CDS 130: Computing for Scientists
Summer 2021
Syllabus and Class Policies

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Course Introduction and Overview

CDS-130 Overview

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.

Follow-on CDS courses provide the opportunity for students to build on the basic methodologies learned in CDS-130 with learning other computer language tools, more advanced techniques for more complex problems, and solving problems involving large amounts of data. Following this course, you may consider going on to complete a minor or a major in this field.

Results of salary surveys in 2016-2018 clearly showed that young professionals in the Washington, DC, area with backgrounds in computational data sciences are in high demand. In fact, one 2016 survey showed that skills in computational data science is among the fastest growing talent needed. The survey found many job openings requiring CDS skills of qualified candidates. The result was that salaries for early career professionals with CDS skills were about $5,000 to 10,000 higher than their peers.

The CDS-130 instructors understand that for many students, CDS-130 may be their first formal computer language course. As a result, CDS-130 focuses on the basics of turning data into information. Additionally, CDS 130 meets the Mason Core Requirements for Information Technology with Ethics.

CDS-130 Learning Outcomes

By the end of this course:

- Students will be able to use technology to locate, access, evaluate, and use information, and appropriately cite resources from digital/ electronic media.
- Students will understand the core IT concepts in a range of current and emerging technologies and learn to apply appropriate technologies to a range of tasks.
- Students will understand many of the key ethical, legal and social issues related to information technology and how to interpret and comply with ethical principles, laws, regulations, and institutional policies.
- Students will understand the essential issues related to information security, how to take precautions and use techniques and tools to defend against computer crimes.

Advice to Succeed in CDS-130

1) It is strongly recommended that you stay on top of the workload for this! There is a HUGE amount of work to be done in CDS-130.
   a) Experience shows that CDS-130 assignments become highly demanding for students who choose not to invest time in their readings and other assignments - or both.
   b) It is realized that MATLAB is probably the first exposure to a scientific programming language for most students, so the course is paced to help everyone.
   c) Lectures and MATLAB skills are cumulative.
2) **HINT**: Students who begin homework early in the week have the time to ask the instructors for help on questions or clarification on skills and concepts.
   a) Remember that the only dumb question is the one you don't ask.
   b) I can guarantee that someone else has the exact same question.
   c) So, asking not only helps yourself, but will help your classmates.

Textbook: None.

- All class materials are made available through the class website on Blackboard.
- Presentations are made available in the native PowerPoint (.pptx) format as well as in '4—slides-to-a-page' Adobe (.pdf) format. Additionally, transcripts (.txt) files and closed captioning is available for all presentations as well.
- All printed materials are available for download as well. Most materials are available in the native Microsoft Word (.docx) format and in Adobe (.pdf) formats as well.

Course Logistics

This course will use a distance learning format; the primary meeting space is MASON's Blackboard application; and we will use other means of keeping in touch such as: email, telephone, and text. In a typical week:

- You will read about 3 articles and watch about 10 videos
- Accomplish on-line activities as a part of video mini-lessons, complete 2-4 assignments.
- All activities and assignments are submitted through Blackboard by the due date listed.
- Post discussions on ethics topics with your classmates
- You should expect to spend approximately 9 hours on coursework each week.
- Since the material is cumulative, it is critical that you keep up with weekly requirements.
- Activities and assignments will ONLY be accepted until the due date. Late items will NOT be accepted.
- For each week, a weekly module is provided giving links to reading/videos, and activities/assignments to accomplish in that week. You can find the Weekly Modules under the tab on the left side of the website labeled "What's Due".

Class Schedule

CDS-130 is an on-line course, classes will be held per parts 3 and 4 of this syllabus (Summary Class Schedule and Detailed Class Schedule). Should MASON close the Fairfax Campus for

weather, illness, or any other reason, CDS-130 classes will be held and assignments will be due as scheduled, unless otherwise notified by the instructor.

The workload in CDS-130 is designed to take about 2 hours of outside work for each hour of classroom/lesson work. Since CDS-130 is a 3 credit course, students can anticipate working about 9 hours per week on CDS-130. This workload is in compliance with 34 CFR 668.8 (k & l)[1] and MASON Policy 3011.[2]

Safe Return to Campus

CDS-130 is an on-line course and there is no face-to-face portion of the class. There are no preparations needed for safe return to campus; HOWEVER, students are encouraged to read and follow the MASON Safe Return to Campus Plan. https://www2.gmu.edu/Safe-Return-Campus

Computer Requirements

Students are required to provide their own computer and internet access or be able to use a GMU provided computer with access to the Internet. The computer must have:

Hardware Minimums:

