

# CSCI 36500 §001 # 9991 Computer Theory II and CSCI 72400 §01 # 9154 Spring 2024

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**Text:** Hopcroft, Motwani & Ullman, *An Introduction to Automata Theory, Languages and Computation 3rd edition*, Addison Wesley, ISBN 0-321-45536-3.

**Web:** Useful links, including an updated version of this syllabus and all the home work assignments, are available on <http://www.cs.hunter.cuny.edu/~eschweit/365stuff/365.html>

**Finding your Professor:** I can be reached to make appointments etc. by contacting me before or after class, by phoning my office at (212)772-4349, by stopping up at my office (N-1000E) during scheduled office hours (Wednesdays and Thursdays 5:00-6:00) or any other time I'm there and not otherwise engaged, or (by far the best way) by sending me e-mail at [eric.schweitzer@hunter.cuny.edu](mailto:eric.schweitzer@hunter.cuny.edu). Please note that I will only read plain **ASCII text** email, not HTML or MicroSoft Word encoded documents. Also note that any email concerning anything that might fall under the FERPA regulations (e.g. questions about grades or other class related issues) *must* be sent from your "myhunter" account.

In addition, messages can be left for me at the Computer Science Department office, which is located in N-1008 and is reachable at (212)772-5213.

**36500 Grades:** Grades will be based on a midterm exam, a final exam, and a program and short paper about that program.

- The midterm exam will be given on Monday March 25. It is worth 45% of your final grade.
- The Final will be given at the appointed hour during finals week. This is currently Monday, May 20, from 6:20 to 8:20, however the College may change this schedule. The Final will be 45% of your grade.
- The program and paper, worth the remaining 10% of your grade, will be a Turing Machine simulation and a short paper about that. You will be encouraged to use  $\text{\LaTeX}$  to create it the paper. More details will follow.

**72400 Grades:** Grades will be based on a midterm exam, a final exam, and a presentation and paper.

- The midterm exam will be given on Monday March 25. It is worth 45% of your final grade.

- The Final will be given at the appointed hour during finals week. This is currently Monday, May 20, from 6:20 to 8:20, however the College may change this schedule. The Final will be 45% of your grade.
- The presentation and paper, worth the remaining 10% of your grade, will have two parts. There will be a short (8-12 pages, not including notes or bibliography) paper about something you find interesting that is related to the class. It will be due Wednesday April 17. It must be created with L<sup>A</sup>T<sub>E</sub>X. Over the next few classes, you will present the paper to the class in a 15 minute presentation. More details will follow.

I do not give “extra credit” assignments. Do not expect to be able to pull up your grade by doing additional work. Do expect to do the assigned work in a timely manner. You need to do problems in order to understand the material, and you need to master material before you move on to more advanced material. It is easy to fall behind and very difficult to catch up.

**Topics, Goals or Outcomes:** This is a “theory” course. To succeed, you will have to understand some abstract concepts (“machines” and “languages”). You will need to use them, and mathematical reasoning, to understand and construct proofs. We will spend the semester focusing on “recursive” and “recursively enumerable” languages and various machine models (“Turing machines”, “Post machines”, etc.) that accept them. We will also delve into time and space bounds.

The successful student will demonstrate mastery of the subject by constructing proofs and solving problems related to the subject matter on exams, and by clearly presenting proofs and solutions in their oral presentations.

This course supports departmental learning goals 1A, 1C and 1D, by exposing the student to the mathematics that underlies the theory of computation, 3C, by giving them the theoretical underpinnings of complexity theory, and 3A, by requiring oral presentations and written exams.

We will try to hew the following schedule:

Week	Topic	Sections
1	Intro, 265 review, PLs for CFLs and RLs, TMs	
2	Undecidability, TMs, reductions	8.1, 8.2
3 and 4	TM techniques and extensions	8.3, 8.4
5	Special TMs, TMs and computers	8.4, 8.5
6	Undecidability	9.3
7	Review and Exam	
8	P and NP	10.1
9 and 10	NP-completeness and SAT	10.2, 10.3
11 and 12	More NP-complete problems, co-NP	10.4, 11.1
13	Other computers, other considerations	no text
14	Review and catch-up	

**Academic Integrity** Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

**Policy on Bullying:** Bullying, cyberbullying, online hate, intimidation, threats, harassment, and pressure to share schoolwork are all forms of violence. CUNY holds a zero tolerance stance towards all such acts. The University is committed to prevention of any form of bullying, will respond promptly to threats and/or acts, and will protect victims of bullying from retaliation. As a criminal matter, the New York Attorney General defines cyberbullying as the use of email, websites, instant messaging, chat rooms, text messaging and digital cameras to antagonize and intimidate others. Disrupting a teleconferencing platform (such as Zoom/Skype/Blackboard Collaborate Ultra) is a federal crime.

**ADA Compliance** In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: 212-772-4857 or 212-650-3230.

**Personal Protective Equipment and other COVID matters:** Whatever rules CUNY or Hunter put in place will be enforced. Remember that these rules can change with little warning.

**Hunter College Policy on Sexual Misconduct** In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123. CUNY Policy on Sexual Misconduct Link:

<http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf>

**Cell Phones etc.** I expect all cell phones, pagers, etc. to be inaudible during class. I expect laptops and other electronic devices, if used, to be used only for class related activities. Activities not related to class include but are not limited to facebook, twitter, other social networking web sites, "surfing", email, mu\*s, hulu, southparkstudios, etc. Any student with an electronic device that disrupts the class will lose two (2) points from their final average (per occurrence).

Note that details of this document are subject to change if the need arises.