COLLEGE OF ENGINEERING

CMSC 512: ADVANCED SOCIAL NETWORK ANALYSIS & SECURITY

Credits: 3 lecture hours. 3 credits

Instructor: Thang Dinh

Class hours: TR, 11:00AM-12:15AM, W105
(Zoom: https://vcu.zoom.us/j/97476783314)

Office hours: TR, 12:30 – 01:30 pm, plus by appointment
(Zoom: https://vcu.zoom.us/j/93618694489)

ERB2321, Engineering Research Building, 401 W. Main St

Please join and monitor Slack channel daily for announcement

Category: This is a technical elective course in the curriculum.

Course (Catalog) Description: Semester course; 3 lecture hours. 3 credits. Prerequisites: CMSC 401 with a grade of C or better. Social network analysis, graph algorithms, cybersecurity risks, privacy.

Textbooks (recommended):

- M.E.J. Newman, Networks: An Introduction, Oxford University Press, 2010
- D. Easley and J. Kleinberg, Networks, Crowds, and Markets: *Reasoning About a Highly Connected World*, Cambridge University Press, 2010
- R. Diestel, Graph Theory, 2010

Prerequisites/ Co-requisites: CMSC 401 with a grade of C or better.
The students will be expected to work with mathematical models and analytical reasoning. While there is no formal requirement, some programming background will be helpful.

List of Topics:
 This course will enable students to attain*:
 1) Mathematical and theoretical background in network structure analysis including centrality measures, community structure formation and detection, and network evolution
 2) Mathematical and theoretical background in modeling and analyzing dynamical processes in complex networks
 3) Modeling, analysis methods, and countermeasures for security and privacy issues, network embedding, linked data mining
 4) Visualization and software for network analysis

Course Evaluation

ACTIVITIES	PERCENTAGES
Homework assignments	20%
Midterm exam	25%
Final exam	25%
Final project	30%

Final grade: A (90% - 100%), B (80% - 89%), C(70% - 79%), D(60%-69%), F(0% - 59%)

Homework: There will be 4 homework assignments.

Midterm Exam: The Midterm Exam will cover all materials cover until *Centrality measures*. The Midterm Exam is scheduled for TBA.

Course project: The project topic will be chosen in consultation with the instructor. A project may consist of

- Experimental evaluation of algorithms and models on an interesting network dataset
- A theoretical project that considers a model, an algorithm and derives an in-depth analysis
- Developing scalable algorithms for large-scale graphs

Late submission: For each day your assignment is late, 10% will be deducted from your score; assignments will NOT be accepted after three days.

Class participation: You will be expected to attend class regularly and to come to class prepared to discuss the material in your reading assignments. Your grade will be enhanced by making relevant contributions and asking intelligent questions.

Statements for Syllabi and Blackboard Pages

The topics are:

1. VCU Email Policy
2. VCU Honor System: Upholding Academic Integrity
3. Student Conduct in the Classroom
4. Students with Disabilities
5. Statement on Military Short-Term Training or Deployment
6. Excused Absences for Students Representing the University
7. Campus Emergency Information
8. Important Dates
9. VCU Mobile
10. Class registration required for attendance

Email Policy

Electronic mail or "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 e-mail on a frequent and consistent basis in order to remain informed of university-related communications. The University recommends checking e-mail daily. Students are responsible for the consequences of not reading, in a timely fashion, university-related communications sent to their official VCU student e-mail 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: http://www.ts.vcu.edu/kb/3407.html

VCU 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 and integrity." In addition, "All members of the VCU community are presumed to have an understanding of the VCU Honor System and are required to:

- Agree to be bound by the Honor System policy and its procedures;
- Report suspicion or knowledge of possible violations of the Honor System;
- Support an environment that reflects a commitment to academic integrity;
- Answer truthfully when called upon to do so regarding Honor System cases, and,
- Maintain confidentiality regarding specific information in Honor System cases."

