

CDS 130 Computing for Scientists

Spring 2022

Class Meetings:

- Tuesday & Thursday 10:30-11:45 @ G205

Instructor Information:

- Instructor: Dr. Sohyun Park, spark230@gmu.edu
- Office Hours: TR 14:00-16:00 @ G656

Prerequisite:

- No formal prerequisites.

Course Description:

CDS-130 is an introductory course about how to think computationally. Thinking computationally is a problem-solving methodology where computational tools (e.g., MATLAB) are used to solve scientific problems. Thinking computationally approaches problem solving by first developing a theoretical model to represent what is happening in a natural event and then converting that model into a computer simulation to solve the problem being investigated.

Examples of natural problems that will be solved in CDS-130 include modeling the population of rabbits on an island over time, the quantities of chemicals as they decay, or how to use random numbers to play a game with dice. In this course, you will learn how computer algorithms are developed to model events, how they are used to solve problems and how to use MATLAB programming as a tool to simulate the model in the problem solving. Developing computer algorithms is a process methodology which will be directly applicable in many scientific and business careers. By the end of CDS-130, students will be able to solve a problem such as the problem NASA had in predicting the heat output of power sources used on spacecrafts traveling to Mars and beyond.

The course is divided into weekly modules. All course materials (slides, reading materials, lab data and exam study guide etc.) will be provided online via Blackboard (<https://blackboard.gmu.edu/>). This is a 3-credit hour class. For each week, students should expect approximately 3 hours spent on online lectures and labs, and 6 hours of independent study such as textbook reading, online quizzes, lab assignments and preparation for the exam to earn a C grade.

Objectives

- To understand the principles of information storage, exchange, security, and privacy and be aware of related ethical issues,
- To understand how to think computationally; To use appropriate information and computing technologies to organize and analyze information and use it to guide decision-making,
- To solve scientific problems using computational tools; To choose and apply appropriate algorithmic methods to solve a problem.

Materials

- Textbook and reading materials:
 - No textbook is required for this course.
 - Each week's course materials, including lecture, readings, and videos, are organized in modules on Blackboard.
- Data storage:
 - A portable memory device (with 16GB or larger) or a cloud drive (OneDrive, Dropbox etc.) is needed for data storage.

Evaluation

- Weekly Assignment (WA) – 60%
 - There will be 14 WAs, each with an assignment. All lab assignments will count toward your final grade of the course.
 - A single WA may involve a combination of multiple-choice, fill-in-the-blank, short answer, and MATLAB programming problems. Some of them will be about the ethics lessons. Lab assignments are due ***Sunday evening at 11:59 pm every week.*** Please refer to the course schedule for detailed information.
 - Some questions will be **covered during the class**. WA questions are precursors to the problems on the exams.
- Exams – 40%
 - The course includes mandatory two midterm (10% each) and final (20%) exams. You are responsible for all the content covered before the exam. Both the midterm and final exam will be conducted on paper. There will be no group work in the exam. You're not allowed to use other communication technologies. The honor code will be in effect in ensuring that all work turned in will be your own and that you followed the exam rules.
 - About 4-5 days prior to the Exam, another "Study Advice" will be posted providing more sample problem to help students prepare for the exam. The answers to the "Study Advice" are included with this "Study Advice" when it is posted. The "Study Advice" is optional and is student-self-graded.
 - A student who cannot write a course examination or complete a course homework because of an incapacitating illness, severe domestic affliction, or other compelling reasons can apply for an extension of time. Note that such

extensions will be evaluated case by case. There is no guarantee that the instructor will grant the extension.

- Attendance – extra 5%
 - 0.2% per every attendance will be added to your final grade.
 - An attendance sheet will be passed around the classroom.
- Grading Scale

A+	97.0-100%	B0	81.0-84.9%	C-	65.0-68.9%
A0	93.0-96.9%	B-	77.0-80.9%	D	60.0-64.99%
A-	89.0-92.9%	C+	73.0-76.9%	F	below 60.0%
B+	85.0-88.9%	C0	69.0-72.9%		

Software

We will be using the MATLAB software.

Course Policies

- Email correspondence policy
 - You are responsible for all course related emails, so be sure to check your inbox on a daily basis.
 - When emailing your instructor, please always begin the subject of the email with the course number (CDS130) and your name (first name followed by last name). This is important as your instructor teaches multiple classes and need to know to which class you are referring. A proper email subject should be like this:
CDS130_Walter White_Questions on Lab 3
- Course website policy
 - You are responsible for all announcements, additional readings, assignments and other material posted on the course website. Be sure to check it frequently.
- Lab questions policy
 - If you have any questions on lab content (can't finish specific steps, tools are not working etc.), please contact your instructor via email.
 - If you have concerns on lab grades, please contact your instructor via email.
- Late submission policy
 - Assignments will be penalized 10% for each business day late. Thus, assignments submitted 10 business days after the deadline will be graded 0.
 - Extensions will not be granted due to lost work; be sure you back up and keep all your work.
- Exam policy
 - Exams must be taken at the scheduled time (detailed information can be found in Blackboard) unless you have informed your instructor *before* the exam with proper reasons and documents and got approved by the instructor. Please contact your instructor in advance of the scheduled exam to schedule a make-up exam, except in the case of emergency.
 - Make-up exams for excused absences will not be penalized.
 - Make-up exams for unexcused absences will be penalized 15%.

