

CS530: Mathematical Foundations of Computer Science, Fall 2023

Instructor: Michael Jarret, Exploratory Hall 2220, mjarretb@gmu.edu

Office Hours: TBD During First Class

Meetings outside of regular office hours or meetings in-person are by appointment.

Textbook:

Mathematics for Computer Science, by E. Lehman, F.T. Leighton and A.R. Meyer.
<https://courses.csail.mit.edu/6.042/spring15/mcs.pdf>

Other texts used:

Lecture Notes on Mathematical Logic, by Vladimir Lifschitz.
Probability Course Notes, by Richard Weber

Tentative Course Outline:

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|---------|--|
| Week 1 | Introduction, Warm-up, & Semester Prep |
| Week 2 | Proofs |
| Week 3 | Induction |
| Week 4 | Recursion |
| Week 5 | Sets, Relations |
| Week 6 | Structural Induction |
| Week 7 | Number Theory |
| Week 8 | Propositional logic |
| Week 9 | Propositional algebra |
| Week 10 | Predicate algebra |
| Week 11 | Classical probability |
| Week 12 | Probability spaces |
| Week 13 | Conditional probability |
| Week 14 | Random variables |
| Week 15 | Important distributions & Methods |

Grade Policy:

CS 530: The course will be broken down into 5 units, with each unit having a corresponding homework assignment. Units will be graded on P/I (Pass/Incomplete) scale, with P being an 80% or better. Students who receive an I on any unit will be given the opportunity to improve their score to a P, by attempting follow-up assignments.

Homework will be due approximately every two weeks and will be the student's first opportunity to earn a 'P' for the unit. The final exam will be take-home and will also be broken down into 5 units. This exam will serve the **dual purpose of allowing students to pass any incomplete units**, by passing the corresponding unit on the final, and to achieve distinguished marks in the course.

The grade scale is as follows:

| Units Passed | Final Exam | Course Grade |
|--------------|---------------|--------------|
| 5 | A+ | A+ |
| | A | A |
| | anything else | A- |
| 4 | A- | B+ |
| | anything else | B |
| 3 | B | B- |
| | anything else | C |
| 2 or fewer | – | F |

The final exam is graded similarly to the rest of the course and will be broken down into units. Note that achieving an *A* grade on the final exam is not possible without simultaneously passing all 5 units on the exam. Similarly, a *B+* is not possible without simultaneously passing at least 4 units on the exam. A student passing all 5 units on the final will get a *P* for each unit and will additionally be given a numerical score for the unit. The numerical score average will determine the student's overall grade. Final Exams will be evaluated as follows:

| Units Passed on Final | Final Exam Score | Course Grade |
|-----------------------|------------------|--------------|
| 5 | > 95 | A+ |
| 5 | [90,95) | A |
| 5 | [80,90) | A- |
| 4 | [80,95) | B+ |
| 3 | [70,80) | B |
| ≤ 3 | [0,70) | N/A |

Submitting assignments Students should upload their assignments to Blackboard.

Contesting grades: Students can request regrades of assignments within one week of their return to the student. A regrade will only be considered if the student (1) has a clear explanation for why the original score was inaccurate and (2) it is possible for the resulting change to convert an 'I' into a 'P.' During a regrade, the instructor will completely disregard the original grade and reevaluate the relevant problem. **Regrades are not guaranteed to improve scores and can result in either an increased or decreased score on the problem.**

Collaborating with other students: You are encouraged to discuss homework assignments with other students, however you *must* identify anyone who has made significant intellectual contributions towards your submission. No more than 4 collaborators should make *significant* contributions towards your homework submission. In other words, while you can briefly discuss the assignment with as many people as you like, a study group should not exceed 5 people. **Although collaboration is encouraged, homework submissions must be the unique work of the author.**

Although students can collaborate on assignments, each student must write and submit their own assignment.

Exams are to be completed independently.

Attendance Policy: Attendance will not be factored into a student's grade, however I may introduce information that *will not be found in the textbook and will be needed to complete homework.*

Academic Honesty: This course will be conducted in accordance with the GMU Honor Code, and all students are expected to abide by it. The GMU Honor Code, as found in

the University Catalog, is as follows: To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work. <http://oai.gmu.edu/the-masonhonor-code-2/>. You may find the honor code for School of Engineering on the Blackboard course menu.

Any form of cheating on an activity, project, or exam will result in zero points earned. “Cheating” includes, but is not limited to, the following: looking at others’ exam papers, having ANY paper visible (including under your seat) when not allowed, having ANY electronic device visible (including electronic devices in or on your ear), talking with another student during an individual assignment. If you have questions about when the contributions of others to your work must be acknowledged and appropriate ways to cite those contributions, please talk with the professor or utilize the GMU writing center.

Plagiarism and the Internet: Copyright rules also apply to users of the Internet who cite from Internet sources. Information and graphics accessed electronically must also be cited, giving credit to the sources. This material includes but is not limited to e-mail (don’t cite or forward someone else’s e-mail without permission), newsgroup material, information from Web sites, including graphics. Even if you give credit, you must get permission from the original source to put any graphic that you did not create on your web page. Shareware graphics are not free. Freeware clipart is available for you to freely use. If the material does not say “free,” assume it is not. Putting someone else’s Internet material on your web page is stealing intellectual property. Making links to a site is, at this time, okay, but getting permission is strongly advised, since many Web sites have their own requirements for linking to their material. <http://oai.gmu.edu/the-mason-honor-code2/plagiarism/understanding-plagiarism/>

Academic Integrity & Inclusivity: This course embodies the perspective that we all have differing perspectives and ideas and we each deserve the opportunity to share our thoughts. Therefore, we will conduct our discussions with respect for those differences. That means, we each have the freedom to express our ideas, but we should also do so keeping in mind that our colleagues deserve to hear differing thoughts in a respectful manner, i.e. we may disagree without being disagreeable. <http://oai.gmu.edu/>

Diversity, Religious Holiday: Please refer to George Mason University’s calendar of religious holidays and observations (<http://ulife.gmu.edu/calendar/religious-holiday-calendar/>). It is the student’s responsibility to speak to the instructor in advance should their religious observances impact their participation in class activities and assignments.

Student Privacy Policy:

George Mason University strives to fully comply with FERPA by protecting the privacy of student records and judiciously evaluating requests for release of information from those records. Please see George Mason University's student privacy policy <https://registrar.gmu.edu/students/privacy/>

Disability Statement: If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Disability Resource Center. If you qualify for accommodation, the DRC staff will give you a form detailing appropriate accommodations for your instructor.

In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Disability Resource Center and are waiting to hear from a counselor, please tell me.