The University of Texas at Austin
Department of Civil, Architectural and Environmental Engineering

CE 311K – Introduction to Computer Methods – Spring 2023
Unique: 16130, 16135, 16140

INSTRUCTOR: Dr. Christian Claudel
ECJ 6.208
e-mail: christian.claudel@utexas.edu

MEETINGS: Tuesdays and Thursdays: 11:00AM-12:30PM
Location- UTC 3.102
Zoom Meeting Link: https://utexas.zoom.us/j/4923437507

OFFICE HOURS: Wednesdays 11-12PM and by appointment (ECJ 6.208)

I encourage students to attend office hours. The next best method to get in touch with me is by email. Please allow 24 hours for an email response on business days.

TEACHING ASSISTANTs: Hassan Iqbal, Hari Priya Kandasamy
LAB SESSIONS: Tuesday 2:00pm-4:00pm (16130), ECJ 2.210 Zoom link TBD
Wednesday 2:00pm-4:00pm (16135), ECJ 2.210 Zoom link TBD
Tuesday 4:00pm-6:00pm (16140), ECJ 2.210 Zoom link TBD

OFFICE HOURS: Session 16130 TBA
Session 16135: TBA
Session 16140: TBA

WEB PAGE: You will find the online materials for this course on Canvas at: https://courses.utexas.edu/

COURSE CATALOG DESCRIPTION: CE 311K is a required course for both CE and ARE majors. The course provides an introduction to engineering software (MATLAB) and numerical methods. This course will help you to formulate and solve (using computers) various scientific problems. Both skills are essential to succeed as an engineer.

PREREQUISITE: Mathematics 408D

ACADEMIC/LEARNING GOALS: This class is an introduction to computers and computer methods for Civil Engineers. Computers are now prevalent, and allow us to solve a number of problems that were intractable before. The two main objectives of the class are:

(1) Present basic elements of programming and computing using MATLAB
(2) Introduce numerical methods for solving classical engineering problems

By taking this class, you will be able to:

(1) Develop programs for reading, manipulating, exporting and plotting data in MATLAB language
(2) Organize a plan for solving engineering problems
(3) Select appropriate computational tools for solving a given problem

(4) Use numerical methods to obtain solutions to these problems

TEXTBOOK AND READINGS:

There are no textbooks required for this class.
For reference, you can use MATLAB for Engineers, Holly Moore, Third edition

Supplemental reading material will be distributed on the course website (Canvas) or in class.

GRADING:

Grade components will be weighted as follows in the computation of the final course grade:

Quizzes	30%
Homeworks	30%
Labs	30%
Final (take home)	10%

The correspondence of letter grade to numerical grade is:

A:	grade $\geq$ 93
A-:	90 $\leq$ grade < 93
B+:	87 $\leq$ grade < 90
B:	83 $\leq$ grade < 87
B-:	80 $\leq$ grade < 83
C+:	77 $\leq$ grade < 80
C:	73 $\leq$ grade < 77
C-:	70 $\leq$ grade < 73
D+:	67 $\leq$ grade < 70
D:	63 $\leq$ grade < 67
D-:	60 $\leq$ grade < 63
F:	grade < 60

As the plus/minus system allows fairer grading, assigned grades will **strictly** follow calculated scores.

5 Quizzes will be given, these quizzes are open book and notes, and time limited. No communication is allowed between students during quizzes.

Homework consists of traditional problem sets as well as short written questions relating to the course materials and reading. Homework assignments should be completed individually, but I encourage study groups for discussion. Length of homework assignments will vary, and weighting of homework grades will vary with length and difficulty.

All assignments **are due at midnight (23:59 CST) of the posted date** and those turned in late will have a grade reduced by 20%. No assignments will be accepted if turned more than **24 hours** after the due date and time.

GRADE DISPUTES:

Your grades will be posted on Canvas and you should check there often to make sure that the posted scores are correct. Any grade disputes need to be made in writing to the instructor up to ***3 calendar days*** after the grades have been posted on Canvas or distributed in class, whichever occurs first, regardless of whether the student in question was present in class or not. No dispute will be accepted after the deadline.

