



**EE 497: Special Topics: Applied Machine Learning**  
**Course Syllabus, Spring 2026 (section 01E)**  
**Rev 3, 1/9/2026**

**INSTRUCTOR INFORMATION**

Instructor	Gerald L. Fudge, PhD
Office Location	AG/ET 217
Office Hours	Monday – Friday, except Tuesday. (9:00 am – 10:00 am) Tuesday (9:00 am – 10:30 am) Also, by appointment at other times
Phone	E&T Office: 903-886-5474
Office Fax	903-886-5960 (Inform instructor if fax is sent)
University Email Address	Gerald.Fudge@etamu.edu
Preferred Form of Communication	Email
Communication Response Time	Typically within 12-48 hours on weekdays for email

**COURSE INFORMATION**

Class Meeting Schedule	See schedule at end of syllabus
Class Meeting Days & Classroom	Tuesday / Thursday 11:00 am – 12:15 pm AG/ET 211
Textbooks Required	Machine Learning with PyTorch and Scikit-Learn, by Raschka, Liu, and Mirjalili. (978-1801819312)  The Hundred-Page Machine Learning Book, Andriy Burkov (free download at <a href="https://themlbook.com/wiki/doku.php">https://themlbook.com/wiki/doku.php</a> )
Software Required	Microsoft Office, Python (open source; can use on school computers)
Other Resources	Additional on-line videos and reading material (free)

## COURSE DESCRIPTION

This course allows for studying emerging topics in electrical engineering that are not present in the curriculum. This course will focus on Machine Learning (ML) applications with real-world data, including data scrubbing, visualization, and exploratory analysis; data preprocessing steps such as normalization and principle component analysis; ML algorithms to perform clustering, prediction, and classification; and potential impacts of machine learning and artificial intelligence on society. This class will focus on Python, but will also use Excel and MATLAB. Application areas are not limited to engineering, and can include such diverse fields as wildlife, human health performance, biology, etc. **Prerequisites:** Instructor's consent.

## STUDENT LEARNING OUTCOMES (SLOs)

Upon successful completion of this course, students will demonstrate the following SLOs:

- 1 **Fundamental concepts:** Describe important ML concepts, including unsupervised, supervised, and semi-supervised training; overfit & underfit; visualization, classification, regression, and clustering; data scrubbing; train-test split, and other preprocessing steps; sample bias; the curse of dimensionality & dimensionality reduction; performance metrics; training, test, and verification; shallow & deep learning; large language models (LLMs) & generative AI; ML and AI ethics in product development; and the process to develop a ML system.
- 2 **Algorithms and tools:** Use a variety of ML tools to develop code that performs visualization, dimensionality reduction, clustering, regression, and classification based on comma separated variable files and other data structures.
- 3 **Natural language processing (NLP):** Perform a variety of NLP tasks using ML tools, and outline process to develop a LLM from scratch.
- 4 **Code and algorithm development:** Use LLMs to aid in developing ML code, and develop algorithms with and without the use of LLMs and related generative AI tools. Develop code that supports re-use and reproducibility via internal and external documentation, including proper figure labeling.
- 5 **Student led seminars:** Research and present a topic to the class in a lecture style format, either individually or in teams.

## COURSE REQUIREMENTS

### Minimal Technical Skills Needed

Students should be reasonably proficient in Python and the basics of machine learning (typically covered in ENGR 2304 (Computing for Engineers) and ENGR 213 (Engineering Probability and Statistics). Although this course focuses on Python, students should be familiar with MATLAB and Excel.

## INSTRUCTIONAL METHODS

The instructional methods in this course include lectures, class discussion and participation, homework assignments, exams, supplemental video and reading assignments, and a final project designed to better prepare students for real-life situations that are more complex than standard textbook or typical classroom examples. In addition, this course incorporates seminar-style methods in which each student team will research and prepare a lecture. Instruction will be based on the course textbook, supplemental reading and videos, instructor experience. Since machine learning (ML) applications designed by engineers can have a significant societal impact, and because ML applications are often interdisciplinary, the class discussions will be broad-based, touching on many ML areas, and we will use a number of real-world datasets.

## STUDENT RESPONSIBILITIES AND TIPS FOR SUCCESS IN THE COURSE

### 1 Students are responsible for the following activities that will aid in success:

- **Attendance & participation:** Students are expected to attend class, show up on time, and participate in class activities. Class attendance & participation will be graded.
- **Supplemental Assignments:** Each student will be expected to complete in a timely manner the supplemental assignments involving reading and/or videos to enhance their understanding of ML.
- **Seminar Presentations:** This class will include a seminar-like component in which teams will be required to investigate and present specific ML techniques in a lecture-style format to the class. These presentations form an integral component to the classroom experience.
- **Homework Assignments:** Students are expected to submit HW assignments in a timely manner. Students are expected to request an extension if needed for any late submission. Late submissions will be penalized by default, although the penalty may be waived for extensions. Students are expected to submit both code and reports. Students are expected to follow the file name conventions and template requirements for both code and reports. Students are encouraged to correct and re-submit assignments subject to a nominal re-submit grade penalty.
- **Collaboration:** Students are expected to turn in their own work. However, students are also expected to collaborate on assignments since team collaboration is typically required for success as a working engineer. Students are expected to note any significant collaboration within the assignment submission (code and report).
- **Use of internet and artificial intelligence (AI) tools:** As with collaboration, students are expected to turn in their own work. However, most employers expect engineers to know how to use AI tools appropriately to aid in report writing, code development, and product design. Thus, students are encouraged to use AI tools to improve grammar and wording in reports, and students will be shown how to use AI tools to support code development and problem solving, and will be allowed to use AI tools on selected assignments. The use of AI tools for code generation and substantial editing must, however, be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).
- **Final project:** The final project will be a team exercise, with approximately 2-4 students per team working on a common problem, but with students focusing on different ML algorithms. Each student will submit their own project report.

