

**CSC200/200H: Undergraduate Problem Seminar
Information Handout/Syllabus**

Spring 2011

Version 1.4

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**(the most recent revision of this document can always be found on the course
web site)**

Location/Time: The course meets in Room CSB 632, M/W 4:50PM–6:05PM.

Instructor: Lane A. Hemaspaandra, CSB 618, 275-1203, cs200 “at” cs.rochester.edu

TA: Jacob (“Jake”) Scheiber, CSB 726, 275-5414, cs200 “at” cs.rochester.edu

Office Hours: Lane (CSB 618): By appointment (but please always feel free to stop by any time without an appointment, or to grab me right after any time I lecture).

Jake (CSB 726): Mon/Wed 1pm-2pm, Tue/Thu 450pm–550pm, and Fri noon–1pm, all in Room CSB 726 (but please always feel free to stop by any time without an appointment, or to make an appointment with him via email to see him at some mutually convenient time).

Prerequisites: You must have completed all the URCS B.S. premajor requirements and CSC173. *That is, to take this course this term, you must have already taken, completed, and received a passing grade in all of the pre-major requirements—MTH 150, MTH 161, MTH 162, CSC171 (or AP credit for 171), and CSC 172—and CSC 173.* (A computer accounts sheet, due to scheduling, might be passed around at the start of the first class, but getting/having a computer account doesn’t mean you are actually correctly in the course; you must have the prerequisites to be in the course and receive grades on your work.)

Course Goal/Description: This is two courses in one. They are quite different, though related. Each has its own goal.

One part of the course is learning about the areas/research going on in computer science here in Rochester. To this end, we will have lectures from many of the department’s research faculty members about their own research, and we might also include talks by some others (e.g., maybe a talk by UR’s wonderful CS librarian, a few talks by URCS Ph.D. candidates, and a talk from Prof. Piotr Faliszewski, from Krakow, Poland, during his visit here). You should (read: must) attend these, and please listen and learn well—you will be hearing talks by people whose lives are devoted to aspects of a field that you care enough about to be taking this course (and in most cases, you are also majoring in computer science). Your grade on this part will be based on attendance as follows: There are a possible 100 points for this aspect of the course. You lose 0 points for the first research guest lecture you miss and you lose 20 points for each one after that that you miss (and if that leaves you with a negative score here then it will, when added in, even eat points out of your score on other parts of the course!). (By research guest lectures, I mean all the lectures by anyone other than myself and the TA—except when I or the TA have research guest slots to discuss our research and I make it clear that that counts as a research guest lecture then that counts as

a research guest lecture.) I will not have an exam on the guest lectures, but it is a course rule that you may not have a laptop open during the guest lectures—your eyes should be on only the speaker and his or her presentation, and if you want to take notes, do so with pen and paper (it is a good skill to have, and you are free to scan or copy those to a computer later if you like). (As to audio or video recording of lectures, the course rule is that during the lectures other than the research guest lectures, you may not record the class, and during any guest research lecture, you may record the lecture only if you get the explicit permission of the lecturer to do so. Note: If you have a documented disability that affects the issue of recording of lectures, please see me.)

The other part of the course, which will take (far) more of your out-of-class time, is about... doing cooperative problem solving. The goal of that aspect of the course is to immerse you in doing projects and research, and in writing up the research, and, basically, for you to have an early-on-in-your-careers chance to learn what it is like to *do research*.

Grading: The overall course grades (A, A-, etc.) will not be any fixed curve, but rather will reflect the instructor's judgment about what grade is appropriate based on performance quality, i.e., based on the number of points you get. Each of the three regular projects is worth 100 points. Students who are taking this course as CSC200H (honors) have in addition to do a special (and very difficult) project, which is worth 100 points, and that project will be as assigned by me (see below for more on this special project). Also, regarding the research guest lectures, there are 100 points (and your score can vary from 100 to some negative number), scored as discussed above. You will also get a class participation grade out of 100 points. See the *class participation* section below for a discussion of this grade. The quizzes, all combined (except with two dropped), will be averaged and will constitute another 100 point block. All these 100-point blocks are added together to form your point total, and then that will be divided by 700 if you are in 200H and 600 if you are in 200 to get your course average. For example, suppose you are taking this as 200H, so you do 3 projects and also the honors-only project, and suppose you get 0 points on two and 100 points on two, and suppose there are 8 quizzes and you get 0% on 4 and 100% on 4, and suppose your class participation score is 20% and you missed 7 research guest lectures. Then your point total is built of 200 (out of a possible 400) for projects and the paper, 66.67 (out of a possible 100) for quizzes, 20 (out of a possible 100) for class participation, and negative 20 (out of a possible 100) for attendance. So your point total is 266.67 out of a possible 700, and your course average is 38.1 percent. (In a typical year, this would be very deep in "E" land, grade-wise, though of course there is no fixed curve. But do keep in mind that this is an intensive course, and each student is expected to apply himself or herself with dedication. But don't worry—the projects are challenging but (often) fun.)

