CMSC 435 Intro to Data Science
Fall 2021 Syllabus

Catalog listing:	CMSC 435
Course Level:	Undergraduate
Prerequisites:	CMSC 401 with a minimum grade of C
Instructor:	Lukasz Kurgan, Ph.D.
Office:	E4268
Phone:	804-827-3986
Email:	lkurgan@vcu.edu (preferred way to communicate)
Classroom:	Engineering East E3229
Class website:	Canvas
Lecture Hours:	Tue and Thu 12:30pm to 1:45pm
Office Hours:	Tue and Thu 2:00pm to 3:00pm
	(office hours in my office and on zoom at https://vcu.zoom.us/j/97739066052)
TA:	TBD
TA Email:	TBD
TA Office Hours:	TBD

1.0 – Overview (Catalog Course Description):

This course covers understanding, representation, storage, retrieval, preprocessing and analysis of data. Specific topics include data quality and preprocessing, database management systems, data warehouses, selected methods for scalable unsupervised and supervised data analysis, and assessment of results generated by these methods. Students will be engaged in analysis of real-life data from data preprocessing, through data analysis, to the assessment of a knowledge product.

2.0 – Course Structure:

Lecture hours/week –   3
Lab hours/week –   0

3.0 – Course Goals

Upon successful completion of this course, the student will be able to:
1. Define and execute data science projects
2. Identify and correct common data quality issues
3. Work with several popular methods for data analysis
4. Assess results generated by the methods for data analysis

4.0 – ABET Criteria Addressed:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

5.0 – Major Topics Covered:
- Definition of data science
- Knowledge discovery model
- Data quality issues
- Dats science algorithms and complexity
- Data preprocessing methods
- Databases and data warehouses
- Information retrieval
- Introduction to supervised and unsupervided data analysis
- Selected unsupervised data analysis methods: clustering and association learning
- Selected supervised data analysis methods: decision trees and support vector machines
- Team project

6.0 – Textbook(s):
There is no required textbook. Class notes in electronic will be provided via Blackboard ahead of time by the instructor. Recommended (optional) textbook:
Cios KJ, Pedrycz W, Swiniarski RW, and Kurgan L, Data Mining: A Knowledge Discovery Approach, ISBN: 978-0-387-33333-5, Springer, 2007.

7.0 – Class Schedule:
- Lecture time: Tue and Thu 12:30pm to 13:45pm
- Lecture location: Engineering East E3229

8.0 – Evaluation:
General Instructions:
A   [90 - 100) %
B   [80 - 90) %
C   [70 - 80) %
D   [50 - 70) %
F   [0 - 50) %

Grading:

Category	% weight
Assignments	25
Group project	15
Group project presentation	10
Midterm exam	25
Final exam	25

Late Submission Policy: All submissions must be turned in on the due date. Late submissions turned in within 12 hours from the due date will receive a 15% penalty, and those turned more than 12 and less than 48 hours late will receive a 30% penalty. Submissions will not be accepted when over 48 hours late unless approval is obtained from the instructor before the due date.

9.0 – Tips for Success

- Make every effort to come to the class. In case if you cannot make it, recorded lectures from Fall 2020 semester are available. The listing of these recordings is available on the class website in Canvas.
- **Plan Ahead.** Make note of the deadlines that are listed in the detailed class schedule in Canvas. Study as you go instead of at the last minute. Make steady, weekly progress towards the group project, once it is released.
- **Be Proactive.** If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible and **always before** the deadline.

Technology requirements and resources

Personal Computer Requirement: For our current system requirements and recommendations, see: https://egr.vcu.edu/admissions/accepted/computer-recommendations/

VCU provides a lot of software for students to download to their personal computers: See: https://ts.vcu.edu/software-center/. In particular, Microsoft Office is free to students.

For IT help in the College of Engineering: see our Wikipedia for "student" help at: https://wiki.vcu.edu/display/EGRITHELP

VCU's Technology Services (TS) provides support for "central IT" services. If you have a technical issue with any of the following services, please submit a ticket with VCU Technology Services at https://itsupport.vcu.edu/ or call (804) 828-2227. VCU TS maintains and supports these services and will be able to help you: VCU Cisco VPN, 2Factor or Dual Authentication (DUO), Canvas, Gmail or other Google Apps, Zoom videoconferencing, VCU App2Go (Application server), Resetting VCU password.

