

DATA SCIENCE PRACTICUM

DATA 793

Spring 2021

Instructor:	Zois Boukouvalas	Time:	M 5:30 PM - 8:00 PM
Email:	boukouva@american.edu	Room:	Online (Live Sessions)
Office:	Don Myers Building - 222		

Course description: The Data Science Practicum serves as the primary capstone option for Master's students in Data Science and is designed to provide an important bridge between the academic setting and the professional world. Students will be given real-world research problems to apply the skills acquired during the first year of their MS program. The students in the practicum will work with clients from across campus or other companies and institutions on various research problems in data science. Each student will be assigned to at least one team and research project during the semester. Each team will meet with the instructor at least once a week to review progress and identify any problems. Once each team meets with its client, students will solidify the scope of their project and break it down into manageable tasks that fully involve all team members. Each project will culminate in both an oral presentation that includes the client and the instructor and a written report that contains reproducible results.

Learning outcomes At the end of this course, students will be able to:

- Research and conceptualize a problem, define the scope of the project and break it down into workable components (Analytic).
- Gather data necessary to address the questions posed, tidy the data, visualize and analyze the data. (Data Science)
- Work effectively as a team member by identifying key tasks, sharing responsibility for the project, and ensuring all deadlines are met (Teamwork and Project Management).
- Establish a positive working relationship with a client by understanding the client's needs and deadlines, follow up with client requests, and managing expectations (Client Relations).
- Deliver an organized, articulate presentation effective data analysis and visualization (Oral Presentation skills).
- Prepare a professional, cleanly written document that encapsulates reproducible research on the topic (Written Presentation).

Class structure and office hours: Due to the current situation, our course will be fully online. We will have our class lectures through Zoom. I will provide the link for our weekly class meetings on Blackboard. The online office hours will be M 3:00PM – 5:00PM, or after the online class, or by appointment. In addition, you are encouraged to ask me questions online or via email. If you are having **ANY** trouble with the class, please see me about it as soon as possible. **Do not wait until it is too late!**

Course pages: I will use Blackboard (<https://blackboard.american.edu>) to post any supplementary materials, suggested readings/practice exercises, assignments, and announcements. Sometimes I may also use my personal website (<https://zoisboukouvalas.github.io/>).

Course Policy: In addition to being an important capstone project, the practicum staffs the cross-disciplinary research arm of the Center for Data Science. Students are expected to fully participate in the program from the earliest stages to the final report. Student workload will be determined by the instructor based on the scope of the projects assigned. Each student must complete at least one project during the semester. It is expected that practicum students serve as responsible team members who are involved in project management, respectful of team deadlines, and conscientious of the larger needs of the team. Students must also respect the client relationship and the terms set forth in client agreement letters

regarding client records, personnel, confidentiality or non-disclosure requirements. Students who do not conduct themselves in a professional manner will be removed from the practicum and receive a failing grade for the course.

Assignments & Grading:

Interim Assignments (10%): I anticipate having 4 short assignments outside of the project work covering topics that we cover in class. These include:

- a. Resume writing / LinkedIn profile
- b. High Performance Computing, storage and data management
- c. Presentation and Communication skills
- d. Ethical considerations for Data Science

Preparatory assignments (20%): These assignments include an agreed statement of work with the sponsoring client, a work plan and schedule for the team (10%). Preparatory assignments also include all team meetings and in-class meetings, data gathering and working with the clients to understand the data. Weekly status reports will be submitted and presented weekly, and these contribute to this portion of the grade as well (10%).

Oral Presentation (20%): Students will present a report of their findings to the class, instructor and client. Participation is mandatory. The presentation grade will be based on clarity of the question, sound data gathering, visualization of the data and analysis that meets the client's needs. Clear oral communication skills are required.

Written Report (20%): The final paper will be generated using R Markdown and will contain all steps from acquisition of data through to visualization and conclusion. The research contained in the report should be fully reproducible (no step omitted or worked outside of the document).

Client and Team Assessment (30%): The client assessment will be through a separate evaluation form provided by the instructor to the client representative. The client will evaluate the team based on its performance, communications, contribution to research and the quality of the final oral and written reports. If the project is a team project, each member of the team will also be evaluated by other team members for their contribution to the project. The instructor will provide an evaluation form to all team members at the end of each project.