- Reliable internet connection capable of running Blackboard, viewing videos (such as YouTube) and internet video conferencing capabilities (such as Blackboard Collaborate, WEBEX, Zoom).
- Sufficient capabilities to run MATLAB software. Click on the following link to see MATLAB's listing of software needed for MATLAB Version R2020a or later. (https://www.mathworks.com/support/sysreq.html)
- Video camera (aka: Web Cam) which is required to be used when taking exams with RESPONDUS. More information is available under the "Help: RESPONDUS" tab on the Class Website.
- A USB Drive or other computer storage. Only a few mega-bytes will be needed. (This will give you a means to save your MATLAB code so codes can be reused. Also, handouts are recommended to be saved as well.
- In an emergency, students can connect with the instructor through a telephone call, but video connection is the expected norm.
- Calculators are NOT needed for CDS-130. (The addition/multiplication needed during CDS-130 is quite simple. Calculators may **NOT** be used on exams.)

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[1] 34 Code of Federal Regulations Part 668—"*Student Assistance General Provisions*" Section 668.8 subsections "*Eligible Program*"k & l can be found at: *https://www.ecfr.gov/cgi-bin/text-idx?SID=074e5218454792ab5b4acc0e605ba2dd&mc=true&node=se34.3.668_18&rgn=div8*

[2] MASON University Policy 3011 "*Credit Hours" can be found at https://universitypolicy.gmu.edu/policies/credit-hours/* .

Software Minimums:

- MS Office suite (or equivalent) is required for viewing classroom materials. (A free copy of MS Office 365 can be downloaded from GMU IT Services at: https://its.gmu.edu/service/office-365-onedrive/
- E-mail access to MasonNet e-mail account

  (**Note**: ONLY GMU.EDU e-mail accounts may be used in CDS-130. Other e-mail addresses will **NOT** be responded to.)
- RESPONDUS Lockdown Browser must be running on the computer when a quiz, or Exam is being taken. Week #0 Computer Check will have you load RESPONDUS. (A free copy of the RESPONDUS Lockdown Browser may be downloaded without charge from GMU/IT Services at: https://its.gmu.edu/service/respondus-lockdown-browser-monitor/)
- **MATLAB**: Students MUST have access to a copy of MATLAB software. A listing of sources for MATLAB copies may be found on the Class Website's left side tab called "Getting MATLAB". Week #0 Computer Check will have you load MATLAB. More information is available under the "Help: MATLAB" tab on the Class Website. ***NOTE**: Issues loading MATLAB should be directed to MASON IT Services.*

Scanning Capability

- For CDS-130, you **will** need to be able to scan a handwritten page(s) and then upload the scan to the Class Blackboard site to answer MATLAB programming problems. You are welcome to do this using the method that is most available to you. Here is a listing of available methods that I am aware of:
  - Use a scanner (hardware item). At home I have an HP Printer that also scans.
  - Use a MASON scanner. While on MASON campus, you can use one of the Print Stations to scan a document and then e-mail it to yourself.
  - Use your Smartphone with a scanning software.
    - **For iPhone/IOS Devices: "Evernote Scannable"** is a free app that has been certified as safe to use on Mac devices. The software can be downloaded from:
      - Apple iTunes: https://itunes.apple.com/us/app/evernote-scannable/id883338188?mt=8
    - **For Android Devices:**
      - IF you already have the Adobe suite is "Adobe Scan". It can be downloaded at: https://play.google.com/store/apps/details?id=com.adobe.scan.android .
      - Other free scanning apps include: https://play.google.com/store/apps/details?id=com.microsoft.office.officelens
- **Other SCANNING software/hardware devices/methods are acceptable. HOWEVER, DO NOT TAKE PHOTOS** of the handwritten page or a screen on your computer. Photos are **EXTREMELY** hard to read, have low resolution when being reviewed by your instructors on Blackboard to grade your submissions. Photos should **NOT** be used! Also, Photos are HUGE files that take long times to upload/download/open when using Blackboard. **DO NOT TAKE Photographs and submit them!**

- When you submit a scan for an assignment, you are asked to ONLY use the formats .png or .jpg. Other graphic file formats are not 100% reliable. Please note that unreadable scans will NOT receive any credit for that assignment!

PLEASE NOTE: *There is a folder on the "Weekly Modules" tab under "Week #1 Module" called "Computer Check" that will allow students to check their computers to make sure that all of the above hardware and software is installed correctly. EVERYTHING in that folder MUST be completed PRIOR to beginning the work with Week #1. Completion of the checks listed are REQUIRED to be completed by the end of the first week.*

Email Requirements

- ALL e-mails to your instructors and STARs MUST be from your Mason e-mail account.
- Mason Mail MUST be checked daily at a minimum for announcements, and updates.
- Since your instructor teaches sections other than your own, PLEASE put CDS-130 and your section number in the subject line and PLEASE include your first name in closing your message.