- Disability Services policy
 - Students with disabilities that have been certified by the Office for Disability Services (DS) will be appropriately accommodated and should inform the instructor as soon as possible of their needs.
 - Point of Contact: Jonna Park, Senior Coordinator for Student Care and Conduct (spark214@gmu.edu)
 - Website: <https://ds.gmu.edu/> for more information
 - Please contact the instructor as soon as you are registered with DS for attendance, assignment and/or exam accommodations.
- Academic Misconduct policy
 - It is the responsibility of the Committee on Academic Misconduct (COAM) to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee. More information about the Honor Code, including definitions of cheating, lying, and plagiarism, can be found on the Committee of Academic Integrity’s website at <https://masonkorea.gmu.edu/resources-and-services/cai/overview>.
 - Collaboration for the purposes of troubleshooting is highly encouraged in this course, but everyone is expected to submit their own unique work. For example, asking a classmate how to resolve an unexpected error message is OK, but using another classmate’s work (e.g. screen captures, etc.) as your own is NOT ok, regardless of whether or not they provide consent for the use of their materials. (Note: There are many other acceptable/unacceptable actions than those exemplified here.) If you have any questions or concerns about acceptable/unacceptable actions, ask your instructor for clarification/permission.
 - All open-ended responses to questions, prompts, etc. must be written entirely, nearly entirely, or at least in majority using your own words. Use credible sources, and cite all sources, including those only referenced, those indirectly paraphrased, and those directly quoted, being sure to use quotation marks to identify excerpts from these credible sources. This expectation to cite all of your sources also extends to the textbook, the lab instructions, lecture slides, other course materials, online resources, etc. Please contact Center for the Academic Resource Center or the instructor if you have difficulties organizing language for assignments.
- Student Privacy
 - All course materials posted to Blackboard or other course sites are private; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.
 - Video recordings of class meetings that include audio or visual information from other students are private and must not be shared.

- Live Video Conference Meetings (e.g. Collaborate or Zoom) that include audio or visual information from other students must be viewed privately and not shared with others in your household
- Other Course Policy
 - Please refer to Student Academic Services for more academic services provided by MK.

Other Course Technology

Please contact GMU IT Service Desk for any help with password, university e-mail, Blackboard, or any other technology issues, questions, or requests.

- Phone: 032-626-5300
- Email: mkits@gmu.edu
- Self-Service and Chat support: <https://masonkorea.gmu.edu/resources-and-services/it-services>

Basic technical skills necessary for this course

- Basic computer and web-browsing skills
- Navigating and utilizing Blackboard

Ethical Discourse and Inclusivity

George Mason University is committed to social justice. I share that commitment and strive to maintain a positive learning environment based on open communication, mutual respect, and non-discrimination. In this class we will not discriminate on the basis of race, sex, age, economic class, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment will be appreciated and given serious consideration. Disability Accommodations If you are a student with a physical, learning, and/or psychological disability, I will gladly work with you to arrange academic accommodations for this class. Please note that reducing assignments or reducing the class participation requirement are not permitted as accommodations for a disability at the college level.

Copyright Violation Notice

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Tentative Course Content Schedule

Week	Date	Lecture			Assignments
		Ethics	Basic Computational Skills	MATLAB	
1	T 2/22	Course introduction	Topic 1-2 Topic 2-3 Topic 2-6		FERPA form WA01
	R 2/24	Lesson1 - Introduction		I2M Ch 1 Prologue Topic 2-1 Booting up MATLAB	
2	T 3/1	Independence Movement Day (no classes)			
	R 3/3		Topic 2-4 Topic 2-5 Topic 3-1 Topic 3-2	I2M Ch 3	WA02
3	T 3/8		Topic 2-6 (review) Topic 3-3		MASON Academic Integrity Training Module
	R 3/10			I2M Ch 4 I2M Ch 6 Special – Introduction to Plots	WA03
4	T 3/15	Lesson 2		I2M Ch 6 I2M Ch 8	WA04
	R 3/17			I2M Ch 10	
5	T 3/22	Exam preps			WA05
	R 3/24	Exam 1			
6	T 3/29		Topic 1-8	I2M Ch 12	WA06
	R 3/31		Topic 5-3 Topic 5-4-1		
7	T 4/5		Topic 5-4-1 (review)		WA07
	R 4/7			I2M Ch 5	
8	T 4/12	Lesson 3	Topic 5-1 Topic 6-1		WA08
	R 4/14			I2M Ch 13	
9	T 4/19		Topic 6-1 (continued) Topic 5-4-2		WA09
	R 4/21		Topic 5-6		
10	T 4/26			I2M Ch 7	WA10
	R 4/28			I2M Ch 9	
11	T 5/3	Exam 2			
	R 5/5	Children's Day (no classes)			
12	T 5/10			Topic 1-9 Special – Number formats	WA11
	R 5/12		Topic 4-1-1 Topic 4-1-2		
13	T 5/17	Lesson 4	Topic 4-2		WA 12
	R 5/19				
14	T 5/24		Topic 5-2		
	R 5/26			I2M Ch 11	WA 13
15	T 5/31		Topic 7-1		WA 14
	R 6/2	Exam preps			
16	R 6/9	Exam 3			