

CMSC 303 - Introduction to the Theory of Computing

Syllabus, Spring 2023

Course Level: Undergraduate
Prerequisites: CMSC 302 with a grade of C or better

Instructor: Dr. Ralph Grove
Office: Engineering East E4253
Office Hours: Tuesday/ Thursday 12:45-1:45, or by appointment
Email: grover@vcu.edu
Zoom: ***

Student Tutor: See the class website for schedule and contact information.

Class website: Canvas
Classroom: Engineering West 0101
Class time: Tuesday / Thursday, 2:00-3:15 PM
Final Exam time: Thursday, May 4, 12:30PM

1.0 – Overview (Catalog Course Description):

Semester course; 3 lecture hours. 3 credits. Prerequisites: CMSC 302 with a grade of C or better. Complexity classes, grammars, automata, formal languages, Turing machines, computability.

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:

- Create DFAs, NFAs, regular expressions, and convert from one to the other
- Work with Turing machines, and explain the significance of the Church-Turing Thesis
- Prove that a language is regular, context-free, or recursively enumerable
- Prove that certain languages are not regular or not recursively enumerable
- Prove certain problems are undecidable via a diagonalization argument
- Define the classes P and NP, and prove NP-hardness of certain problems

4.0 – ABET Criteria Addressed:

6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

Other Criteria Addressed:

- Substantial coverage of algorithms and complexity, computer science theory, concepts of programming languages, and software development.

5.0 – Major Topics Covered:

- Discrete Mathematics
- Finite Automata
- Regular Expressions
- Context-free Grammars
- Pushdown Automata
- Turing machines and computability theory
- Complexity theory

6.0 – Textbook:

Title: Introduction to the Theory of Computation, 3rd Ed.
Author: Michael Sipser
Publisher: Course Technology
ISBN-13: 978-1133187790 (other versions also available)

7.0 – Assessment:

Assessment Types:

Category	Description	Weight
Classroom Activities	Small group problem solving during class	10%
Homework	Problem sets assigned every 2-3 weeks; submitted online	10%
Quizzes	Written quiz covering recent material; taken in class every 2-3 weeks	30%
Midterm Exam	Written exam in class covering the first half of the semester	25%
Final Exam	Written comprehensive exam in class during finals week	25%

Grading scheme:

A: $\geq 90\%$
B: $\geq 80\%$ and $< 90\%$
C: $\geq 70\%$ and $< 80\%$
D: $\geq 60\%$ and $< 70\%$
F: $< 60\%$

General Policies:

1. All homework assignments must be uploaded to Canvas on or before the due date. No homework will be accepted by email or paper.
2. A late penalty will be applied to homework submission one or two days late. No work will be accepted more than two days late.
3. Homework assignments are given with enough time to complete them before the due date. No extensions will be given, except in case of extended absence due to illness or emergency.
4. Technical problems are a fact of life and a risk that you assume if you wait until the last minute to submit assignments. No extensions will be granted due to last-minute computer, network, or other technical issues.
5. Homework can be worked on collaboratively, but each student must write their own answers. If answers are simply copied in writing or digitally, this will be considered plagiarism.
6. Questions about homework grading should be directed to the TA in charge of homework. Appeals can be made to the instructor afterwards if necessary.
7. Requests to review grades for any assessment must be made within **ten days** from the date the grade is posted in Canvas. Requests after this time will be denied.
8. No makeup quizzes or exams will be given unless special permission has been given **in advance of the quiz or exam**.
9. Each student will be allowed to miss up to three classroom activities without penalty, to allow for unavoidable absences. The three lowest grades (including absences) will be dropped automatically.

8.0 – Classroom Policies:

- Feel free to come and go as you please during lectures. If you need to use the restroom, get a drink, leave early, etc., then do so - no permission needed. Quiz and exam periods are more strict, however.
- Please do not carry on conversations or use cell phones during class - doing so makes it harder for other students to concentrate. Feel free to walk out into the hallway if you need to phone or text.
- Please do not eat in the classroom. Drinks are OK.

9.0 – Communications:

- Please use the Canvas discussion forums to post general questions about homework or class topics. You are more likely to get a faster answer this way, possibly from a TA or other students.

Campus emergency information

What to know and do to be prepared for emergencies at VCU:

- Sign up to receive [VCU text messaging alerts](#). 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](#).
- Know the emergency phone number for the VCU Police (828-1234).
- Report suspicious activities and objects.
- Keep your permanent address and emergency contact information current in eServices.

Class registration required for attendance

Students may attend only those classes for which they have registered. Faculty may not add students to class rosters or Blackboard. Therefore, if students are attending a class for which they have not registered, they must stop attending.

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 in the [VCU policy library](#).

Important dates

You can view important dates for the semester in the [academic calendar](#).

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).

Mandatory responsibility of faculty members to report incidents of sexual misconduct

It is important for students to know that all faculty members are mandated reporters of any incidents of sexual misconduct/violence (e.g., sexual assault, sexual exploitation and partner or relationship violence). This means that faculty cannot keep information about sexual misconduct/violence confidential if you share that information with them and they must report this information immediately to the university's Title IX Coordinator. In addition, department chairs, deans, and other unit administrators are required to report incidents of sex or gender-based discrimination to the university's Title IX Coordinator. Once a report is made, you will receive important information on your reporting options, on campus and off campus resources and remedial measures such as no-contact directives, residence modifications, and academic modifications. If you would prefer to speak with someone confidentially for support and to discuss your options for reporting, contact:

VCU's Wellness Resource Center

804.828.9355 | myoptions@vcu.edu | thewell.vcu.edu

Greater Richmond Regional Hotline (Community program)

804.612.6126 | 24-hour hotline

VCU's Counseling Services 804-828-6200

Follow this link for [more information on how to help](#). The Policy on Sexual Misconduct/Violence and Sex/Gender Discrimination, can be found in the [VCU policy library](#). For more information about the University's Title IX process, please visit equity.vcu.edu.

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 or access the corresponding policies.

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](#).

Student financial responsibility

Students assume the responsibility of full payment of tuition and fees generated from their registration and 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).

Students representing the university – excused absences

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 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.

Students with disabilities

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, as amended, require that VCU provide "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 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). Please also 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 should schedule a meeting with their instructor (s) and provide their instructor (s) with an official accommodation letter. Accommodation letters will outline the required classroom accommodations. Additionally, if coursework requires the student to work in a lab environment, the student should advise the instructor or a department chairperson of any concerns that the student may have regarding safety issues related to a disability. Students should follow this procedure for all courses in the academic semester.

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, visit the [Student Services Center](#) at 1015 Floyd Avenue (Harris Hall) and/or contact your financial aid counselor regarding the impact on your financial aid.

Faculty communication about students

VCU instructional faculty, administrators and staff maintain confidentiality of student records and disclose information in accordance with the Family Educational Rights and Privacy Act (FERPA). This means that VCU officials may disclose student record information without the consent of the student in certain situations. To support university operations, for example, VCU officials share information about students with other educational officials as necessary to perform their job duties. FERPA permits this disclosure to school officials who have a legitimate educational interest in the student information. In addition, VCU officials have obligations to report information shared by a student depending on the content of that information, for example, in compliance with VCU's policy on the duty to report (policy.vcu.edu). Unless FERPA permits a certain disclosure, VCU generally requires consent from a student to disclose information from their education record to another individual. You may find additional information on the VCU FERPA

website: <http://rar.vcu.edu/records/family-educational-rights-and-privacy-act/>.