# CMSC 435 Intro to Data Science
# Fall 2022 Syllabus

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| **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 |
| **TA:** | Sina Ghadermarzi |
| **TA Email:** | ghadermarzis@vcu.edu |
| **TA Office Hours**: | TBA |

## 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:**

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|---|---|
| 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**. I will try to record lectures but this is a tentative plan and may not work.
- **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 assignments and the group project, once they are 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.

# Health and safety

**Public health information**
Health advisories, including information about COVID-19 testing, vaccination, supplies and other public health measures, can be found at [the Safety and Risk Management website](). Visit this site to stay informed about recommendations for VCU and surrounding communities. Additional links to health, wellness and safety information are on the [Life at VCU webpage]().

**Campus emergency information**
[Sign up to receive at VCU Alerts](). It is essential to keep your information up-to-date within VCU Alert and to keep your permanent address and emergency contact information current in [eServices](). VCU uses a variety of communication methods to alert the campus community about emergency situations and safety threats. Learn more about [types of alerts]() online. Know the emergency phone number for the VCU Police (828-1234), and report suspicious activities and objects.

**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) which provides brief therapy treatment, [University Student Health Services]() (MPC 804 828-8828, MCV Campus 804 828-9220) and the [Department of Recreation & Well-Being (RecWell)]() (804-828-9355). 24 hour emergency mental health support is available by calling (804) 828-6200 or utilizing the [National Suicide Prevention Lifeline]() (dial 988).

**Mandatory responsibility of faculty members to report incidents of sexual misconduct**
All VCU faculty members are Responsible Employees as defined by University policy. Responsible employees have a duty to report alleged policy violations to the Title IX Coordinator. This includes incidents of sexual harassment, sexual assault, dating & domestic violence, stalking, sexual exploitation, and related retaliation. Responsible employees may report information through this form or by emailing [titleix@vcu.edu](). For confidential support, contact [University Counseling Services](), (804-828-6200 for MP Campus/804-828-3964 for MCV Campus) For more information, visit [our Title IX webpage]().

**Reading Days**
No classes or exams are held on Reading Day (Friday, Oct. 21, 2022) except in instances where a student is involved in clinical and field placements, practica, co-ops, internships and other work-related experiential learning activities. Faculty may not give an examination or an assignment on those days. Instead, students are encouraged to use these days for relaxation, study and/or review of class materials.

# Academic Success and Integrity

### Honor System: upholding academic integrity
The VCU Honor System policy describes the responsibilities of students, faculty and administration in upholding academic integrity. 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." [Students are expected to read the policy in full and learn about requirements](#).

### Early academic alerts
VCU's [Early Notification Program](#) supports student success. If as an instructor I am concerned about your academic engagement or performance in the first few weeks of class, you may receive a Progress Report email encouraging you to reach out to me after class or during student hours (office hours) for additional support. As a community of care, your [academic advisor](#), the [Writing Center](#), and the [Campus Learning Center](#) may also follow up to provide additional layers of support.

### Students with disabilities
VCU is committed to ensuring that all students maintain equal access to all aspects of the university, including educational experiences through the provision of reasonable accommodations and academic adjustments. In addition to being a requirement under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, this speaks directly to VCU's mission of inclusion, equity, and access. To receive accommodations or other disability-related supports, students must register with the Office of Student Accessibility and Educational Opportunity on the Monroe Park Campus (828-2253) or the Division for Academic Success on the MCV campus (828-9782). Students and faculty can visit the [Student Accessibility and Educational Opportunity website](#) and/or the [Division for Academic Success website](#) for additional information. Once students have completed the registration process, they will be provided with a letter of accommodation. They should provide a copy to their instructor(s) and attempt to schedule a meeting to discuss the implementation of accommodations as early in the semester as possible.

### Career Services
Looking for ways to tie what you are learning in your class to your future career or professional goals? [VCU Career Services](#) provides career planning services for all current VCU students and alumni. Career Services can help students with finding a work-study job on/off campus, resume writing, internship development, interviewing, preparing for graduate school, networking, or job searching. Students are invited to attend career events and workshops, and schedule individualized career advising appointments.

# Registration, Attendance and Financial Responsibilities

**Class registration required for attendance**
Students may attend only those classes for which they have registered. Faculty may not add students to class rosters. If students are attending a class for which they have not registered, they must stop attending.

**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.

**Attendance and consequences of poor attendance**
The instructional programs at VCU are based upon a series of class meetings involving lectures, discussions, field experiences, special readings and reporting assignments. Therefore, it is important for each student to be in attendance on a regular basis. A student who misses a class session is responsible for completing all material covered or assignments made during the absence.
- Students having attendance problems should contact their instructor to explain the reasons for nonattendance and to discuss the feasibility of continuing in the course. If the student has fallen so far behind that the successful completion of the course is impossible, the student should withdraw from the course before the end of the first 10 weeks of classes (by Oct. 28, 2022).
- If the student continues to miss class and does not officially withdraw from the course, the instructor may withdraw the student for nonattendance with a mark of "W'' before the end of the first 10 weeks of classes or may assign an academic grade at the end. Withdrawals are not permitted after the end of the first 10 weeks of classes. For classes that do not conform to the semester calendar, the final withdrawal date occurs when half of the course has been completed.

**Withdrawal from classes**
Before withdrawing from classes, students should consult their instructor as well as other appropriate university offices. Withdrawing from classes may negatively impact a student's financial aid award and his or her semester charges. To discuss financial aid and the student bill, contact the [Student Financial Management Center (RAMQ)](#) regarding the impact on your financial aid.

**Military short-term training or deployment**
If military students receive orders for short-term training or for deployment/mobilization, they should inform and present their orders to Military Student Services and to their professor(s). For further information on policies and procedures contact [Military Student Services](#) at 828-5993.

**Students representing the university – excused absences**
Students who represent the university (athletes and others) do not choose their schedules. All student athletes should provide their schedules to their instructors at the beginning of the semester. The Intercollegiate Athletic Council strongly encourages faculty to treat missed classes or exams (because of a scheduling conflict) as excused absences and urges faculty to work with the students to make up the work or exam.

**Student financial responsibility**
[Students assume the responsibility of full payment](#) of tuition and fees generated from their registration, all charges for housing and dining services and other applicable miscellaneous charges. Students are ultimately responsible for any unpaid balance on their account as a result of the University Financial Aid Office or their third party sponsor canceling or reducing their award(s).

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# Technology

**Technology requirements and resources**

    **Personal Computer Requirement**:  For our current system requirements and recommendations, see:  [https://egr.vcu.edu/admissions/accepted/computer-recommendations/](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/](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](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/](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](mailto:egrfixit@vcu.edu)

    **For loaner Chromebooks for emergency purposes:** see [https://vcutsmpc.getconnect2.com/](https://vcutsmpc.getconnect2.com/)

**Computer and network use**
All students are expected to know and comply with [VCU's Computer and Network Use policy.](#)

**Student email standard**
Email is considered an official method for communication at VCU. Students are expected to check their official VCU email on a frequent and consistent basis (the university recommends daily) in order to remain informed of university-related communications. **Students are responsible for the consequences of not reading, in a timely fashion, university-related communications sent to their official VCU student email account.** Mail sent to the VCU email address may include notification of university-related actions, including disciplinary action. [Students must read this standard in its entirety.](#)