### 2 Additional tips for success include:

- **Practice:** Learning requires practice; don't expect to learn just by watching the instructor or YouTube videos or your classmates. When learning ML and AI, one useful approach is to play with any adopted code to better understand how it works. In addition, generative AI tools can be useful for explaining how small code snippets work, and for outlining approaches to solving complex problems. But, students need to practice these techniques to (a) verify, and (b) learn.
- **Learning how to learn, how to collaborate, and how to use AI tools effectively:** Learning how to learn involves collaboration, reading, searching, and using powerful tools *while thinking critically*. One of the challenges in using AI tools is the potential impact on critical thinking that can be detrimental to an engineer's long-term career. Thus, students must think through solutions, and be able to create new designs without depending heavily on AI tools for long-term success.

## GRADING

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

A	B	C	D	F
100.00 – 90.00	89.99 – 80.00	79.99 – 70.00	69.99 – 60.00	<60.0

Overall grades will be based on a weighted average as shown below:

Assessment Type	Percent
Supplemental assignments	10
Seminar presentations	15
Homework	25
Final Project	25
Exams	25
<b>Total</b>	<b>100</b>

**Note:** There may also be opportunities for bonus points; these will be discussed in class.

### COURSE OUTLINE / CALENDAR

Wk.	Tue	Thu	Weekly Topic Plan	Notes	Assignment Plan
1	1/13	1/15	1: Intro to ML, Anaconda, Spyder, Jupyter Notebooks, CSV		SA1 & HW1: Intro to Machine Learning
2	1/20	1/22	2: Visualization and unsupervised learning		SA2 & HW2: Visualization
3	1/27	1/29	3: Visualization and unsupervised learning	<b>1/28 Census</b>	SA3 & HW3: Dimensionality reduction
4	2/3	2/5	4: Shallow classification methods		SA4 & HW4: Regression Survey
5	2/10	2/12	5: Shallow classification methods		SA5 & HW5: Classification survey
6	2/17	2/19	6: Regression methods, ML performance metrics		SA6 & HW6: Clustering survey
7	2/24	2/26	7: Regression methods		SA7 & HW7: Performance metrics
8	3/3	3/5	8: Midterm: review & exam	<b>Midterm</b>	
9	<b>3/10</b>	<b>3/12</b>	<b>9: Spring Break, no class</b>		
10	3/17	3/19	10: Deep learning methods	<b>Project kickoff</b>	
11	3/24	3/26	11: Natural language processing, student seminar 1		SA8 & HW8: CNN
12	3/31	4/2	12: Natural language processing, student seminar 2		SA9 & HW9: NLP
13	4/7	4/9	13: Project time, student seminar 3, 4		SA10 & HW10: Summary
14	4/14	4/16	14: Project time, student seminar 5, 6		
15	4/21	4/23	15: Project time		
16	4/28	4/30	16: Project time, project presentations	<b>Projects due!</b>	
17			Finals Week		

**Notes:**

1. The weekly topic and HW assignment plans are notional, and may be revised by the instructor as needed to optimize learning
2. Each supplemental assignment (SA) involves videos and/or reading assignments with a short summary report
3. Each homework assignment (HW) will include code development (Python and/or Jupyter notebook) and a report

## TECHNOLOGY REQUIREMENTS

### LMS

All course sections offered by East Texas A&M University (ETAMU) 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](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=universallmenu](https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universallmenu)

### 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](mailto: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 ETAMU campus open computer lab, etc.

## COMMUNICATION AND SUPPORT

### 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>

### Interaction with Instructor

If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will be through your university "myLeo" email, including emails from the instructor, whether direct or via D2L. Students are encouraged to check university email daily. You can ask questions during lectures or office hours. Students can also ask questions and make appointments outside of office hours via email.

## 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.

### **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 online in the [Student Guidebook](#). Students should also consult the [Rules of Netiquette Webpage](#) for more information regarding how to interact with students in an online forum.

### **ETAMU Attendance**

For more information about the attendance policy, please view the [Attendance Webpage](#) and the [Class Attendance Policy](#)

### **Academic Integrity**

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

[Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

[Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10](#)

[Graduate Student Academic Dishonesty Form](#)

### **Use of Artificial Intelligence**

East Texas A&M University 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 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.

### **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**

East Texas A&M University

Velma K. Waters Library Rm 162

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

Fax (903) 468-8148

Email: [studentdisabilityservices@etamu.edu](mailto:studentdisabilityservices@etamu.edu)

Website: [Office of Student Disability Services](#)

**Nondiscrimination Notice**

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

**East Texas A&M Supports Students’ Mental Health – Counseling Services**

The Counseling Center at East Texas A&M University, 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](http://www.tamuc.edu/counsel)

**Mental Health and Well-Being**

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.