E-mail Tips

- Keep your mailbox maintained so that messages are not rejected for being over quota.
- You may forward your Mason e-mail to other accounts but always communicate with your instructor and your fellow students using Mason e-mail for verification of your identity and YOUR security.
- Students are responsible for the content of university communications sent to their MasonNet email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account. https://masonlivelogin.gmu.edu/

Course Recordings

- A person recording any class session MUST get verbal permission from the instructor prior to beginning any recording.
- All CDS-130 materials and class sessions are considered as Intelectual Property and therefore coyrighted by the instructor. Sharing of any recorded, copied, or other class materials without the instructors written permission is STRICTLY prohibited.

Grading

Final Course Numerical Grade / Final Course Letter Grade Correspondence

A+	> 97.00	B	83.00 - 86.99	C-	70.00 - 72.99
A	93.00 - 96.99	B-	80.00 - 82.99	D	60.00 - 69.99
A-	90.00 - 92.99	C+	77.00 - 79.99	F	< 60.00
B+	87.00 - 89.99	C	73.00 - 76.99		

Grading Items

- "**Ethics Discussions**" (13%): Most weeks, an "Ethics Question of the Week" will be posted in Blackboard Discussion. These are required.
  - By Day 1 evening at 11:59pm, students are required to enter a short post (usually 2-3 sentences will do) to answer the question.
  - By Day 2 evening at 11:59pm, students are to comment on 2 classmate responses to the question of the week (usually 1-2 sentences will do). Grade assigned will be based on subjective quality of the answers and insightfulness of comments.
  - Additionally, Ethics Quizzes will appear throughout the course and are **required**.
- "**Your Turn Exercises"** (YTE) (9%):
  - Throughout the course, most mini-lectures and video presentations will have YTE's following a part of the presentation or after the presentation.
  - YTE's are made up of a small number of quick-to-do problems to check your understanding of the material. The problems will be multiple choice, fill-in the blank or short answer questions. Most problems are graded by Blackboard and answers will be available immediately.
  - YTE's should be completed **BEFORE** continuing on with the next video. If you get a Your Turn Exercise wrong, it is suggested to re-view the lecture.
  - All YTE for the week **must** be completed by the date listed on the "Week-at-a-Glance" schedule, but no later than Day 2 evening at 11:59pm.
- "**Mid-Week Exercises"** (MWE) (13%):
  - Mid-Week Exercises (MWE) **MUST** be completed by Day 1 evening at 11:59pm.
  - These 2 or 3 MATLAB programming problems will review the programming skills covered that week.
  - Most MWE must be done in MATLAB and then uploaded to Blackboard for grading.
  - Answers to MWE problems will be available at 12:30am on the day after they are due.
  - MWE problems are precursors to the problems on the "Weekly Assignments" (as well as the quizzes and exams).
- "**Weekly Assignments**" (WA) (18%):
  - Each week a set of WA questions will be posted, and **MUST** be completed by Day 2 evening at 11:59pm.
  - WA questions are a combination of multiple-choice, fill-in-the-blank, short answer, Ethics problems, and MATLAB programming problems.
  - WA questions may be from anything covered earlier in the course up through that week but will mostly focus on that week's material.
  - Answers to WA problems will be available at 12:30am on the day after they are due.
  - WA questions are precursors to the problems on the quizzes and exams.
- **Stage Exams** (20%):
  - There will be 2 "Stage" Exams in approximately weeks 5 and 10.
  - The Stage Exams will be a combination of multiple-choice, fill-in-the-blank, short answer, Ethics problems, and MATLAB programming problems.

- About 2 weeks prior to the Stage Exams, a "Study Advice" will be posted providing more sample problem to help students prepare for the exam. The answers to the "Study Advice" will be posted about a week prior to the exam. The "Study Advice" is optional and is student-self-graded.

- **Final Exam** (25%):
  - The Final Exam will be a combination of multiple-choice, fill-in-the-blank, short answer, Ethics problems, and MATLAB programming problems.
  - The Final exam will mostly focus on materials after the 2nd Stage Exam cut-off but will cover materials from the entire course.
  - About 4-5 days prior to the Final 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.
- "**Participation Points**" (2%):
  - There will be several activities throughout the course which will be mandatory. Completion of these activities will earn participation points.
- **"Extra Credit Quizzes" (ECQ):**
  - Throughout the course there will be ECQ's. These quizzes will add bonus points to one of the above grading categories. ECQ's are **OPTIONAL**.
  - About a week prior to the Extra Credit Quiz, a "Study Advice" will be posted provide a few problems to help you prepare for the ECQ.