Grading scale: Students with final percent between 94%-100% will receive an A, 90%-93% an A-, 87%-89% a B+, 83%-86% a B, 80%-82% a B-, 77%-79% a C+, 73%-76% a C, 70%-72% a C-, 60%-69% a D, and under 59% F.

Please note that an "A" grade denotes a truly excellent performance and work that is original, insightful, critical, clear, and well-written. It indicates that the team has worked effectively and successfully to marshal the talents of each member. A "B" is solid work that is well organized and goes beyond minimum requirements. It reflects a good command of the material, with instances of higher level thinking and intellectual engagement. It will also indicate the degree to which the team has worked effectively. A "C" reflects a lack of higher level thinking, intellectual originality, clear organization, and teamwork. A "D" indicates that minimum course requirements were not fully met. An "F" means the minimum course requirements were not met. Students require a B or above on their capstone in order to be eligible to graduate.

Academic integrity: Standards of academic conduct are set forth in the University's Academic Integrity Code. By registering, students have acknowledged their awareness of the Academic Integrity Code, and they are obliged to become familiar with their rights and responsibilities as defined by the Code. Violations of the Academic Integrity Code will not be treated lightly, and disciplinary actions will be taken should such violations occur. Students should consult their instructor if they have any questions about the academic violations described in the Code in general or as they relate to particular requirements for this course.

Emergency preparedness: In the event of an emergency, students should refer to the AU Web site <http://www.american.edu/emergency> and the AU information line at (202) 885-1100 for general university-wide information. In case of a prolonged closure of the University, I send updates to you by email and will post all announcements on Blackboard.

Support services: The Practicum will provide students with “real world experience” in navigating the challenges associated with working with clients, working in teams, and meeting demanding deadlines. Students may also discover that you need additional expertise in their substantive area and/or in their methodological approach. The instructor is available to mentor students throughout their work on the Practicum. She/he may put students in touch with other “experts” on campus or elsewhere to assist them with particular issues that may arise. It is very important that students address issues early on and maintain a positive and pro-active attitude. In general, clients should not be approached to provide guidance on analytical matters that the team is expected to possess or obtain, such as statistical methods, collaborative software tools, application programs, and basic concepts in international relations theory or the topics area of the Practicum.

Students may also face other academic challenges. There is a wide range of services available to support them here at American University. These include:

1. Mathematics & Statistics Tutoring Lab (Don Myers Building) provides tutoring in Intermediate Mathematics and Statistics. <http://www.american.edu/cas/mathstat/tutoring.cfm>
2. Academic Support and Access Center offers study skills workshops, individual instruction, tutor referrals, Supplemental Instruction, writing support, and technical and practical support and assistance with accommodations for students with physical, medical, or psychological disabilities. Writing support is also available in the Writing Center, Battelle-Tompkins 228.
3. Center for Diversity & Inclusion (X3651, MGC 201) is dedicated to enhancing LGBTQ, Multicultural, First Generation, and Women’s experiences on campus and to advance AU’s commitment to respecting & valuing diversity by serving as a resource and liaison to students, staff, and faculty on issues of equity through education, outreach, and advocacy.
4. The Office of Advocacy Services for Interpersonal and Sexual Violence (X7070) provides free and confidential advocacy services for anyone in the campus community who is impacted by sexual violence (sexual assault, dating or domestic violence, and stalking).
5. The Writing Center, Room off of first floor commons in Bender Library offers free, individual coaching sessions to all AU students. In your 45-minute session, a student writing consultant can help you address your assignments, understand the conventions of academic writing, and learn how to revise and edit your own work. Hours: 11 a.m. to 9 p.m. Monday through Thursday; 11 a.m. to 6 p.m. Friday. Call 202-885-2991 to arrange a session. Meanwhile find handouts, information, and a weekly writer’s blog at the Writing Center website and on Facebook.
6. International Student & Scholar Services, Butler Pavilion, Room 410, tel. 202-885-3350, has resources to support academic success and participation in campus life including academic counseling, support for second language learners, response to questions about visas, immigration status and employment and intercultural programs, clubs and other campus resources.