

VIRGINIA COMMONWEALTH UNIVERSITY
Department of Mathematics

I. Required Syllabus Information

A. Course prefix and number, section number, and title

CRN: 34995

Section Number: 001

Subject: Mathematics & Appl Mathematics

Course Number: 356

Title: GRAPHS AND ALGORITHMS

B. Semester term and credit hours

Associated Term: Spring 2024

Credit Hours: 3

C. Class meeting days/times/location

Class meeting days/times: TTH 9:30 AM - 10:45 AM

Location: Monroe Park Campus | Grace E. Harris Hall | Room 2125

D. Instructor name, contact information, and office hours

Instructor name: Allison H. Moore

Contact information: mooreal4@vcu.edu

Office hours: T 12:30-1:30, F 9-10 Harris Hall 4149 (tentative)

E. University course description (required to be verbatim from the University Bulletin)

An introduction to basic graph theoretic concepts such as trees, colorings and matchings; basic theorems such as the handshaking lemma and the Gallai identities; algorithms such as Dijkstra's and Kruskal's; and discussion of famous open problems such as finding shortest tours for a traveling salesman.

F. Course prerequisites, if any

MATH 201 with a minimum grade of C

G. Student learning outcomes

This class is an introduction to the graph theory. Graphs are important and useful structures in chemistry, computer science, operations research, engineering, and of course, in mathematics. Students will learn about graphs, graph properties, and graph invariants with a special emphasis on algorithms. The course will serve as an introductory proofs class, with students gaining experience with different strategies for formulating mathematical arguments. Students will also gain familiarity implementing graph structures and algorithms in code.

H. Required texts and/or course materials

There are several textbooks that we will draw material from; all of them can be found for free online. They are recommended but purchase is not required.

1. “Algorithmic Graph Theory” by Gibbons. Available free online, recommended.
2. “Graph Theory with Applications” by Bondy and Murphy. Available free online, recommended.
3. “Introduction to Graph Theory” by Wilson. Available free online, recommended.

In addition to these books, we will do many examples and worksheets. Some will be handwritten on paper, and other examples and exercises will involve implementing concepts in code. For this you will need access to several materials.

4. Access to a (free) CoCalc account or local installation of Sage. Required.
5. A binder for organizing notes, worksheets, and other paper handouts.

I. Course schedule

The schedule is [subject to change](#), as is appropriate for the progression of the class. Weekly homework and quiz dates, in particular, may vary with the course content. Announcements regarding assignments due dates will be made regularly via Canvas.

Homework and in-class worksheets/quizzes: *Assigned weekly, check Canvas.*

Major Assignment Schedule:

• Midterm 1	February 13	In class, in-person
• Midterm 2	March 21	In class, in-person
• Midterm 3	April 23	In class, in-person
• Final Exam	May 2	8:00 AM – 10:50 AM

See section II-Q below for additional information about quiz, exam and homework policies.

J. Final exam date and time (if applicable)

Exam to be held during May 2, 2024, 8:00 AM – 10:50 AM. (Scheduled by Registrar.)

K. Grading scale

90-100 A, 80-89 B, 70-79 C, 60-69 D, below 60 F. Instructor reserves the right to curve.

L. Grade categories and weights

Homework: 15%

In-class worksheets and quizzes: 15%

Midterms 15%

Final Exam: 20%

Attendance and participation: 5%

M. Link to the VCU Syllabus Policy Statements on the Provost’s Website

Students should visit <http://go.vcu.edu/syllabus> and review all syllabus statement information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal and more.

N. The following statement and link:

Use VCU Libraries to find and access library resources, spaces, technology and services that support and enhance all learning opportunities at the university. (<https://www.library.vcu.edu/>)

II. Additional Syllabus Information

O. Modality

The modality of this course is Face-to-Face Instruction. In-person attendance and participation is required. Quizzes and exams will be held in person unless otherwise stated. Homework may be submitted online.

P. Zoom and Canvas

In the event of an unplanned university closure, we may need to conduct meetings virtually. For online meetings, we will use the following Zoom link:

<https://vcu.zoom.us/j/84884876406>

Meeting ID: 848 8487 6406

Canvas will be used to download and submit homework. Canvas may be used to conduct quizzes in the event that of a university closure or other special circumstances.

Q. Homework, Quiz and Exam Policy

Homework will be assigned approximately every other week with a two-day grace period for late assignments, alternating with worksheets and quizzes during class. Homework assignments will be posted to Canvas in advance. You will submit your completed assignments to Canvas in PDF format. Students in this class are encouraged to work with each other on homework and code-based assignments. Expect that homework will primarily be marked for because the purpose of homework is to prepare you for exams, which comprise the highest percentage of your course grade.

All worksheets and quizzes will be held during our in-class meetings and may be timed. Expect most worksheets and quizzes to be open book(s) and open notes.

Three midterm exams are scheduled along with a final exam. The exams will be a timed and in-person; expect exams to be closed book and closed notes. Final exam times are set by VCU here: <https://rar.vcu.edu/exams/index.html>.

R. Academic Dishonesty (cheating):

- You are expected to uphold the honor system at all times.
- If you are suspected of cheating, the matter will be sent to the honor council. This may result in a zero on the assignment, an F in the class, or suspension from the University.
- Examples of cheating include, but are not limited to, the following:
 - copying someone else's work or allowing another student to copy your work
 - copying answers to problems from websites like Stack Exchange
 - paying a tutor to solve a problem on your homework or having someone else do your homework
 - using sites like Chegg, Quora, Slader, Coursehero or social media to solicit for answers, regardless of whether it is free or paid
 - prompting any type of AI to answer your homework or exam problems
 - gaining knowledge from looking at another student's quiz/test
 - giving another student answers (or letting them copy) on a quiz/test

- discussing a quiz/test with someone who has already taken it or asking for information on a quiz/test from someone who has already taken it

Working together with your classmates on homework assignments and code-based assignments in a collaborative manner is *not considered cheating in this class*. I strongly encourage students in this class to work together on homework assignments.

S. Our shared learning environment

Everyone should know that I am grateful for your presence and appreciate your input in our in-person and online classes. You are welcome here, and our diverse backgrounds make us stronger together. I am dedicated to providing a welcoming and inclusive environment for all students, independent of your immigration status, country of origin and/or citizenship, race, ethnicity, religious affiliation, gender/sex, gender identity, sexual orientation, age, ability or disability, socioeconomic status, or perspective. Thank you for joining my class and bringing your unique experience and background to our intellectual community!

T. 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.