

MATLAB for Engineers with Application (ME 1311) Course Syllabus

Instructor: Dr Simin Nasserri (Professor of Mechanical Engineering)

Office: Q 150

Email: snasser1@kennesaw.edu

Website: <http://facultyweb.kennesaw.edu/snasser1/>

Check the website for office hours, class time and room.

Course Software/ Text (REQUIRED):

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

Order the textbook here:

<https://linuslearning.com/product/solving-mechanical-engineering-problems-with-matlab-2/>

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.

Prerequisite: MATH 1190, ME 1001 (co-requisite)

Course introduction:

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.

Course grade determination:

Your grade in this course will be determined from your performance on lab assignments (in-class assignments or quizzes), case study (includes the presentation of your project), and tests. The main emphasis of the course is on gaining practical skills. For this reason, the lab sessions are essential and should not be missed. Attendance is mandatory and points will be taken off for unexcused absence.

Attendance	5%
Lab assignments	30%
Tests	40%
<u>Case Study</u>	<u>25%</u>
Total	100%

[90 - 100% = A, 80 - 89% = B 70 - 79% = C 60 - 69% = D Below 60% = F]

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

Lab 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.

Course content- Topic coverage:

- 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)

Course Outcomes:

By the end of this course, students will be able 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).

Tentative Schedule for lab assignments and tests:

You can use your list of commands for these assessments.

Lab Assignment /Quiz/Test	Chapters of the book
Online Quiz 1	Chapters 1 and 2
Lab 1	Chapter 2
Online Quiz 2	Chapters 2 and 3
Lab 2	Chapter 4
Test 1	Chapters 2, 3 and 4
Lab 3	Chapter 5 (and previous ones)
Lab 4 (Homework assignment)	Chapters 5, and 7 (and previous ones)
Test 2	Chapters 2 to 7 (mainly 5 and 7)
Case study (Instead of final exam)	All
Test 3	Chapters 9 and 10

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)

Email your function (.m file) + your report (.doc file)+ the input files and images to metengcomp@gmail.com.

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.

Grading policy:

5%	Appearance (Assembly and Organization)
20%	Defining the problem (equations, figures, flowcharts, etc)
15%	Explaining how your function works (inputs and outputs and every section of the function)
40%	Function is written professionally(**) (fprintf, clc, help line at the beginning, fool-proofing, logical statements, correct loops, avoiding repetitions, etc)
20%	Results: How you call the function, Output values you get, figures and anything you want your function to do.
100%	Total

As will discuss in class, Plagiarism cannot be tolerated and the penalty is that the student not only gets zero for the case study, but also he/she will fail the course. You can review [this document](#) related to Plagiarism.

Check D2L and find the following documents on your case studies: 1-

Components of a flowchart

2- How to draw a flow chart using www.draw.io 3-

How to type equations in Microsoft Word

4- Case study draft samples

5- Matlab case study- A sample

ACADEMIC HONESTY:

The high quality of education at Kennesaw State University is reflected in the credits and degrees its students earn. **All assignments must be your own work and original for this course.** The protection of these high standards is crucial since the validity and equity of the University's grades and degrees depend upon it. Any student found to have violated any KSU academic honesty regulation after a hearing before a university hearing panel or before the Vice President for Student Success and Enrollment Services (or his/her designee) shall be suspended for at least one semester, unless the student persuades the deciding body that the circumstances of his or her behavior substantially mitigate the gravity of the violation. These regulations are designed to assist students in (1) developing appropriate attitudes about, and (2) understanding and following the university's standards relating to academic honesty. The regulations protect students by helping them avoid committing infractions that may compromise the completion of their KSU degrees or damage their reputations.

Student Conduct Pledge/Statement: As a member of the Kennesaw State University community of scholars, I understand that my actions are not only a reflection on myself, but also a reflection on the University and the larger body of scholars of which it is a part. Acting unethically, no matter how minor the offense, will be detrimental to my academic progress and self-image. It will also adversely affect all students, faculty, staff, the reputation of this University, and the value of the degrees it awards. Whether on campus or online, I understand that it is not only my personal responsibility, but also a duty to the entire KSU community that I act in a manner consistent with the highest level of academic integrity. Therefore, I promise that as a member of the Kennesaw State University community, I will not participate in any form of academic misconduct.

