CDS 492: Capstone Course in Data Science
Fall 2019 - Section 001
Syllabus and Class Policies

- Subject to change at the discretion of the Instructor –

Instructor: Dr. Ron Mahabir
Assistant Professor (Term)

Office and Office Hours:

- Dr. Mahabir's office is in Research Hall Room 225 on the Fairfax Campus.
- Dr. Mahabir will hold office hours in Research Hall Room 225 on Wednesdays from 5pm to 6pm. Please contact the Instructor using your GMU email to book an appointment outside of these hours.
- Dr. Mahabir may be contacted using: e-mail and by using the "Ask the Professor" discussion on the left side of the website as well as in-person. Dr. Mahabir's responses on "Ask the Professor" will be available to all class members.
- Students wishing to meet with Dr. Mahabir are asked to send an e-mail to Dr. Mahabir requesting a meeting time. Be sure to list when you are available to meet.
- Dr. Mahabir will endeavor to answer e-mail questions within 24 hours. Please note that unless it's an emergency, Dr. Mahabir will not reply to emails on weekends (i.e. Saturday or Sunday) or replies may be delayed if students' emails are sent late on Friday afternoon.
- Dr. Mahabir will announce any General Help Sessions being held on the class website. Sessions may be held via Blackboard Collaborate and/or in person.

Emails and Telephone:

- Dr. Mahabir rmahabir@GMU.EDU 703-993-6377

Course Introduction and Overview

CDS-492 Overview:

This course is intended to provide a capstone experience for undergraduate students by synthesizing knowledge and experience that they acquired in earlier coursework to address a complex Data Science problem. This course requires analytical, collaborative, and communication skills.

Learning Outcomes:

- Apply one or more theories or concepts from courses within their major to an analysis of a particular issue relevant to the major.
- Identify an idea, method, or concept from a discipline outside their major field of study and be able to apply it within the context of their major field of study.
- Examine how their previous coursework has contributed to their intellectual development and/or their post-graduation plans.
- Improve their writing and communication skills.
- Enhance students' ability to work and manage a project collaboratively.

Course Objectives

The capstone project aims to provide students an opportunity to integrate and apply core knowledge and skill components in Computational Science and Data Science that were acquired during the program in a real-world project driven setting. The problems we will address in this course will include extensive use of various data sources and questions from diverse scientific domains including Medical & Life Science, Social Science, Business and Policy Science, and other domains including urban and transportation. In the context of specific data and questions, students have to develop analysis methods and tools. In this environment students will be required to define possible scenarios, identify key challenges, explore possible solutions and deliver an effective solution. Given its nature, a capstone project often goes beyond a single discipline and require the application of varied disciplines to the solution of a single large-scale problem. In addition, a capstone project may require analysis at different scales, from local to regional or national. In light of this, the particular goals of the course are to:

- Allow students to implement and demonstrate their core skill set in their major.
- Develop integrative multi-disciplinary problem-solving skills.
- Promote critical thinking, including the ability to critically examine existing works and established methods, and develop innovative approaches.
- Enhance and develop rigorous writing and presentation skills.
- Enhance students' ability to work and manage a project collaboratively.

Textbook: None.

- All class materials are made available through the class website on Blackboard.
- Lecture presentations are made available in Adobe (.pdf) format. In some cases, videos may also provided. Videos may be standalone components of the course that students may have to review on their own, or they may be used to augment materials being taught in class.

Course Logistics

This course will primarily be taught in the classroom with some videos and supplementary reading material made available for students to review on their own. All content will be made available to students on MASON's Blackboard application.

In a typical week:

- You will read about 1 to 2 articles and watch relevant videos
- All activities and assignments are submitted through Blackboard by the due date listed.
- You should expect to spend approximately 6 hours on coursework each week (this includes the time you would have spent in a classroom).
- Activities and assignments will ONLY be accepted until the due date. Late items will **NOT** be accepted.

Computer Requirements

CDS- 492 is an a face-to-face classroom with a large amount of on-line materials. 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

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-proplus/)
- E-mail access to MasonNet e-mail account

  (**Note**: ONLY GMU.EDU e-mail accounts may be used in CDS-492. Other e-mail addresses will **NOT** be responded to.)

- Students must have administrative access in order to install a programming language (e.g. Python, R, Matlab, Java,…) of their choice to carry out individual/group tasks as needed.

Email Requirements:

- ALL e-mails to your instructors MUST be from your Mason Net e-mail account. E-mail from non-Mason e-mail accounts will NOT be responded to.
- Mason Mail MUST be checked daily at a minimum for announcements, discussion inputs, or updates.
- Since Dr. Mahabir teaches other courses other than your own, PLEASE put CDS-492-001 in the subject line and PLEASE include your First and Last 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. [See https://masonlivelogin.gmu.edu/].

Grading

Final Course Numerical Grade / Final Course Letter Grade Correspondence

A+	> 97.00	C+	77.00 - 79.99
A	93.00 - 96.99	C	73.00 - 76.99
A-	90.00 - 92.99	C-	70.00 - 72.99
B+	87.00 - 89.99	D+	67.00 - 69.99
B	83.00 - 86.99	D	60.00 - 66.99
B-	80.00 - 82.99	F	<60.00

Grading Items:

- Class participation (Week 1 to Week 16) - 10%
- Project proposal (Week 5) – 10%
- Project update (Week 10) – 20%
- Final Project Presentations (Week 13) – 20%
- Final project paper (Week 15) – 40%

Dr. Mahabir's 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.
- There is **NO** grade curve for this course. Assigned semester final grades are from the mathematical calculation of the earned credit.
- 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 Dr. Mahabir and must be in writing from Dr. Mahabir, and will give a specific time to be provided by Dr. Mahabir.

Netiquette For On-line Discussions[1]

- 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 to 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, jokes may sometimes be viewed as criticism, even if this is not the case. Experience shows that even an innocent remark in the online environment can be easily misconstrued.

Collaboration & Plagiarism

- All CDS-492 activities are subject to GMU's Honor Code and IT policies.
- **Collaboration**: Students are encouraged to discuss problems with each other. Discussion means each student working the problem may talk with someone else (aka: conversation on the logic or software needed to compete the assignment) but will fully work the assignment on their own.
- **Plagiarism** will not be tolerated at any time. Students will be given a zero for any assignment where plagiarism is suspected by the Instructor. If plagiarism is suspected a second time for any student, an automatic grade of "F" will be assigned for the course with a report sent to the College of Science Assistant Dean of Student Affairs for further action.
- All plagiarism violations will be reported by your Instructor in writing to the Dean's office.

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

Disability Accommodations

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 (SUB I, Rm. 4205; 703-993-2474; http://ods.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-492 due to personal limitations, PLEASE discuss them with your Instructor.

We want to help you succeed in CDS-492 and in your GMU career!