Spring 19: CSci 2011H—Honors Discrete Structures of Computer Science

Instructor
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Office hours: MW 2:45–3:45 p.m.

Course Web page: z.umn.edu/2011H

Welcome to CSci 2011H!

This honors-level course covers a wide range of concepts in discrete mathematics that are central to computer science. It is a required (4-credit) course if you are a computer science or computer engineering major, and you will benefit the most from it if you take it in your sophomore year. This course is necessary for admission to the CSci major and is a direct or indirect prerequisite for many of the higher-level CSci courses that you may take later (e.g., CSci 4011, 4041, 4041H, 5421, 5511, 5801, etc.), as those courses rely quite heavily on the material that we will discuss here.

In this course, we will cover a broad range of topics, including propositional and predicate logic, proof methods, finite and infinite sets, functions, sequences, summations, basic algorithms and analysis techniques, induction, recursion, counting methods, recurrences, discrete probability, trees, and graphs. Wherever possible, we will also describe applications of these techniques. The expectation is that, upon successful completion of this course, you will be able to appreciate the power and beauty of these techniques and will be able to use them to analyze and solve discrete problems arising in various domains.

To succeed in this course, you must have some facility with basic mathematics (the official prerequisite is first-year calculus–Math 1271/1371/1571H) and possess good analytical skills. If you are unsure of your preparation, please talk to me right away. In addition, you should work out as many problems as possible from the text, read ahead for class, as well as attend the lectures and the Discussion section regularly and participate actively in them. The Discussion section will be used to reinforce concepts covered in class and for problem-solving. Please do avail of the assistance offered by yours truly and by the Teaching Assistants; we’re here to help you do your best.

The rest of this write-up describes the course in more detail. In particular, please pay attention to the section on class policies. They are designed to ensure that the course proceeds smoothly and will be implemented from the very beginning.

Once again, welcome to CSci 2011H and best wishes for a successful semester. I hope that you enjoy the course as much as I enjoy teaching it.
Detailed information

When/Where/etc.: Lectures meet MWF 9:05–9:55 a.m. in Amundson 240. Discussion section meets Thu 1:25–2:15 p.m. in Civil Engg. 212. Prerequisite: Math 1271/1371/1571H or instructor’s consent.

Teaching assistants:
Graduate Asst.: Mr. Rohit J.V. (jakku004@umn.edu). Office hour: Tue. 2:30–3:30 p.m.
Undergraduate Asst.: Mr. Ry Wiese (wiese176@umn.edu). Office hour: Thu. 4:00–5:00 p.m.

TA office hours will be held in Keller 2–209.


Topics: The following topics will be covered from the text; not all subtopics within a chapter will be covered. This list may change slightly as we go through the course.

Ch. 1: Logic and Proofs  Ch. 6: Counting
Ch. 2: Sets, Functions, Sequences, ...  Ch. 7: Discrete Probability
Ch. 3: Algorithms  Ch. 10: Graphs
Ch. 5: Induction and Recursion  Ch. 11: Trees

Coursework: This will consist of eight homework assignments, four quizzes, and a Final exam. (See schedule below.) The quizzes are forty-five minutes long and will generally focus on recent material; however, you should be familiar with earlier material as well. The Final is two hours long and will be comprehensive, i.e., it will cover all of the material discussed during the semester. The quizzes and the Final are closed book and notes; however, you can create and bring with you a single sheet of notes (8.5 × 11 inches, double-sided, handwritten or typed). Other than a standard calculator, no electronic/internet-enabled devices will be permitted.

Each homework will be posted on the class web page the day it is assigned.

Evaluation: The course grade will be based on a weighted average of the homework assignments (48%, weighted at 6% each), quizzes (30%, weighted at 7.5% each), and Final (22%). Course grades will be based on the following absolute scale:

\[ A \geq 93\%, \quad A- \geq 90\%, \quad B+ \geq 85\%, \quad B \geq 80\%, \quad B- \geq 75\%, \quad C+ \geq 70\%, \quad C \geq 65\%, \quad C- = S \geq 60\%, \quad D+ \geq 55\%, \quad D \geq 50\%, \quad \text{and} \quad F < 50\% . \]

Note that the weighted average will not be rounded up when determining grades.

Web page: Throughout the semester, information about the course, including homework assignments, weekly readings, and late-breaking class news, will be posted on the class web page. The page also links to an online forum, where you can discuss material related to the course. Please check the class web page regularly.

Comparison to (the non-honors) CSci 2011: Both courses are expected to cover roughly the same core set of topics. The main differences are the following: (i) We will cover basic material somewhat quickly, which will allow us to delve deeper into more advanced topics. Towards this end, lectures will focus on distilling and presenting key ideas and concepts from
the text (rather than going over every last detail). You will be expected to independently augment this with additional readings from the text, as appropriate. (You should plan on roughly 30–40 pages per week.) (ii) Our smaller class size will allow for more personalized attention and interaction. You are expected to be fully engaged in this process by attending lectures and discussion regularly, contributing constructively to them, and, in general, helping create and maintain a vibrant learning environment.