Types of Academic Misconduct:

- 1) **Cheating:** Receiving, attempting to receive, knowingly giving or attempting to give unauthorized assistance in the preparation of any work required to be submitted for credit (including examinations, laboratory reports, essays, themes, term papers, etc.) is considered cheating, as is engaging in any behavior that a professor prohibits as academic misconduct in the syllabus or class discussion. Unless specifically authorized, using and/or having access to electronic devices during an examination, quiz, test or other assessment is automatically considered cheating, regardless of the student's reason for using/accessing the device;
- 2) **Plagiarism:** Including direct quotations from other sources into work required to be submitted for credit without indicating them as such by quotation marks, block quotes or other appropriate formatting. Incorporating the work of someone (e.g. ideas, theories, data, figures, graphs, programs, electronic based information, illustrations, etc.) into a paper or project without due acknowledgement;
- 3) **Self-Plagiarism:** Submitting any work for credit which was not authored specifically and originally for the assignment in question without the prior permission of the professor receiving that assignment. Most commonly, this means submitting the same, or substantially the same, paper or other assignment for credit in more than one class;
- 4) **Misrepresentation and/or Falsification:** Knowingly providing false information in completing University forms or applications (including admissions forms, scholarship applications, time sheets, false or counterfeit transcripts, etc.) or in any work submitted for credit. This includes providing fabricated/altered documents to substantiate an excused absence (such as to meet attendance requirements or have the chance to make-up a missed exam). Signing in for another student or having another individual sign in on a student's behalf on an attendance sheet also constitutes a violation of this code section.
- 5) **Unauthorized Access to University Materials:** Taking, attempting to take, stealing or in any unauthorized manner otherwise procuring, gaining access to, altering or destroying any material pertaining to the conduct of a class (including tests, examinations, grade change forms, grade rolls, roll books, laboratory equipment, University grade records in written or computerized form, etc.).
- 6) **Malicious/Intentional Misuse of Computer Facilities/Services:** Maliciously or intentionally misusing university-controlled computer facilities and services. This includes violations of state and federal laws (e.g. copyright violations, unauthorized access to systems, alteration/damage/destruction, or attempted alteration/damage/destruction, use for profit, etc.) or a department's rules for computer usage (e.g. account violations, damage, or destruction of the system and/or its performance, unauthorized copying of electronic information, use of threatening or obscene language, etc.).

7) Malicious **Removal, Retention or Destruction of University Resource Materials:** Misplacing, taking, destroying any item or part of an item belonging to or in the protection of the University (or the attempt thereof) with the intention of bringing about an undue disadvantage in the academic pursuits of other Kennesaw State University students.

These examples of academic dishonesty shall not be construed to be comprehensive, and infractions will be dealt with on an individual basis according to university policies and procedures. It is the obligation of each student to assist in the enforcement of academic standards.

See: **The KSU Student Code of Conduct at KSU Codes of Conduct-2015.pdf**

Enforcement: This policy is strictly enforced. Please note, **I reserve the right to select any paper and/or assignment that are turned in for a grade for plagiarism review. Plagiarism review consists of running your paper/assignment through various search engines and databases at my disposal in order to check for “borrowed” or “bought” information. Students will be required to use TurnItIn.Com to have their papers reviewed for plagiarism.** If you are found in violation of academic dishonesty, then you will be subject to the enforcement policies and procedures, as outlined by the University and the Department.

Turnitin

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site.

WEB ACCESSIBILITY:

Kennesaw State University follows the guidelines of the Universal Design for Learning standard of web accessibility. Faculty use Word, PDF, and HTML formats when communicating electronic information to students whenever possible and appropriate in light of the goals of the course. Faculty are trained to use Web Accessibility Evaluation tools, e.g., WAVE (www.wave.webaim.org), and make adjustments as possible and appropriate in light of the goals of the course. For free resources available to students on web accessibility, please visit the Web Accessibility Resources page at the Distance Learning Center:

<http://www.kennesaw.edu/dlc/facultyresources/index.php#>

Kennesaw State University provides program **accessibility** and reasonable accommodations for persons defined as disabled under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) please contact the Office for Student Disability Services (SDS). Kennesaw Campus, 470-578-2666 or Marietta Campus, 678-915-7244. Please do not request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services (SDS).

Also check Accessibility Statements for Technologies:

<https://softchalkcloud.com/lesson/serve/jV10GKPfztZwQn/html>

For additional information see:

<http://digitalcommons.kennesaw.edu/accessibility.html>

<http://commencement.kennesaw.edu/guests/accessibility.php>

KSU SEXUAL MISCONDUCT POLICY:

Kennesaw State University adheres to KSU's policy prohibiting sexual misconduct both in and out of the classroom. Questions about this policy should be directed to the KSU Equal Employment Opportunity (EEO) and Title IX officer by telephone at (470) 578-2614. You may also visit the University's EEO website

<http://www.kennesaw.edu/eeo/index.html> for more information.