For IT issues related to College of Engineering teaching and research: email egrfixit@vcu.edu

For loaner Chromebooks for emergency purposes: see https://vcutsmpc.getconnect2.com/

Honor System: upholding academic integrity

The VCU Honor System policy describes the responsibilities of students, faculty and administration in upholding academic integrity, while at the same time respecting the rights of individuals to the due process offered by administrative hearings and appeals. According to this policy, "**Members of the academic community are required to conduct themselves in accordance with the highest standards of academic honesty, ethics and integrity at all times**." In addition, "To support a commitment to the Honor System, all members of the VCU community are required to:

- Adhere to the Honor System policy and its procedures;
- Report any suspicion or knowledge of possible violations of the Honor System;
- Answer truthfully when called upon to do so regarding Honor System matters;
- Maintain appropriate confidentiality regarding related to Honor System matters."

Cheating and Plagiarism

Plagiarism is stealing and passing off the ideas or words of another as one's own; it is using another's production without crediting the source. The best way to avoid plagiarism is to cite properly in any assignment information and concepts that are not your own originally. If a student is discovered to have plagiarized, that student will fail that particular assignment. Harsher punishments are possible. Find details at https://conduct.students.vcu.edu/vcu-honor-system/

Managing stress

Students may experience situations or challenges that can interfere with learning and interpersonal functioning including stress, anxiety, depression, alcohol and/or other drug use, concern for a friend or family member, loss, sleep difficulties, feeling hopeless or relationship problems. **There are numerous campus resources available to students including University Counseling Services (804-828-6200 MPC Campus, 804-828-3964 MCV Campus), University Student Health Services (MPC 804 828-8828, MCV Campus 804 828-9220) and the Wellness Resource Center (804-828-9355)**. 24 hour emergency mental health support is available by calling 828-1234 and asking to speak to the on-call therapist or utilizing the National Suicide Prevention Lifeline (1-800-784-2433).

Student conduct in the classroom

According to the Faculty Guide to Student Conduct in Instructional Settings, "The university is a community of learners. Students, as well as faculty, have a responsibility for creating and maintaining an environment that supports effective instruction. In order for faculty members (including graduate teaching assistants) to provide and students to receive effective instruction in classrooms, laboratories, studios, online courses, and other learning areas, the university expects students to conduct themselves in an orderly and cooperative manner." Among other things, **cell phones should be turned off while in the classroom**. The Student Code of Conduct also prohibits the possession of or carrying of any weapon. For more information see http://register.dls.virginia.gov/details.aspx?id=3436

Student email policy

Email is considered an official method for communication at VCU because it delivers information in a convenient, timely, cost-effective, and environmentally aware manner. Students are expected to check their official VCU email on a frequent and consistent basis in order to remain informed of university-related communications. The university recommends checking email daily. **Students are responsible for the consequences of not reading, in a timely fashion, university-related communications sent to their official VCU student email account**. This policy ensures that all students have access to this important form of communication. It ensures students can be reached through a standardized channel by faculty and other staff of the university as needed. Mail sent to the VCU email address may include notification of university-related actions, including disciplinary action. Please read the policy in its entirety at the VCU Policy Library.

Accommodations for Students with Disabilities

Students with a disability requesting reasonable accommodations should visit Student Accessibility and Educational Opportunity. Requests require registration with SAEO in advance of need. Faculty, students and SAEO work together regarding classroom accommodations.

Vaccinations

Vaccination are required for all students who live, learn, work or will be on campus for any reason (excluding those with religious or health exemptions). For more information about full vaccination, documentation requirements, religious and health exemptions, confidentiality and vaccine manufacturers, see the vaccine FAQ at https://together.vcu.edu/faq/student-vaccine/.

- Students who receive vaccination exemptions must follow safety guidelines including but not limited to: routine surveillance testing, completing daily health checks, and continuing to follow public safety measures including quarantine procedures. Entry Pass requirements will apply and entry will be allowed if the proper public health measures are followed.
- Vaccinated students are exempt from daily health checks, surveillance testing and quarantine requirements. Entry Pass requirements will continue to apply; however, your Entry Pass will default to a green check.

Masking indoors is mandated throughout the university. Studies show that masking effectively reduces the spread of viruses and, combined with COVID-19 vaccination, can greatly reduce the transmission of COVID-19.