

# CMSC 635 Knowledge Discovery and Data Mining

## Spring 2021 Syllabus

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<b>Catalog listing:</b>	CMSC 635
<b>Course Level:</b>	Graduate
<b>Prerequisites:</b>	Graduate student standing in Computer Science or related discipline such as Bioinformatics or acceptance into five-year accelerated program in Computer Science; and, either completed CMSC 401 or co-requisite CMSC 501
<b>Instructor:</b>	Lukasz Kurgan, Ph.D.
<b>Office:</b>	E4268
<b>Phone:</b>	804-827-3986
<b>Email:</b>	lkurgan@vcu.edu
<b>Lectures:</b>	Tue Thu, 9:30am to 10:45am
<b>Classroom:</b>	Synchronous via zoom
<b>Class website:</b>	Blackboard
<b>Office Hours:</b>	Tue 11:00am-1:00pm

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### 1.0 – Overview (Catalog Course Description):

This course covers knowledge discovery and data mining concepts, tools and methods; provides hands-on experience based on a project involving analysis of large real-life data. Topics include the knowledge discovery process, data storage and representation, preprocessing algorithms for missing data imputation, feature selection and discretization; unsupervised learning algorithms for clustering and association mining; supervised learning algorithms including decision trees, Bayesian models and intro to support vector machines and neural networks; ensemble learning; protocols and measures for validation of predictive models; and data security and privacy issues.

### 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. Understand and apply knowledge discovery process
2. Understand and preprocess data
3. Understand and apply various supervised and unsupervised data mining methods
4. Evaluate results produced by data mining methods

#### 4.0 – Major Topics Covered:

- Knowledge discovery process
- Data
- Data preprocessing
- Unsupervised data analysis
- Supervised data analysis
- Ensemble models

#### 5.0 – Textbook(s):

No required textbook. Lecture notes will be provided by the instructor and will be sufficient to complete the class.

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.

#### 6.0 – Class Schedule:

- Lecture: Tue Thu, 9:30am to 10:45am, Synchronous via zoom

#### 7.0 – Evaluation:

##### Grading schema:

A	[90 - 100) %
B	[80 - 90) %
C	[70 - 80) %
D	[60 - 70) %
F	[0 - 60) %

##### Grading:

Category	% weight
Reviews	40
Group project	35
Final examination	25
Extra credit	5

**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. Late submissions of project presentations are not allowed and will result in 0 marks.

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## 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)
- Blackboard/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/>

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## Important dates

You can view important dates for the semester at <https://academiccalendars.vcu.edu/>

## 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."

More information can be found at in the VCU policy library.

## 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.