ATTENDANCE:

Attendance in this class highly encouraged. Attendance is not factored in the grade.

COURSE/INSTRUCTOR EVALUATIONS:

An evaluation of the course and instructor will be conducted at the end of the semester using the approved UT Course/Instructor evaluation forms. Feedback from students will be requested throughout the semester.

GENERAL ADMINISTRATIVE RULES AND ANNOUNCEMENTS:

Sharing of Course Materials is Prohibited: No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Class Recordings: Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

COVID Caveats: To help keep everyone at UT and in our community safe, it is critical that students report COVID-19 symptoms and testing, regardless of test results, to University Health Services, and faculty and staff report to the HealthPoint Occupational Health Program (OHP) as soon as possible. Please see this link to understand what needs to be reported. In addition, to help understand what to do if a fellow student in the class (or the instructor or TA) tests positive for COVID, see this University Health Services link.

Scholastic dishonesty policy:
Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site:
http://deanofstudents.utexas.edu/sjs/.

Students with disabilities:
The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259 (voice) or 512-410-6644 (video phone) or http://www.utexas.edu/diversity/ddce/ssd.

Counseling:
The University of Texas at Austin maintains extensive counseling facilities for students. Resources are available at http://www.utexas.edu/student/cmhc/. The instructor recommends that you visit this website to become acquainted with the range of services available.

Drop policy for long sessions:
Undergraduate Students: From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 13th class day through the university's academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor. After the academic drop deadline has passed, a student may drop a course only with Dean's approval, and only for urgent, substantiated, non-academic reasons.

Graduate Students: From the 1st through the 4th class day, graduate students can drop a course via the web and receive a refund. During the 5th through 12th class day, graduate students must initiate drops in the department that offers the course and receive a refund. After the 12th class day, no refund is given. No class can be added after the 12th class day. From the 13th through the 20th class day, an automatic Q is assigned with approval from the Graduate Advisor and the Graduate Dean. From the 21st class day through the last class day, graduate students can drop a class with permission from the instructor, Graduate Advisor, and the Graduate Dean. Students with 20-hr/week GRA/TA appointment or a fellowship may not drop below 9 hours.

Class web sites, use, and student privacy:
This class will use Canvas for posting course announcements, changes to the syllabus, schedule, grades, additional reading materials, assignments, etc. I will also send messages via e-mail over the course e-mail list which I inherit from the registrar/CLIPS. IT IS YOUR RESPONSIBILTY to make sure that address is up-to-date and an address you read frequently – and one that has space to receive messages. E-mails bounced back to me are not my responsibility. As to privacy, let me know as soon as possible if you do not want your name on class lists, etc. The University has this policy: Web-based, password-protected class sites will be associated with all academic courses taught at the University. Syllabi, handouts, assignments and other resources are types of information that may be available within these sites. Site activities could include exchanging e-mail, engaging in class discussions and chats, and exchanging files. In addition, electronic class rosters will be a component of the sites. Students who do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1. For information on restricting directory information, see the Undergraduate Catalog.

Wearing a recommended protective face mask at all times when inside university buildings will be mandatory except when alone in a private office, eating in a campus dining facility or when students are in their own residence hall rooms. UT will encourage compliance by increasing awareness and fostering a spirit of cooperation. Students who refuse to follow directives to wear a mask will be referred to Student Conduct and Academic Integrity in the Office of the Dean of Students for disciplinary action.
More information on how you can help keep our campus healthy this Fall can be found here: "Protect Texas Together."

IMPORTANT DATES:.