This course is available only for credit, not as an audit.

If you are unhappy with your grade on some quiz or project or you attended an entire guest lecture but in BlackBoard's grade center we have you marked down as not attending it, you may appeal it, but only *in writing* and *within 48 weekday hours* (Saturday and Sunday don't count against you) of the date the piece of work was announced as available for return or of the time the guest lecture in question ended in the case of attendance records. To

do so regarding attendance records, send an email to cs200 at cs.rochester.edu stating that you attended the entire lecture on [then give the date] yet that BlackBoard marks you as not having been present (the attendance grade for a class is all or nothing, so if you missed part of a lecture and got a No, you cannot ask you have your No turned into a Yes, even if you caught most of the lecture; in recording attendance we might give a Yes to people who are just very slightly late, but that is at the TAs discretion and is not an entitlement). To appeal a quiz or project grade, you must see the TA and give him the piece of work you are appealing and your written argument as to why you think your work was misgraded, keeping for yourself a photocopy of both. He'll get back to you, also in (email) writing. If you are still unhappy, you have another 48 weekday hours from when the TA emails you letting you know his regrade is available to you to re-appeal your grade to me (to do that, put in my mailbox the piece of work and your written appeal to the TA and his written reply, and your written new argument about why things are still not correctly graded, and keep for yourself a photocopy of all of the above, and then email me letting me know you have done all that). The exception is that at the end of the term (defined as from April 20th onward), those two "48 weekday hours"s each become "24 weekday hours"s.

Note that when you request a regrade, the entire piece of work—not just the point you are asking about—will be regraded, and your grade may move either up or down. For example, if I (or the TA) discover that the TA missed some errors, or just was overgenerous (as TAs sometimes are), moving down is a real possibility. These rules and deadlines will be strictly enforced. Of course, the TA and I are always happy to discuss with you, after a project is handed in, the (intellectual/technical) issues regarding the solutions of the project.

As to grades (and what is made public and what is not), each student gets his or her own grade on each project and quiz (and of course I assume and expect that you will keep each given-back item/grade), and through BlackBoard he or she will (if we can get it set up right) see some information about the overall class performance on those items, and at the end of the course he or she will receive his or her course grade either from the registrar or from me. However, I in general do not give out grade/distribution info beyond that, though of course if a student wishes to share with some classmate his or her grades on some items or the course, that is up to him or her.

Exams: There will be no final or midterms.

Quizzes: There will be (usually surprise) quizzes. On some days, we may have more than one quiz on the same day. You should not at all assume that quizzes will be mechanical playback of information. Some might be, but many will expect you to apply and/or extend and/or demonstrate creativity and insight. That is, some quizzes may be easy and some may be hard. Coming in prepared is always a good idea (and is expected). *Rules for quizzes:* No makeups; no exceptions (except for religious holidays mentioned long in advance). The quizzes are closed-book and closed-notes. However, as a bow to sicknesses, broken cars, and other compelling excuses, everyone will have his or her lowest two quizzes dropped before the quizzes are averaged into a 100-point-block grade (for example, if there were 8 quizzes and you got 0% on 4 of them and 100% on 4 of them, your 100-point quiz score would be a 66.67). The only exceptions to this drop-2 rule will be in cases where you bring in an

appropriate letter from a convincing Dean who in writing certifies that he or she has read and understands the course's policy that no quizzes beyond two are dropped and feels that your case is so extraordinary that there is a compelling case to not follow this fixed course policy in your case.

Dropping Grades: As a bow to sicknesses, broken cars, and other compelling excuses, everyone will have his or her lowest two quiz grades dropped and will have his or her first absence from a research guest lecture "charged" at zero points. Absolutely no drops or makeups beyond that will be given or allowed. The only exceptions to this will be in cases where you bring in an appropriate letter from a convincing Dean who in writing certifies that he or she has read and understands the course's policy on no quizzes beyond two are dropped and on absence scoring (0, 20, 20, etc.) and feels that your case is so extraordinary that there is a compelling case to not follow this fixed course policy in your case.

Class Attendance: Required.