Comments on Grading

- Grades for each category listed above will be mathematically determined for each category as the total points earned divided by the total points available. The semester grade will be a weighted sum of the grades from each category.
- All grade columns that begin ".NET" are recalculated after each item is graded. The column "..NET Semester Grade" is the current grade for all graded assignments and assesssments.
- There is **NO** grade curve for this course. Assigned semester final grades are from the mathematical calculation of the earned credit.
- There are no extra credit assignments/projects available for CDS-130. There is about 7% extra credit built in throughout the term in each of the above categories.
- YTE, MWE, WA, Stage Exams, and Final Exam **may** contain BONUS points embedded in the assignment/exam.
- Due dates are **ABSOLUTE**! Assignments submitted after the published due date will be reviewed but will NOT receive a grade for the assignment. Time extensions are only given for extreme circumstances PRIOR to the start of week and may ONLY be granted by your instructor and must be in writing from your instructor and will give a specific time to be provided to your instructor.
- While correct answers are important, it is more important in how you arrived at those answers. Completeness in answers (compete thoughts, complete codes, complete plots) is about ½ credit for the problem.

- Students will be REQUIRED to show their GMU ID card PRIOR to beginning either exam on the webcam operating with the RESPONDUS Lockdown Browser. (Remember: "No GMU ID, No exam, No exception") More details to follow.

Notes on Exams

- You are "ON YOUR HONOR" to not cheat on Exams. MASON's Honor Code will be STRICTLY imposed.
- **Important**: You will use the RESPONDUS Lockdown Browser to take all quizzes, and exams. The exam sessions will be monitored and recorded.
- You are permitted to use scratch paper on Exams. Within 24 hours of completing an exam, you are to upload a scan of your handwritten scratch paper This upload is considered as a part of the exam and will be given points for uploading as a part of the exam. Then you are REQUIRED to destroy the scratch paper.

Netiquette for On-line Discussions[3]

- Class discussions should be collaborative, not combative; you are creating a learning environment, sharing information and learning from one another. Respectful communication is important to your success in this course and as a professional.
- Please re-read your responses carefully before you post them so others will not take them out of context or as personal attacks.
- Be positive to others and diplomatic with your words and I will try my best to do the same.
- Be careful when using sarcasm and humor. Without face-to-face communications your joke may be viewed as criticism.
- Experience shows that even an innocent remark in the online environment can be easily misconstrued.

Collaboration, Cheating, Plagiarism, Lying, and Stealing

All members of the Mason community are expected to uphold the principles of scholarly ethics. On admission to Mason, students agree to comply with the requirements of the GMU Honor Code and System.[4] [5] Similarly, graduating students are bound by the ethical requirements of the professional communities they join.

- To uphold the rigor of the course and the value of your degree, the Honor Code will be rigorously enforced. The instructor will use several manual and automated means to detect cheating in all work submitted by students. Keep in mind it is extremely easy to detect cheating with logic and code.
- All activities within all MASON courses are subject to GMU's Honor Code and IT policies.

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[3] Netiquette prepared by Charlene Douglas, Associate Professor, College of Health & Human Services, GMU.

[4] https://oai.gmu.edu/mason-honor-code/full-honor-code-document/

[5] https://oai.gmu.edu/faculty-resource-center/syllabus-language-2/ materials provided by Volgeneau School of Engineering

- The penalty for cheating, plagiarism, lying, and stealing will always be far worse than a zero grade, to ensure it is not worth taking the chance. Any instance of misconduct that is detected will be referred to the Office of Academic Integrity (OAI) and will most certainly translate into a lowered grade at a minimum and may result in course failure (a final grade of F).