The Honor System in its entirety can be reviewed on the Web at http://www.provost.vcu.edu/pdfs/Honor_system_policy.pdf or it can be found in the current issue of the VCU Insider at http://www.students.vcu.edu/insider.html

Student Conduct in the Classroom
According to the *Faculty Guide to Student Conduct in Instructional Settings* (http://www.assurance.vcu.edu/Policy%20Library/Faculty%20Guide%20to%20Student%20Conduct%20in%20Instructional%20Settings.pdf)*,* "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 and beepers should be turned off while in the classroom. Also, the university Rules and Procedures prohibit anyone from having "in his possession any firearm, other weapon, or explosive, regardless of whether a license to possess the same has been issued, without the written authorization of the President of the university..." For more information, visit the VCU Insider online at http://www.students.vcu.edu/insider.html

Students with Disabilities
SECTION 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 as amended, require that VCU provides "academic adjustments " or "reasonable accommodations" to any student who has a physical or mental impairment that substantially limits a major life activity. To receive accommodations, students must request them by contacting the Disability Support Services Office on the Monroe Park Campus (828-2253) or the Division for Academic Success on the MCV campus (828-9782). More information is available at the Disability Support Services webpage: http://www.students.vcu.edu/dss/ ; or the Division for Academic Success webpage at www.specialservices.vcu.edu/disabilityss.

If you have a disability that requires an academic accommodation, please schedule a meeting with me at your earliest convenience. Additionally, if your coursework requires you to work in a lab environment, you should advise your instructor or a department chairperson of any concerns you may have regarding safety issues related to your disability. This statement applies not only to this course but also to every other course in this university.

Statement on Military Short-Term Training or Deployment
If military students receive orders for short-term training or deployment, 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 Services at 828-5993 or access the corresponding policies at http://www.pubapps.vcu.edu/bulletins/about/?Default.aspx?uid=10096&iid=30704 and http://www.pubapps.vcu.edu/BULLETINS/undergraduate/?uid=10096&iid=30773.

Excused Absences for Students Representing the University
Students who represent the university (athletes and others) do not choose their schedules. Student athletes are required to attend games and/or meets. All student athletes should provide their schedule to the instructor at the beginning of the semester. The Intercollegiate Athletic Council (IAC) 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.

Campus Emergency information
What to Know and Do To Be Prepared for Emergencies at VCU:
- Sign up to receive VCU text messaging alerts (http://www.vcu.edu/alert/notify). Keep your information up-to-date. Within the classroom, the professor will keep his or her phone on to receive any emergency transmissions.
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in on-campus classrooms.
- Listen for and follow instructions from VCU or other designated authorities. Within the classroom, follow your professor's instructions.
- Know where to go for additional emergency information (http://www.vcu.edu/alert).
- Know the emergency phone number for the VCU Police (828-1234). Report suspicious activities and objects.

Important Dates
Important dates for the Spring 2013 semester are available at:
http://academiccalendars.vcu.edu/ac_fullViewAll.asp?term=Spring+2013

VCU Mobile
The VCU Mobile application is a valuable tool to get the latest VCU information on the go. The application contains helpful information including the VCU directory, events, course schedules, campus maps, athletics and general VCU news, emergency information, library resources, Blackboard and more. To download the application on your smart phone or for more information, please visit http://m.vcu.edu.

Class Registration Required for Attendance
Please remember that students may only attend those classes for which they have registered. Faculty may not add students to class rosters. Therefore, if students are attending a class for which they have not registered, they must stop attending.

Technology Support from Engineering & VCU

- **Personal Computer Requirement**: For our current system requirements and recommendations, see: https://egr.vcu.edu/admissions/accepted/computer-recommendations/
- **Remote Access to Public Lab computers**: To provide remote access, we use the Citrix App2Go environment to provide full and exclusive control over "the next available" computer in the lab. See this link for more details: https://wiki.vcu.edu/x/Oa0tBg
- **VCU provides a lot of software available for students to download to their personal computers.** For a list of software and the specifics for each, see: https://ts.vcu.edu/software-center/. In particular, Microsoft Office is available free to students.
- **VCU is transitioning to Canvas.** See the Canvas Student Guide at this link: https://community.canvaslms.com/t5/Student-Guide/tkb-p/student
- **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 provide assistance to 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**
- **For loaner Chromebooks for emergency purposes:** See this link for more details: https://vcutsmpc.getconnect2.com/