COPYRIGHT LAW:

Kennesaw State University adheres to USG's policy to respect the right of copyright. Holders and comply with copyright laws as set forth in the United States Copyright act. For more information, see the following link to USG's policy: <http://www.usg.edu/copyright/>

STUDENT RECORDS/FERPA:

Kennesaw State University adheres to the Family Educational Rights & Privacy Act of 1974 – FERPA. See the following link for more information:

http://www.usg.edu/information_technology_handbook/section9/tech/9.5_privacy_and_security

Privacy Policies:

Desire 2 Learn - <https://www.d2l.com/legal/privacy/>

Blackboard Collaborate - <https://sas.illuminate.com/privacy.html>

ELECTRONIC RECORDING AND SOCIAL MEDIA:

Electronic recording performed without the consent of the people being recorded chills the free exchange of ideas. Academic freedom, free inquiry, and freedom of expression should not be limited by the fear that one's brainstorming, polemic discourse, speculative inquiry, or any other kind of expressed curiosity made within the space of a university classroom will be made public without one's consent. This fear is unacceptable regardless of whether one is in an online, hybrid, or face-to-face classroom setting. Accordingly, no person shall make public any electronically recorded class discussion without the written permission of the instructor. This policy is not intended to discourage electronic recording in the classroom or the use of social media when such actions are performed with the written consent of the instructor, and others as appropriate. Note: Faculty accommodate all reasonable requests to electronically record a class discussion; these requests must be documented by the Disabled Student Support Services available at: http://www.kennesaw.edu/stu_dev/dsss/prospect.shtml

DISRUPTION OF CAMPUS LIFE STATEMENT:

It is the purpose of the institution to provide a campus environment, which encourages academic accomplishment, personal growth, and a spirit of understanding and cooperation. An important part of maintaining such an environment is the commitment to protect the health and safety of every member of the campus community. Belligerent, abusive, profane, threatening and/or inappropriate behavior on the part of students is a violation of the Kennesaw State University Student Conduct Regulations. Students who are found guilty of such misconduct may be subject to immediate dismissal from the institution. In addition, these violations of state law may also be subject to criminal action beyond the university disciplinary process.

COURSE ENROLLMENT POLICY:

Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal.

STUDENT SUPPORT RESOURCES

The following resources and policies are found under this link:

<http://learnonline.kennesaw.edu/resources/index.php>

DISABLED STUDENT SUPPORT SERVICES

In compliance with applicable disability law, qualified students with a disability may be entitled to reasonable accommodation. Any student with a documented disability (hidden or visible) needing academic adjustments, including classroom or test accommodations is requested to notify the instructor within the first two weeks of the course. **Verification from KSU Disabled Student Support Services is required. All discussions and documentation will remain confidential.**

Disabled Student Support Services

James V. Carmichael Student Center Addition – 2nd Floor, Suite 267

470.578.6443

http://www.kennesaw.edu/stu_dev/dsss/prospect.shtml

Please visit the following Student Disabilities Services website for more information.

[//www.kennesaw.edu/stu_dev/sds](http://www.kennesaw.edu/stu_dev/sds)

Student Rights and Responsibilities

Students of Kennesaw State University are entitled to an environment that is conducive to learning and individual growth. To this end, students enrolling at Kennesaw State University assume a responsibility to abide by the policies and regulations expressed in this section. By doing so, students may fulfill their responsibilities and enjoy the exercise of their own rights while also respecting the rights of others.

All rights and responsibilities may be found in the University Catalog at

[//catalog.kennesaw.edu](http://catalog.kennesaw.edu)

Help Resources

Contacts to get Help

Student Help Desk studenthelpdesk@kennesaw.edu or call 470.578.3555

D2L FAQ's [click here](#)

D2L Student User's Guide [click here](#)

UITS Student Training Workshop Schedule [click here](#)

Additional Resources

Remote access to Library Resources: <http://library.kennesaw.edu/>

Student Support:

http://learnonline.kennesaw.edu/resources/student_support_resources.php

Tutoring and Academic Support: http://learnonline.kennesaw.edu/resources/tutoring_academic_support.php

Advising: <http://learnonline.kennesaw.edu/resources/advising.php>

Bookstore: <http://bookstore.kennesaw.edu/home.aspx>