

Instructor

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Office Hours: T-Th 10-11:00 am



**KENNESAW STATE
UNIVERSITY**

SOUTHERN POLYTECHNIC
COLLEGE OF ENGINEERING AND
ENGINEERING TECHNOLOGY
Department of Mechanical Engineering

Faculty Web Page: <http://facultyweb.kennesaw.edu/aaphale/>

Course Description

Catalog Description (Credit Hours: 3)

This course provides an introduction to fundamental computing principles and programming concepts. Students use the high-level programming language, MATLAB to develop and implement programs to solve engineering problems. Basic programming concepts covered include: algorithm design, data types, flow control, functions, sorting, plotting, simulation, and numerical methods.

Prerequisites

MATH 1190, ME 1001 (Co-requisite). If you do not meet the prerequisite requirements, you are expected to withdraw from this course. If it is discovered that a student is lacking in prerequisites (at any time during the semester), the instructor reserves the right to remove the student from the class and assign a grade of W (or WF if past the drop date).

Course Details

Semester: Fall 2022
Course name: MATLAB for Engineers with Application
Course number: ME 1131
Section number: 01
Meeting times: M/W 8:00-9:15 pm
Room number: Engineering Technology Center, Room 303

Course Learning Outcomes

Upon completion of this course, students should have the ability to:

- Introduce vectors and matrices in MATLAB,
- Apply basic concepts of Linear Algebra for vector and matrix operations,
- Perform 2D and 3D plotting,
- Formulate and solve systems of linear equations by Gaussian elimination, and matrix inversion,
- Write conditional statements and loops,
- Write Scripts and functions in MATLAB,
- Solve some engineering problems using MATLAB,
- Apply the fundamental knowledge of mathematics, science & engineering, to solve the real mechanical engineering problems (through case studies).

Performance Indicators for Assessment of ME Program Student Outcomes:

1. "Demonstrate an ability to use modern tools and techniques, such as MATLAB and SolidWorks, for mathematical or computational modeling, and analysis of results. Assessment Exercise: Last test on polynomials, differentiation and integration."
2. "Demonstrates an ability to use modern tools and techniques for measurement, data acquisition and analysis. Assessment Exercise: Lab assessment 2 or quiz 2 in which the student should use the commands and functions that he/she has learned to plot the 2D and 3D graphs."
3. "Demonstrates an ability to write and use high level programs to solve mechanical engineering problems. Assessment Exercise: Case study or final project for which the student is required to write the Matlab code to solve a mechanical engineering problem."

Topics covered

MATLAB environment and important commands

- Linear Algebra and matrix operations
- Fundamental engineering computing and statistics
- Save, load, display and fprintf and other similar commands
- Communication with Excel
- 2D (normal, logarithmic and subplots) and 3D plotting
- Solutions to systems of linear equations
- Conditional statements (if statements, also any, all, find and other commands)
- Loops (for and while loops)
- MATLAB scripts and functions
- Polynomials, including numerical and symbolic differentiation and integration (trapz, quadl, integral, int, diff and other commands)
- Using MATLAB for simple and complicated engineering problems (applying MATLAB to solve problems related to mechanical engineering problems; thermal/fluid and solid mechanics)

Textbook

The textbook "Solving Mechanical Engineering Problems with MATLAB" written by Simin Nasseri, Linus Publications, 2015, (ISBN: 978-1-60797-524-3) will be used for this course.

Students should work on practice lab problems to get ready for tests and lab assignments. MATLAB has been installed on all Q building labs' computers and it can be downloaded to be used at home as well. Please see the instruction in D2L.

Important Dates

- First day of class: Aug 15, 2022
- Add/drop date: Aug 15-19, 2022
- Last day to withdraw: Oct 11, 2022 (w/o penalty)
- Last day of classes: Dec 5, 2022
- Final Exams start: N/A

Course Delivery

KSU may shift the method of course delivery at any time during the semester in compliance with University System of Georgia health and safety guidelines. In this case, alternate teaching modalities that may be adopted include hyflex, hybrid, synchronous online, or asynchronous online instruction.

COVID-19 Illness

If you are feeling ill, please stay home and contact your health professional. In addition, please email

your instructor to say you are missing class due to illness. Signs of COVID-19 illness include, but are not limited to, the following:

- Cough
- Fever of 100.4 or higher
- Runny nose or new sinus congestion
- Shortness of breath or difficulty breathing
- Chills
- Sore Throat
- New loss of taste and/or smell

COVID-19 vaccines are a critical tool in “Protecting the Nest.” If you have not already, you are strongly encouraged to get vaccinated immediately to advance the health and safety of our campus community. As an enrolled KSU student, you are eligible to receive the vaccine on campus. Please call (470) 578-6644 to schedule your vaccination appointment or you may walk into one of our student health clinics.

For more information regarding COVID-19 (including testing, vaccines, extended illness procedures and accommodations), see KSU’s official [Covid-19 website](#).

Face Coverings

Based on guidance from the University System of Georgia (USG), all vaccinated and unvaccinated individuals are encouraged to wear a face covering while inside campus facilities. Unvaccinated individuals are also strongly encouraged to continue to socially distance while inside campus facilities, when possible.

Technical Requirements

Access to D2L is essential for the course material and instructions.

Grading Policy

Attendance	5%
Assignments	30%
Tests/Quiz	40%
Case Study	25%
Total	100%

Grade Conversion: A: (90-100), B: (80-89), C: (70-79), D: (60-69), F: (0-59)

Course Expectations

Course Communication

Students are expected to check emails and D2L for the updates or questions related to the course. All the lecture notes, assignments and any announcements will be communicated through D2L.