Important class policies—Please read carefully!

- **Assignments and exams:** To qualify for full credit, a hardcopy of each homework assignment must be submitted in its entirety at the beginning of class on the due date. *Work submitted after the start of class (i.e., 9:05 a.m.) is considered late.* Late work will be accepted in the instructor’s office until 11:00 a.m. on the due date but will lose 10% of the total points that the assignment is worth. No work will be accepted after that.

  Do not email your homework to the instructor or TAs, or leave it in the department mailbox. Such submissions are difficult to track and could get overlooked/lost.

  Assignments must be legible and pages should be stapled together. Remember that, between the quizzes and assignments, we will be handling a large volume of material during the semester, so your cooperation will go a long way in easing our work and in ensuring that the course proceeds smoothly.

  Please keep the exam dates in mind when planning any Spring Break travel. Exams must be taken as scheduled.

  Any exceptions to the above policies on timely submission of assignments and taking of exams will be at the instructor’s discretion and will be made in a manner that is consistent with University policy [z.umn.edu/makeupwork].

- **Re-grade requests:** Grading will be done by the TAs. Requests to review the grading should be addressed to the TAs in writing *within seven days* from the date the assignment or quiz is returned; after this period, no review requests will be considered. (For logistical reasons, such a review will not be possible for the Final.) The instructor reserves the right to limit the number and scope of such requests made by a student.

- **Incompletes:** An “Incomplete” grade is given very rarely and will be considered only if a student is doing well in the course and has completed successfully all but a small portion of the coursework, but is unable to complete the course in time due to an emergency. *In particular, an “Incomplete” will not be given for grade improvement purposes.*

- **Academic integrity:** All coursework must be done independently. You may discuss an assignment problem in general terms with your friends, but the final answer must be your own. Copying or interfering with the work of another student, plagiarizing from another source (including the Internet), or any other misrepresentation of your work constitutes cheating. Penalties will range from a zero for the entire assignment/quiz/exam in question to an “F” for the course. The case will also be referred to the student’s department and/or advisor and to the Office for Community Standards [z.umn.edu/comm-stds]. You are urged to read the CS&E Department’s official policy on academic conduct [z.umn.edu/acadconduct].

**Disability Resources:** It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students that have disabilities that may affect their ability to participate in course activities or to meet course requirements. If needed, please
contact the Disability Resource Center on campus for further information and assistance (z.umn.edu/drc).

Homework, Quiz, and Final Exam schedule

- The first class meeting is on Wed., Jan. 23 and the last class meeting is on Mon., May 6.
- Lectures are on MWF 9:05–9:55 a.m. in Amundson 240. Discussion is on Thu. 1:25–2:15 p.m. in Civil Engg. 212, starting Jan. 31. (On Jan. 24, we will have a lecture instead of Discussion, in Civil Engg. 212.)
- Quizzes last forty-five minutes and are given at the start of lecture.
- The Final exam date and time are set by the University (z.umn.edu/finals)
- Lecture topics and readings will be posted weekly in the online version of this schedule (on the course web page).

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<tr>
<th>Week</th>
<th>Mon.</th>
<th>Wed.</th>
<th>Thu. (Discussion)</th>
<th>Fri.</th>
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<tbody>
<tr>
<td>1 (01/21–01/25)</td>
<td>No class</td>
<td>Lecture, Civil Engg. 212</td>
<td>HW1 out</td>
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<td>2 (01/28–02/01)</td>
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<td>HW1 in, HW2 out</td>
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<td>3 (02/04–02/08)</td>
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<td>HW2 in</td>
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<td>4 (02/11–02/15)</td>
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<td>Quiz 1</td>
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<td>5 (02/18–02/22)</td>
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<td>HW3 out</td>
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<td>6 (02/25–03/01)</td>
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<td>HW3 in, HW4 out</td>
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<td>7 (03/04–03/08)</td>
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<td>8 (03/11–03/15)</td>
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<td>Quiz 2, HW5 out</td>
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<td>9 (03/18–03/22)</td>
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<td>Spring Break!</td>
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<td>10 (03/25–03/29)</td>
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<td>HW5 in, HW6 out</td>
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<td>11 (04/01–04/05)</td>
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<td>12 (04/08–04/12)</td>
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<td>Quiz 3, HW7 out</td>
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<td>13 (04/15–04/19)</td>
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<td>HW7 in, HW8 out</td>
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<td>14 (04/22–04/26)</td>
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<td>HW8 in</td>
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<td>15 (04/29–05/03)</td>
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<td>Quiz 4</td>
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<td>16 (05/06–0510)</td>
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<td>17 (05/13–05/17)</td>
<td>Final: Monday, 05/13, 1:30–3:30 p.m., Amundson 240</td>
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