CDS 411 Syllabus
Version 2

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Fall 2020

1 Vitals

- Course: CDS 411 - Modeling and Simulation 2

- Instructor: J. M. Kinser, D.Sc.

- Meeting Time: This course is *asynchronous* online

- Contact: Course questions use Piazza website: Personal issues: jkinser@gmu.edu

- Phone Number: Won't be used during the Fall 2020 semester. Connect through Piazza, Blackboard, MS-Teams, Webex, Zoom, Meetups, Whereby, etc.

- Computer Language: Python 3.6 +

2 Hardware

For this class you will need:

- A computer.

- Internet access sufficient to participate in a Zoom meeting and to view recorded videos.

- The ability to record a video (audio and video) of you discussing a topic. This can be done with a computer, a smartphone, or a digital camera.

- The ability to have an online meeting (Zoom, MS-Teams, etc.).

3 Online Course

This class is an *asynchronous online* course. This means that we don't have a specific meeting time. You will have several days (usually a week) to complete assignments.

The course will be delivered as such:

1. Pre-recorded videos will be made available through Blackboard.

2. Textbook: PDFs of chapters will be provided.

3. Quizzes will be embedded in the videos. These will be easy questions if you pay attention to the video.

4. Practice problems. For these you can freely share ideas.

5. Homework assignments will include questions and coding. Assignments will be turned in through Blackboard.

6. Projects: There will be about 7 group projects. Details below.

7. Midterm and Final: NONE. The projects remove the need for a Midterm and Final.

8. Participation: You will be required to react to other group presentations. Details below.

3.1 Software

- Students will need to install Anaconda Python 3.6 or newer.

- Students will need to make videos. This can be in the form of voice-over-powerpoints or the generation of an MP4 movie. Optional (and free) software that might assist include LibreOffice, GoogleSheets, Audacity and KDenLive.

- We will use Blackboard and Piazza.

This is an asynchronous course, so there are no scheduled class-wide teleconferences. However, a teleconference may be scheduled if the you need it. All lectures are on pre-recorded videos and not live feeds.

Feel free to request some e-face time. I live on Webex and MS-Teams these days.

3.2 Videos and Textbook

Since this is an asynchronous class, there is no set meeting time. Thus, a standard sage-on-the-stage lecture is not possible. About 43 short videos have been created for this class. That averages to about 3 videos per week. Most are less than 10 minutes long. You will watch the videos and answer the embedded questions.

Questions concerning the content of the videos should be asked through Piazza so everyone can see the answers. Piazza allows students to ask questions anonymously. Piazza also has a way to enter computer code and equations in your questions. Please allow 48 hours to receive an answer.[1]

The textbook is being developed and accompanies the videos. PDF chapters will be made available. Students are encouraged to submit edits of the chapters for no credit. Basically, if a section of the book doesn't make sense, then let me know. I will create addendum to answer questions as needed.

Much of the Python code shown in the textbook and videos will be provided.

3.3 Homework

Homework will be traditional. You will have 7 days to finish each assignment.

You may communicate with other students concerning concepts of the homework. You can say, "I solved it by using this theory." You can not say, "Here's my code and my answer. Use them freely."

Homework assignments will be graded on an individual basis.

A note on cheating. For some reason, there always seems to be a student who copies from the others. There is no place for cheating at Mason. My wrath will be unforgiving. If you are falling behind in the class, then contact me. I will be glad to help you catch up. Really.

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[1]Surprise, surprise. I eat. I sleep. I go to meetings. I do not sit by the computer 25 hours a day. I will answer questions as soon as I can.

3.4 Projects

Instead of a Midterm and Final, this course will rely heavily on team projects.

- Each team will consist of 3 people. If the number of students is not divisible by 3 then one group will have a different number. I will assign the groups, and each project will have a different arrangement of groups.

- Each report will be delivered as a 5 minute video. This can be as simple as a voice-over-powerpoint. Of course, your creativity in making the videos is welcomed as long as this creativity doesn't impose on the presentation of your work.

- A single grade will be given to all members of the group.[2]

- Each person in the group will be assigned (by me) a responsibility: Theory, Approach used in the Answer, Results and interpretation thereof. Each student will be responsible for presenting their portion of the report. The person responsible for Theory will not present the Approach or Results section.

- The team will submit a PPTX or MP4 and their Python code. All students will be able to view all videos through Blackboard. This course will not post any video on a public source (YouTube) as that violates FERPA regulations. If your Powerpoint is new enough, it can convert the file to MP4. The MP4 is preferred.

- (But wait - there's more): Each student will be required to ask one question for each presentation from the other groups. The individuals will receive grades for asking appropriate (and non-trivial) questions. The group will receive points for appropriately answering these questions.