Students are required to email me from their outlook account (not from D2L) for any communication. It is your responsibility to check D2L for any announcements and due dates that I post. Be sure to check D2L regularly.

Attendance Policy

Students are expected to attend all classes for their full length. Significant absence in class may result in grades penalty. See section below on *Staying Home When Sick*.

Assignments

Assignments are from the previous practice labs and other materials taught in class. You need to prepare the list of MATLAB commands and use them during the lab assignments. During the allocated time, you answer the questions by typing appropriate commands and then print the assignment sheet in the lab. Some

assignments will be hand-written.

Information about case studies will be given in detail. You will use MATLAB to solve some engineering problems. You can make a GUI (Graphical User Interface), if you wish. A manual will be provided by me. This is actually a self-training step in finishing this MATLAB course via which you learn how to create a program which communicates with the user graphically. Besides, students are encouraged to choose the case studies related to sound and image processing if they wish and related course materials will be provided for them.

Tests

Tests will be proctored and will be announced well before the test dates. Some are hand-written and for some you need to use MATLAB.

Course Outline

* Note that the Instructor may update the schedule any time. See online version on D2L for updates. See *Assignments* and Announcements on D2L for specific homework problems that may be collected for grading and their due dates.

Tentative Schedule:

Week 1	Introduction to MATLAB
Week 2	Scalars, Vectors and Matrices
Week 3	fprintf, save, load and other commands
Week 4	Plot commands
Week 5-6	Scripts and Functions
Week 7-8	Solving the System of Equations
Week 9-10	Conditional Statements
Week 11	Loops
Week 12	Polynomial Functions

Case Studies Guidelines: Your case studies weigh 25% of your total grade. These can either be related to engineering (eg. Bernoulli's Equation and Pump Performance Charts, etc) or physics problems or anything else related to your jobs. Remember that each case study should be more difficult than the problems I give you in lab or the ones assigned as homework. You should first get your case studies approved by me.

First Draft: April 12th (Spring Semester), Nov 15th (Fall Semester)

Print out the engineering problem + the MATLAB function Final project (presentations): May 1st (Spring Semester), Dec 4th (Fall Semester)

Points will be taken off for late submission. Follow these guidelines for submitting your case studies reports:

- 1- As the first page of your report, choose a suitable title for your case study, write your name, my name, name of the class, date, etc,
- 2- Clearly state the problem. Use a couple of figures to clarify the problem chosen (in some case studies, this is not required and you can use only the flowchart. However in some like the projectile or oblique impact or modal temperature distribution, flow in the pipe, etc, you need to insert the figures),
- 3- Write the equations neatly (use the equation editor in MS Word and do not write by hand),
- 4- Indicate the inputs and outputs and what exactly the function does. Copy your function from MATLAB editor and paste it into the MS Word,
- 5- Attach all the output results, including the output data and figures that you get after running the function. Place the screen shots of MATLAB when you run your program.

KSU Academic Integrity Statement

Every KSU student is responsible for upholding the provisions of the [Student Code of Conduct](#), as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.

Help Resources

Contacts to get Help

Student Help Desk: email studenthelpdesk@kennesaw.edu or call 470.578.3555 or go to this webpage for the [KSU Service Desk Portal](#) or go to: <https://uits.kennesaw.edu/>

All Federal, BOR and KSU Student Policies, and COVID-19 Policies

<https://cia.kennesaw.edu/instructional-resources/syllabus-policy.php>

KSU Student Resources (including Wellness and Academic)

<https://cia.kennesaw.edu/instructional-resources/syllabus-resources.php>

KSU Coronavirus (COVID-19) Information and Recourses

<https://coronavirus.kennesaw.edu/>

SPCEET College CLUE Center (*formerly the Peer Tutoring Center*)

The Southern Polytechnic College of Engineering and Engineering Technology CLUE (Collaborative Learning for Undergraduate Engineering) Center provides free peer-based academic support for a selection of engineering and engineering technology courses. Tutoring is offered Monday through Saturday, both face-to-face and online. Face-to-face tutoring is in room 306 of the Engineering Technology Center (Building Q) on a drop-in basis and online is by [appointment](#). Tutoring for a given subject is available according to a weekly schedule, based on the tutors' availability. During those hours, students are welcome to receive tutoring from a peer who has already earned either an A or a B in the course. For additional information, visit the [CLUE Center website](#).

Basic Needs Security Statement

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact CARE Services (care.kennesaw.edu). The Campus Awareness, Resource and Empowerment (CARE) Services offers support to students who have experienced homelessness, food insecurity and/or the foster care system. Contact them at 470-578-5260 or careservices@kennesaw.edu for help.



KSU CARES

CAMPUS PANTRY

KSU CARES provides food for ANY KSU student. Pantries located on both campuses.

CASE MANAGEMENT

Case Managers provide students with individualized plans intended to empower the student to work towards their daily living needs.

KENNESAW CAMPUS

Carmichael Student Center, Room 172

MARIETTA CAMPUS

JMW Student Center, Room 184

care.kennesaw.edu | 470-578-5260

CARE always Cares



KENNESAW STATE UNIVERSITY

EMERGENCY ASSISTANCE PROGRAM

ELIGIBILITY

Open to all currently enrolled KSU students with a FAFSA on file.

FINANCIAL ASSISTANCE

Financial assistance is available on a case-by-case basis to assist students in overcoming unforeseen hardships.

CONNECTION TO RESOURCES

Beyond financial assistance, staff work to connect students with on-campus and off-campus resources to relieve financial burdens.

emergencyassistance.kennesaw.edu

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