CISC 4090 Theory of Computation
Department of Computer and Information Science
Prof. Daniel D. Leeds, Fall 2019

Class times: Monday and Thursday, 11:30 – 12:45am, JMH 330
Instructor: Prof. Daniel D. Leeds
Office: JMH 332
E-mail: dleeds@fordham.edu
Office hours: Monday 3-4pm, Thursday 1-2pm

Course website: http://storm.cis.fordham.edu/leeds/cisc4090/

Text:
"Introduction to Theory of Computation", Michael Sipser. 3rd Edition (2012) is preferred.

Course description: This course studies the theoretical foundations of computation. Several classes of machines and problems are explored. Topics to be covered include:

- Finite state automata and regular expressions
- Push down automata and context free grammars
- Turing machines
- Computational complexity and NP-complete problems

Machines and languages will be examined through pen-and-paper simulations on example inputs as well as through logical proofs.

Objectives: To understand diverse strategies for computation, the nature of computability, and the complexity of computations.

Attendance and class participation: It is important to attend every class, and to arrive on time. One unexcused/unexplained absence is permitted for the semester. Attendance will be taken regularly. Please *actively* participate in class since this will make the course more interesting for everyone! Ask questions if you are unsure about something.

Course assignments: There will be roughly 4-5 homeworks assigned for the course. The homeworks usually will be announced at least 4 days before they are due, e.g., a homework announced on Thursday may be due the following Monday. (Usually you will have a week advanced notice.) All assignments must be turned in on time.

Academic honesty: All work produced in this course must be your own unless it is specifically stated that you may work with others. You may discuss the course material with other students

generally, but may not provide complete assignment solutions to others nor look at complete assignment solutions from **any** source. Copying of **any** part of an assignment is never acceptable and will be considered a violation of Fordham's academic integrity policy. Violations of this policy will be handled in accordance with university policy which can include automatic failure of the assignment and/or failure of the course. See Fordham's Undergraduate Policy on Academic Integrity for more information.

Exams: There will be roughly one mid-term exam in October – the exact date will be announced at least 3 weeks prior to the exam. There will be four 15-minute quizzes held throughout the semester at the beginning of class, each announced 1 or 2 class sessions ahead. There will be a final in December.

Timing conflicts: If you have a significant issue and cannot complete an assignment on time, or cannot attend class on a certain day, whenever feasible let me know beforehand -- I tend to be reasonable in such cases. Examples of significant issues include personal illness (with doctor's note) or a religious holiday (give me at least a week's notice) on an announced exam day. In general, let me know of any significant issues that affect your performance early on.

Grading: The percentages given below are guidelines for both the student and instructor and may be changed as needed to reflect circumstances in the course. Any changes that occur during the semester will be minor.

Participation	5%	Mid-term	25%	Quizzes	20%
Homeworks	20%	Final exam	30%		

Tentative schedule

Schedule is subject to change as the class progresses. The last few days are scheduled as "catch-up" days as it is likely we will run behind at some point as the semester progresses. If we are **ahead** of schedule, I will add some additional topics.

Aug 29 – Sep 4	Background material: graphs, proofs, math terminology	
Sep 4 – Sep 16	Finite state automata and regular expressions	Quiz 1; HW 0 due
Sep 19 – Oct 10	Push down automata and context free grammars	Quiz 2; HW 1 due
Oct 17 – 21	Review	HW 2 due; Midterm
Oct 14, 24 – 28	Turing Machines	
Oct 31 – Nov 14	Decidability	Quiz 3; HW 3 due
Nov 18 – 25	Complexity: P and NP	Quiz 4
Nov 27	THANKSGIVING BREAK	
Dec 2 – Dec 5	Catch up days/review	HW 4 due