to the Dean of Students Office for further disciplinary action.