January 3	Tuition payment deadline is 5:00 p.m. for undergraduate students
	Orientation for new international students
January 4	New student orientation for freshman and transfer students (online only)
January 5 - 8	Spring registration for all students (check your registration information sheet for access times)
January 9	First day of classes
January 9 - 25	Spring registration for all students
January 12	4th class day
	Last day to add a class without permission
	Tuition payment deadline is 5:00 p.m. CST for graduate and law students
January 16	Martin Luther King, Jr. Day; no classes held
January 25	12th class day
	Last day to drop a class without permission
	Last day to add a class (approval required)
	Tuition payment deadline is 5:00 p.m. CST for undergraduate, graduate, and law students
	Payment for added classes ("Add Bill") is due 11:59 p.m. Any owed balance after this will be automatically placed on an installment plan.
March 13 - 18	Spring Break
March 14	Payment for remaining tuition balances due by 11:59 p.m. CST

March 21	Last day an undergraduate may: Q-drop a class; withdraw; change a class to pass/fail
	Last day to apply for an undergraduate degree
March 31	Last day to apply for a graduate degree
April 3 - 14	Summer 2023 and Fall 2023 registration for continuing and readmitted students
April 7	Last day a doctoral candidate may hold a dissertation defense for the Spring 2023 semester
April 17	Last day a graduate student may change registration in a class to or from the credit/no credit basis
April 21	Last day to submit a master's report, recital, thesis, doctoral dissertation, or treatise to the graduate dean
April 24	Last class day
	Last day an undergraduate may, with the required approvals, request a non-academic Q-drop
	Last day an undergraduate may register in absentia
	Last day a graduate student may, with the required approvals, drop a class or withdraw from the university
April 25 - 26	Study days (no-class days)
April 27 - 29 & May 1	Final exams
May 6	University commencement (official graduation date)
May Term 2023	
May 2 - May 31	May Term (optional; may be used for courses such as study abroad, etc.)
May 29	Memorial Day; no classes held
January 3	Tuition payment deadline is 5:00 p.m. for undergraduate students
	Orientation for new international students
January 4	New student orientation for freshman and transfer students (online only)

SCHEDULE:

Note: The course schedule is subject to change. Any changes will be communicated in advance and posted on Canvas.

Week	Lecture	Date	Topic	Assignment	Lab
1	1 2	Jan 10 Jan 12	Course Introduction – Introduction to computers Introduction to numbers -bases		
2	3	Jan 17	Number encoding – integers and floats	HW 1	Lab 1
	4	Jan 19	Number encoding -integers and floats		
3	5	Jan 24	Programming in MATLAB (conditional control)		Lab 2
	6	Jan 26	Programming in MATLAB (loop control)		
4	7	Jan 31	Vector spaces		Lab 3
	8	Feb 2	Operations on scalars, vectors and matrices		
5	9	Feb 7	Operations on scalars, vectors and matrices		Lab 4
	10	Feb 9	Operations on scalars, vectors and matrices		
6	11	Feb 14	Symbolic toolbox	HW 2	Lab 5
	12	Feb 16	Symbolic toolbox		
7	13	Feb 21	Classification of engineering problems		Lab 6
	14	Feb 23	Numerical methods: differentiation and gradients		
8	15	Feb 28	Numerical methods: differentiation and gradients		Lab 7
	16	Mar 2	Numerical methods: integration		
9	17	Mar 7	Numerical methods: integration	HW 3	Lab 8
	18	Mar 9	Solutions to nonlinear equations		
10	19	Mar 14	Spring break		
	20	Mar 16	Spring break		
11	21	Mar 21	Solutions to nonlinear equations		Lab 9
	22	Mar 23	Solutions to linear systems of equations		
12	23	Mar 28	Example problems involving linear systems of equations	HW 4	Lab 10
	24	Mar 30	Approximate solutions to linear systems of equations (least squares)		
13	25	Apr 4	Integration of ordinary differential equations		Lab 11
	26	Apr 6	Integration of ordinary differential equations		
14	27	Apr 11	Integration of ordinary differential equations	HW 5	No lab
	28	Apr 13	Optimization – introduction		
15	29	Apr 18	Optimization – linear and nonlinear programs		Lab 12
	30	Apr 20	Example solutions to linear programs		