ENGR 2304: Computing for Engineers

Section 03E: Course Syllabus, Fall 2024
NOTE: EE students need to take one of the EE sections that focus on MATLAB and Python.
Rev 6, 10/28/2024

INSTRUCTOR INFORMATION

Instructor	Gerald L. Fudge, PhD
Office Location	AG/ET 217
Office Hours	Wednesday (9:00 am – 11:30 am) Friday (9:00 – 11:00 am, 1:00 pm – 2:00 pm)
Phone	Office: 903-468-8122
Office Fax	903-886-5960 (Inform instructor if fax is sent)
University Email Address	Gerald.Fudge@tamuc.edu
Preferred Form of Communication	Email, or per class discussion
Communication Response Time	Typically within 48 hours on weekdays for email

COURSE INFORMATION

Class Meeting Schedule	See schedule at end of syllabus
Class Meeting Days & Classroom	Tuesday / Thursday 12:30 pm – 1:45 pm, AG/ET 211
Textbooks Required	Machine Learning for Absolute Beginners: A Plain English Introduction (Third Edition), by Oliver Theobald. (ISBN-13: 979-8558098426); kindle or paperback.
Software Required	Microsoft Office, Matlab (can use school Matlab), Python (open source; can use on school computers)
Optional Software	Student Matlab Octave (open-source Matlab equivalent – students are responsible for verifying that any Octave code runs in Matlab)

The syllabus/schedule are subject to change

COURSE DESCRIPTION

This course introduces students to the use of computational tools to solve engineering problems. Topics include: problem identification and formulation, computational programming techniques, data transformation and visualization, effective plotting, regression analysis, interpretation of results, team collaboration, and introductory machine learning. Students will solve problems using modern computational tools such as MATLAB, Python, or Excel. **Prerequisites**: MATH 2413 (Calculus I) with min grade C.

Student Learning Outcomes

Upon successful completion of this course, students will achieve the following learning outcomes:
- Develop experience in identifying and formulating solutions to engineering problems using appropriate mathematical techniques implemented in computational tools
- Understand the role of linear algebra and probability & statistics in computational math
- Develop programming skills using computational tools such as MATLAB and Python
- Apply MATLAB and Python skills to solve computational problems in engineering
- Use Excel to perform simple data analysis and plotting
- Gain experience in collaborative teamwork
- Produce effective plots of numerical data using computational tools, including properly labeled plots that facilitate collaborative teamwork and reproducibility of results
- Understand basics of machine learning (ML) and be able to solve problems such as 2D-clustering or classification using ML techniques
- Understand impact on society of machine learning, and the need to avoid potential problems such as bias and profiling through inappropriate application of ML computational methods
- Understand how to learn new tools through individual and collaborative research

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Prerequisites: MATH 2413 (Min Grade C). Students must be able to access the Internet, use the D2L learning management system, and use Microsoft Office tools (Word, Excel, PowerPoint). Experience in programming, linear algebra & matrix math, and probability & statistics is helpful, but not required.

Instructional Methods

This is a Learning Assistant (LA) enhanced course. The instructional methods in this course include lectures, class discussion and participation, written assignments, quizzes problem solving, and assignments using MATLAB, Python, and Excel. In addition, the LA will provide additional one-on-one support, both in class and outside of class.

Student Responsibilities or Tips for Success in the Course

- **Attendance & Participation**: For optimum learning and grades, students need to attend class and participate; note that attendance and participation is a graded component.
- **Engage with the Instructor and LA**: The instructor and Learning Assistant are there to help you learn. The material in this class can be very difficult, so don't wait to get help.

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- **Homework**: The homework will consist primarily of computational coding assignments due approximately once per week to provide the coding experience required to develop competence in computational engineering. We will discuss selected student homework solutions during class, including code errors, lessons learned, problems encountered, and innovative approaches. Late work may be penalized, including a grade of zero, unless student has an acceptable excuse with a doctor's note or other legal documentation.
- **Homework Collaboration**: Students must turn in their own work, but student collaboration to help work through solutions, debug code, fix style errors, etc., is strongly encouraged.
- **Submission of Assignments**: Students shall submit assignments in D2L. If problems are encountered using D2L, then email may be used as a backup with instructor permission.
- **Quizzes**: Quizzes will be used to assess problem solving skills and provide student feedback. Student should bring a scientific calculator to class for quizzes.
- **Exams**: The exams will be closed book & closed notes, and will include a combination of written response questions and writing pseudo-code. The use of a personal phone is strictly prohibited during exams. Makeup exams may be offered with suitable documentation that fulfills University procedures provided to the instructor in a timely manner.
- **Use of Artificial Intelligence (AI) Tools**: Other than as directed by the instructor for specific homework assignments, AI tools, ChatBots, and other software that has the capacity to generate code, text, or suggest replacements for text beyond individual words is prohibited. Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

GRADING

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

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

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

Assessment Type	Percent
Participation and Attendance	10
Reading Assignments	10
Quizzes	10
Homework	35
Exams (Midterm, Final)	35
Total	**100**

Note: The homework grades will be based on accuracy, efficiency of solution, proper labeling of plots, and coding style. There may also be opportunities for bonus points; these will be discussed in class.

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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

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

Interaction with Instructor Statement

Use email, mobile, and office hours as presented under instructor information.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

As described above, student attendance and participation are required for this class.

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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 Procedure 13.99.99.R0.01, and

- 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
- 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:

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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/

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

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/34SafetyOf EmployeesAndStudents/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.

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COURSE OUTLINE / CALENDAR

Wk	Days		Unit / Topic	Notes
	Tues.	Thur.		
1	8/27	8/29	1. Matlab overview, IDE, and programming	
2	9/3	9/5	2. Matlab syntax, variables, load & plot data, programming	**9-4: Labor Day**
3	9/10	9/12	3. Matlab user functions, visualization with histogram	**9-13: Census Day**
4	9/17	9/19	4. Matlab time domain processing, complex sinusoids	
5	9/24	9/26	5. Matlab logic functions & indices; pulse detection example	
6	10/1	10/3	6. Matlab frequency domain processing, filter response	
7	10/8	10/10	7. Time frequency analysis and Matlab spectrogram	
8	10/15	10/17	8. Fourier transform and matrix algebra in Matlab	
9	10/22	10/24	9. Review, Midterm	**Midterm Exam**
10	10/29	10/31	10. Linear algebra in computing and regression in Matlab	
11	11/5	11/7	11. ML Overview; Regression & clustering with Python ML	
12	11/12	11/14	12. Classification with Python ML tools	
13	11/19	11/21	13. Working with Python ML tools, Excel intro & overview	
14	11/26	11/28	14. Excel spreadsheets, functions	**11-27->29: Break**
15	12/3	12/5	15. Excel graphing, pivot tables, statistics, final exam review	
16			Finals Week	**Final Exam**
Notes:				
	1. Specific dates are subject to change			

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