Honor Code Violations

- If you have questions about what does/does not constitute an Honor Code violation, contact your instructor for clarification.
- For this course, the following additional requirements are specified:
  - Students are encouraged to discuss course content with other current students; however, all programming assignment submissions must contain only original, individually completed work.
  - More specifically, if any student submission is deemed to be greater than or equal to 50% identical to another student's submission, the course content discussion that occurred constitutes misconduct and all students involved will be referred to OAI for violating the Honor Code.
  - Copying material from any source not specifically authorized by your instructor may result in a referral to OAI for misconduct for all students involved.
  - All Exams are closed book/closed notes, RESPONDUS Lockdown Browser MUST be used with the video camera turned on.
  - NO other electronic equipment (including phones of any type) may be used during any quiz or exam.
- Students are expressly prohibited from:
  - Discussing program design, algorithm logic, or code with individuals other than the course's instructor or current STARS.
  - Receiving, giving, or showing another student a partial, completed, or graded solution.
  - Knowingly sharing computers or storage devices (e.g. USB drive). If work is stolen because of a shared or borrowed computer or storage device, all students involved will be held equally responsible.
  - Stealing another student's work by taking photographs, using a lost storage device, or gaining access to another student's work in any other way without their knowledge. This action represents a particularly egregious offense placing an innocent student in jeopardy of receiving an Honor Code violation. Any student who has stolen will be referred for two violations: cheating and stealing, and will receive a sanction recommendation of at least course failure and a one-semester suspension.
  - Posting questions or a partial, complete, or graded solution on the Internet, even after the course has concluded.
  - Incorporating program design, algorithm logic, or code found on the Internet.
  - All work must be newly created by the student during this term. Work developed for another course, or for this course in a prior term, may not be used without prior instructor approval.
  - Posting or sharing course content (e.g. instructor lecture notes, assignment directions, or anything not created by the student), using any non-electronic or electronic

medium (e.g. web site) where it is accessible to someone other than the individual student constitutes stealing/copyright infringement and is strictly prohibited without prior instructor approval.

If you have any questions on these requirements, please discuss them with your instructor. Any deviation from these requirements is considered a violation.

Misconduct Process

When the instructor for this section makes the determination that misconduct has occurred, the instructor shall:

- Notify the student that a potential misconduct incident has been identified. The student will be given a chance to provide explanation for their actions prior to the instructor's final determination that misconduct has occurred.
- For the first incident, the instructor shall:
  - Record a grade of zero for the entire assignment or assessment,
  - Issue a letter of warning/notifiucation of misconduct to the student, and
  - Report the incident to the Chair of the Computational and Data Sciences Department and the MASON Honor Committee for further adjudication and additional remedial action/sanctions. (This is not optional for the instructor.)

  Note: Student cannot receive credit for the course until the MASON Honor Committee process has concluded. Also, withdrawing from a course does NOT stop the Honor Committee process.
- For a second or third incident, the instructor shall:
  - Repeat the recording and reporting as in the 1st incident,
  - Recommend to the MASON Honor Committee that the student be assigned an automatic grade of "F" for the course and immediate removal from the course.

  Note: Additionally, with a students 2nd incident's referral to the MASON Honor Committee from any course in any term, the Honor Committee automatically recommends suspension from MASON. With a student's 3rd referral, the MASON Honor Committee automatically recommends expulsion from MASON.

Disability Accommodations

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University.

If you are seeking accommodations for detailed information about the Disability Services registration process, Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474

If you have a documented learning disability or other condition that may affect academic performance, students MUST:

- Have the need for accommodation on file with Office of Disability Services, please visit http://ds.gmu.edu/
- Provide the Instructor with a copy of the Office of Disability Services accommodation determination prior to receiving any accommodations. The Instructor will closely protect this information as private and will not share the information with anyone other than the class assistants unless authorized in writing by the student or the Office of Disability Services.
- PLEASE NOTE: If you are having ANY difficulties with CDS-130 due to personal limitations, PLEASE discuss them with your instructor.

Diversity and Inclusion

The CDS Department seeks to create a learning environment that fosters respect for people across identities. We welcome and value individuals and their differences, including gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability. We encourage all members of the learning environment to engage with the material personally, but to also be open to exploring and learning from experiences different than their own.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

George Mason University is committed to providing a learning, living and working environment that is free from discrimination and a campus that is free of sexual misconduct and other acts of interpersonal violence in order to promote community well-being and student success. We encourage students who believe that they have been sexually harassed, assaulted or subjected to sexual misconduct to seek assistance and support. University Policy 1202: Sexual Harassment and Misconduct speaks to the specifics of Mason's process, the resources, and the options available to students.

- As a faculty member and designated "Responsible Employee," I am required to report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per university policy 1412. If you wish to speak with someone confidentially, please contact the Student Support and Advocacy Center (703-380-1434) or Counseling and Psychological Services (703-993-2380). You may also seek assistance from Mason's Title IX Coordinator (703-993-8730; titleix@gmu.edu).

Student Support Resources

The following resources are available to students:

- Counseling and Psychological Services
- The Learning Services Office or field-specific tutoring
- The Office of Diversity, Inclusion, and Multicultural Education (ODIME)
- University Career Services
- University Writing Center

Information and links regarding these and other student support offices are available on our Student Support Resources on Campus page.

We want to help you succeed in CDS-130 and in your MASON career!