Grading rubric for Projects:

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[2]Welcome to Reality. The work environment is much like this.

Item	Points	Excellence	Good	Fair	Fail
Deadline	10	On time	24 hours late	36 hours late	Not turned in
Theory	10	Fully understood and articulated	Knowledgeable and presented OK	Faults in understanding	Lost in space
Approach	10	Completed project	Got most of it right	Got some of it right	Lost in space
Coding	10	Efficient Python code	Working Python code but some inefficiencies	Spaghetti code	No code turned in.
Results	10	Accurate results	Mostly accurate results	Got some numbers from the computer and they are cool	No results
Replication	10	I can run your codes without modifications	I had to make some tweaks to get it to run	Problems in many places	What is this garbage?
Analysis	10	Full comprehension and interpretation of results	Mostly understood results but less so on interpretation	Understood some of the results	Clueless
Presentation	20	Quite clear. I learned something from you	Mostly clear	There's good stuff in there somewhere	Lost
Answers	10	Intelligent answers to questions	Good answers	Wrong answers	Did not answer

4 Course Grade

- A+: 97% of the available points.

- A: 93.3% of the available points.

- A-: 90.0% of the available points.

- B+: 86.7% of the available points.

- B: 83.3% of the available points.

- B-: 80.0% of the available points.

- C+: 77% of the available points.

- C: 73.3% of the available points.

- C-: 70.0% of the available points.

- D: 60.0% of the available points.

- F: Less than 60% of the available points.

5 Extra Credit

None.

6 Schedule

Since this is an asynchronous class, the schedule is quite easy:

- First week of class starts Aug 24.

- No new items will be given out during the week of Thanksgiving. Nothing will be due that week.

- Last day of class Dec 5. However, instead of a Final, we may extend the Q&A portion of the last Project if necessary.

7 Topics

Below is a tentative list of topics. The schedule may shift depending on the class performance, and a substitution may be possible depending on student's area of research interest.

- Week 1: Random values.

- Week 2: Monte Carlo method

- Week 3: Schelling's model and intro to Hidden Markov Models

- Week 4: Hidden Markov Models

- Week 5: Gene Expression array normalization

- Week 6: Connected graphs part 1

- Week 7: Connected graphs part 2

- Week 8: Simultaneous equations part 1

- Week 9: Simultaneous equations part 2

- Week 10: Kinematic motions

- Week 11: Oscillatory motion

- Week 12: Coupled differential equations

- Week 13: Massive decisions

- Week 14: Virus modeling

7.1 Covid

if you become ill with the coronavirus (or something else that is serious), then contact me. We will figure out the best way to see you through the semester. Accommodations are possible only if you contact me (or in serious cases - someone else contact me on your behalf) during the illness. Students who wait until December to say, "But I was sick back in October," have a much harder time getting accommodations for that illness.

8 Assistance and Legalities

Below are just of few support services available to students. The full list is at: `https://stearnscenter.gmu.edu/knowledge-center/knowing-mason-students/student-support-resources-on-campus/`

8.1 IT Support

If you are having difficulties with your Mason network account, or with software on the Mason network , please contact IT support: support@gmu.edu . Or pay them a visit in Innovation Hall: ITS Support Center, Innovation Hall, Room 226. You can also call them: 703-993-8870.

8.2 Academic Integrity

It is expected that students adhere to the George Mason University Honor Code as it relates to integrity regarding coursework and grades. The Honor Code reads as follows: "To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this: Student members of the George Mason University community pledge not to cheat, plagiarize, steal and/or lie in matters related to academic work." More information about the Honor Code, including definitions of cheating, lying, and plagiarism, can be found at the Office of Academic Integrity website at `http://oai.gmu.edu/honor-code/`.

8.3 Accommodations

If you are a student with a disability and you need academic accommodations, please contact Disability Services (DS) at 703-993-2474. All academic accommodations must be arranged through DS.

8.4 Digital Communication

Privacy is important for faculty and student communications. Students are required to use their Mason email when communicating their instructors. Instructors, being employees of the State of Virginia, are required to use their Mason email when communicating with students.

8.5 Title IX

Notice of Mandatory Reporting of Sexual Assault, Interpersonal Violence and Stalking: As a faculty member, I am designated as a "Responsible Employee," and must 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 one of Mason's confidential resources, such as the Student Support and Advocacy Center (SSAC) at 703- 380-1434 or Counseling and Psychology Services (CAPS) at 703-993-2380. You may also seek assistance from Mason's Title IX Coordinator by calling 703-993-8730 or emailing cde@gmu.edu