Course Overview

Instructors:
[Foteini Baldimtsi](#) (Section 002)
Office: ENG 5333
Email: foteini@gmu.edu
Office Hours: Thursdays 1:30pm - 3:30pm. ENG 5333
Lectures: Tuesdays and Thursdays 12:00pm - 1:15pm. Enterprise Hall 178

Teaching Assistants: Aayush Yadav (ayadav5@gmu.edu) and Bahman Pedrood (bpedrood@gmu.edu)

Course Description

Prerequisites

CS211 and Math 125 (C or better in both).

Content

This course is an introduction to two kinds of formal systems - languages (which are treated as sets of strings) and logics - with important applications to computer science. The study of formal languages underlies important aspects of compilers and other language processing systems, as well as the theory of computation. Various systems of logic and automatic reasoning are put to use in artificial intelligence, database theory and software engineering. The entire course will give you practice in precise thinking and proof methods that play a role in the analysis of algorithms.

Objectives and Outcomes

Will understand the concepts and relevance of logic, formal languages and automata theory, and computability.

Will be able to do mechanical formal proofs, prove program correctness for simple programs, and solve problems in first-order logic.

Will be able to solve problems in elementary machine models: designing finite-state automata, pushdown automata and Turing machines.

Will be able to solve problems in formal languages: writing regular expressions, regular grammars, and context-free grammars.

Textbook

Title: Logic and Languages Models for Computer Science, 3rd edition.

Authors: Dana Richards and Henry Hamberger

Available at the campus bookstore

Note that the 3rd edition is substantially different from the 2nd.

Logistics

Communications: We will exclusively use **Piazza** to communicate with you. If you have a question about the course you should: (a) Come to office hours, OR (b) Post on Piazza. We have already set up different tags for HW problems, exams and lectures. Please don't use private posts/emails to ask technical questions. The rest of the class is probably also interested in your question, so make it public!

Lectures: The class will meet in person every Tuesday and Thursday. I mainly use the whiteboard during lectures, thus taking notes is highly recommended! However, the textbook is a great resource for studying.

Class Material: Any given class material (slides, notes, videos with sample HW problems etc) will be posted on **Blackboard**. However, note that you need to take notes of material presented on the whiteboard during lectures.

Course Requirements

Grading Scheme
Quizzes -- 10%
Homeworks -- 30%
Exams -- 60%
Of two exams the highest score will count 35%, and the lowest 25%.

Homework Submission and Late Policy: We will assign weekly homework problems (posted on Friday and being due the next Friday). Assignments will be posted on **Blackboard** and solutions have to be submitted on Blackboard by **Friday 5:00 pm**. No credit will be given to late submissions. To be fair with everyone in class no exception will be made to the rule above. To accommodate unforeseen issues (i.e. being sick, overwhelmed with other classes etc), the grade of the 2 lowest HWs will be dropped.

Suggestions: It will be very hard to do well in this course if you do not do all of the homework by yourself, including any optional problems. You are strongly encouraged to do *all* of the problems, and to ask questions, in class and in office hours, when you do not understand any of them. Don't start the homework the day before it is due!

Quizzes: All class quizzes will happen at the beginning of the class on Tuesdays (don't be late!), electronically on **Blackboard**. The will consist of 2-5 questions multiple choice or fill-in-the-blank. You may use scratch paper but all notes should be closed. Every quiz will cover the material covered in the previous week.
You need to have an electronic device with you in class (laptop, tablet, smartphone) with access to Blackboard. If you need special accommodations please contact the instructor well in advance.

The grade of the 2 lowest quizzes will be dropped (this is to cover cases where you cannot attend class due to being sick etc).

Exams: All testing is closed book, and notes are not permitted. The two exams, including the final, each cover about a half of the semester. The final will focus on the 2nd half of the semester, but may also include some material from the 1st half.

The midterm is on March 8 during class time.

The final is on May 12th, 10:30am - 1:15pm.

CS330 Adviser Forms: It is a departmental requirement that students in CS330 must see their adviser and discuss their degree progress. The form can be downloaded here. Be sure to fill out the form **before** seeing your adviser, even if you are meeting virtually. This semester, I believe it is also OK to communicate by email.

You will have to email me your filled form **before the Midterm takes place**. Note, if you do it **earlier** in the semester, you will be more likely to connect with your adviser, and you will have more time to correct any problems. If you wait until the last week, your adviser might not be available. Students not fulfilling this requirement will receive an Incomplete grade. (Non-majors are not included.)

Tentative Schedule

Week	Topics, Slides and Video Links	Chapter/Parts	Homework
1/25	Introduction, Propositional Logic and Proofs	1-2	HW1 due 2/4
2/1	Propositional Logic and Proofs	3	HW2 due 2/11
2/8	Predicate Logic and Mathematical Induction	4	HW3 due 2/18
2/15	Predicate Logic and Mathematical Induction	5	HW4 due 2/25
2/22	Program Verification	6	HW5 due 3/4
3/1	Program Verification and Review	6	

3/8	Exam 1. And Regular Expressions and Grammars	7-8	
Spring Break	No class		
3/22	Regular Expressions and Grammars	8	HW6 due 4/1
3/29	RG from RE	8	HW7 due 4/8
4/5	Finite Automata	9	HW8 due 4/15
4/12	NFAs, pumping lemma	9	HW9 due 4/22
4/19	Pumping Lemma and CFGs	10, 11	
4/26	CFGs	11	HW10 due 4/29
5/3	NPDAs and Turing Machines, Computability	12	
5/12	Final Exam. 10:30-1:15		

Additional Class Information

Honor code: All students must adhere to the GMU Honor Code. You can discuss lecture material with other students in class but you have to work on the assignments alone. More specifically: (1) You must work on the homework problems and write your solutions completely on your own, without looking at other people's write-ups. (2) You are welcome to use any textbooks, online sources, blogs, research papers, Wikipedia, etc to better understand a notion covered in class or in a homework question. If you do so you have to properly cited it in any submitted work. Failure to do this is plagiarism and is serious violation of the GMU Honor Code and basic scientific ethics, and will not be tolerated. Note that it is not OK to search for solutions to HW problems online.

Disability Accommodations: Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474

Misconduct Report: As a faculty member, I am designated as a "Non-Confidential Employee," and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, stalking, sexual exploitation, complicity, and retaliation to Mason's Title IX Coordinator per

University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.