Course Change Request

New Course Proposal

Date Submitted: 01/19/18 2:06 pm

Viewing: CDS 492 : Capstone Course in Data Science

Last edit: 01/19/18 2:06 pm

Changes proposed by: mrenz

Are you completing this form on someone else's behalf?

No

In Workflow

1. **CDS Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost-Undergraduate
5. Registrar-Courses
6. Banner

Approval Path

1. 01/19/18 4:25 pm Jason Kinser (jkinser): Approved for CDS Chair

Effective Term:	Fall 2018
Subject Code:	CDS - Computational and Data Sciences
Course Number:	492
Bundled Courses:	
Equivalent Courses:	
Catalog Title:	Capstone Course in Data Science
Banner Title:	Capstone DataScience
Will section titles vary by semester?	No
Credits:	3
Schedule Type:	Lecture
Hours of Lecture or Seminar per week:	3
Repeatable:	May only be taken once for credit (NR)

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

CDS 230 and (CDS 301 or CDS 302) or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

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.

Justification:

The CDS undergraduate program currently does not have a capstone component, which is becoming increasingly more important to prepare our students for their future careers.

No

Does this course cover material which crosses into another department?

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.

Attach Syllabus (PDFs only)

Sylabus_CDS_492_Fall2018.pdf

Additional Attachments (PDFs only)

Staffing:

Any CDS faculty member could teach the course, e.g. Joe Marr, Matthias Renz, James Glassbrenner, Eduardo Lopez, Jason Kinser, Andrew Crooks, aomong others.

Relationship to Existing Programs:

This capstone course will enhance the core skill set in the BS undergraduate degrees programs.

Relationship to Existing Courses:

No relationship to an existing course.

Additional Comments:

Reviewer Comments

Key: 15798

Department of Computational and Data Science

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CDS 492

Capstone Course in Data Science
(Tentative Syllabus - Fall 2018)

1. Introduction

- **Instructor**: Dr. Matthias Renz (tba)
- **Credits**: 3.0
- **Course Forum:** Blackboard. Allow 24hrs for an answer.
- **Office:** Research Hall, 242
- **Email:** mrenz@gmu.edu (Please allow up to 24 hours for response M-F)
- **Phone**: 703-993-5873
- **Office Hours/Skype:** Monday 3:00PM to 4:00PM, or by appointment
- **Preferred Contact Method:** email
- **CDS-492 Assistants:** tba
    - **Teaching Assistants Office Hours:** TBA

2. 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.

3. Course Schedule

The course (3 hours per week) will be taught as a semester-long class project, combining lectures, topic/problem oriented discussion, and directed reading assignments with corresponding class discussion.

4. Textbook

No textbook is required. Handouts distributed in the class will contain all essential material. Additional readings (selected readings from research journals, technical reports, and other sources) will be distributed via the course website.

5. Course Outline

We follow a problem-driven approach, and proceed in steps by identifying issues, solutions and their integrative analysis.

Mod. #	Topic
1	Course Introduction
2	Formulating research question
3	Case study examples
4	Library session
5	Discussion and critique of Expanded Research Statements
6	Critique of literature reviews
7	Critique of methodology
8	Critique of methodology
9	Critique of Case Studies
10	Critique of Case Studies (2)
11	Discussion and critique of Rough Drafts
12	Discussion and critique of Rough Drafts
13	In class Presentations
14	In class Presentations

6. Grades

The grade will reflect the student performance in the classroom and the assignments. At the end of the term all the marks will be totaled as a weighted average according to the following weights:

- Intermediate assignments 30%
- Class participation 30%
- Final report and presentation 40%

Final grades at the end of the course will be assigned using a combination of absolute achievements and relative standing in the class.

7. Exams

This course does not include a midterm or a final exam.

8. Assignments

The course will include a number of intermediate assignments that build on knowledge acquired in the certificate program so far and lead towards a final report and presentation. The time allocated for every assignment will be announced in class.

All assignments are mandatory. You will be working in groups, but each person within a group is expected and required to contribute equally towards that group's workload. Assignment work is typically delivered through a presentation and discussion.

9. Attendance

You are required to attend all class meetings. Your active participation in the class is essential to the success of this course. Attendance may be verified during each session.

10. Course Website

The course has a Blackboard website. This website will provide you a single portal through which you may obtain lecture notes, retrieve assignment data and, review links to additional materials, and receive special announcements. Please notify ITU (and, if necessary, the instructor) if you encounter any problems accessing this website.

11. Electronic Communication

All course related email correspondence, including submission of assignments, should be made through the course Blackboard website. Please DO NOT send emails to the instructors' @gmu.edu address.

12. Student Expectations

• Academic Integrity: Students must be responsible for their own work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See http://academicintegrity.gmu.edu/distance].

• Honor Code: Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/the-mason-honor-code/].

• MasonLive/Email (GMU Email): Students are responsible for the content of university communications sent to their George Mason University 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].

• Patriot Pass: Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See https://password.gmu.edu/index.jsp].

• University Policies: Students must follow the university policies. [See http://universitypolicy.gmu.edu].Responsible Use of Computing - Students must follow the university policy for Responsible Use of Computing. [See http://universitypolicy.gmu.edu/policies/responsible-use-of-computing].

• University Calendar: Details regarding the current Academic Calendar. [See http://registrar.gmu.edu/calendars/index.html].

• Students with Disabilities: Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu].

• Students are expected to follow courteous Internet etiquette at all times; see http://www.albion.com/netiquette/corerules.html for more information regarding these expectations.

13. Student Services

• University Libraries: University Libraries provides resources for distance students. [See http://library.gmu.edu/distance and http://infoguides.gmu.edu/distance_students].

• Writing Center: The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share

knowledge through writing. [See http://writingcenter.gmu.edu]. You can now sign up for an Online Writing Lab (OWL) session just like you sign up for a face-to-face session in the Writing Center, which means YOU set the date and time of the appointment! Learn more about the Online Writing Lab (OWL).

• Counseling and Psychological Services: The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu].

• Family Educational Rights and Privacy Act (FERPA): The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See http://registrar.gmu.edu/privacy].

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported by the instructor.

Note: Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.