Class Participation: The class participation grade regards only the non-guest-lecture part of the course (for the research guest lectures, you are graded on attendance but are strongly urged to participate and ask questions of the speaker). I expect each student to participate energetically and insightfully in class. So, the best case is that your comments reflect such items as insight, creativity, curiosity, and preparation. Note, however, that if I call on you and you reply "We could not solve that but let me now spend two minutes describing the progress we made and the case analysis we did and the one case that we could not handle and why we could not handle it but what our intuition is as to why it should be true even in this case," that—though that is not as heartwarming as having a blockbuster, breakthrough answer—certainly is far better than giving the answer "I dunno." In fact, this is not a grade on brilliance (although that is always nice to see); rather, I base this grade on having done respectably well regarding effort/preparation/participation. A corollary is that it is possible for each student (or all students) to get 100% on this subgrade, and indeed I hope that each of you will. (A related corollary is: Don't expect to "gain points" against your classmates in the category, since it is quite possibly that almost everyone will get 100% on this; of course, actually, thinking along the lines of "gaining points" against one's classmates is in any case not the right way to approach this or any course.)

Work of the Course: The course will involve research guest lectures (mostly on research, and most will be given by URCS faculty members, and some may be from advanced graduate students or others), class discussions, and so on. However, the heart of the course will be the projects. Each project will be done in groups, and we will do them, one after another, throughout the semester.

Rules for Projects: When a project is given, you will be assigned to groups by me. I probably will do so by randomly drawing groups (except I may sometimes tweak that to avoid having groups identically repeat, or for some other goal). Each group will research the project jointly (i.e., the members of a group work with each other), and will submit one paper (from the entire group) at the end of the project, as a paper (say, postscript or pdf, mime-attached) via email, and also you'll at the same time (also attached through

that same one-per-group email, probably as pdf, or perhaps as ppt, but if you send it as ppt you *must* also include a pdf export) send in a copy of the slides for your group’s talk on its project (the talk you’ll be giving on the final Presentation day of the project), and perhaps your email will also include a tar archive of code and examples, depending on the project. *If someone in your group does not pull his or her weight (trust me: sooner or later it may happen—in faculty/academic/industrial research it certainly does surprisingly often), you or a groupmate must cover for him or her, as you all get the same grade. Consider it a valuable learning experience of a painful truth.* Also, it is possible that someone(s) in your group will drop the course, in which case your group might become smaller than it started, and in that case the remaining group members still are responsible for turning in an excellent project. You will want to meet daily with your groupmates to pursue the project. Most projects will have a class discussion session or more typically two in which all groups will share their progress and ideas to date (though some might not have such a session, and some might have the initial project-statement session of a project be the same class session as the final session—the presentation of results session—of the previous project). Aside from that, you should discuss your project primarily with your groupmates. (Since in this course the work and the writing are at their core collaborative, this course is in general not appropriate for the ULW process.)

Regarding discussions with people in other groups, the following holds. It is allowed to have discussions (person-to-person—not via wiki/newsgroups) with members of other groups of a relatively detached sort (e.g., “How does one turn on the extended memory feature?”), but in order to correctly simulate what group research is like, you should insofar as possible avoid detailed discussions of problems and solutions with people in other groups (except at the class discussion sessions mentioned above). You of course should not share files or programs, etc., and obviously each group’s writeup must be completely independent. However, you MAY use inanimate generally available information sources in a nonproactive way. That is, you may seek information in the library, on the Internet, etc. However, you may not ask people (in person, via email, via wiki/newsgroup postings (not even to any class wiki/newsgroup!), or via any other means) for help, except as mentioned above (and so it is cheating to seek project help from previous CSC200/200H students). Remember: The projects are your chance to work closely with your groupmates **DOING RESEARCH**. Shortly (usually, immediately) after a project is due, we will have a class session in which all the groups present their results/solutions/etc. (I myself will also not speak with you about projects while they are running, though I’ll be delighted to speak with you about them after they are handed in. If you are really desperate, there however is a small loophole: Traditionally, the TA of this course views her- or himself as having a bit of freedom in this regard, and I’ll unless it is abused follow that pattern too. Traditionally, the TA uses this freedom in a particular way, namely, if a group comes to the TA and is doing great and wants help the TA tells them they are supposed to be doing research themselves and doesn’t help them too much, but if a group is totally lost and very worried, the TA may try to give some hints to try to help get them on track—but do keep in mind that you are looking at open issues, and so the TA’s hints could be unwise or unproductive or wrong, though of

course the TA if the TA gives hints won't on purpose try to steer you wrong.)

Regarding handing in your projects (which you will always do via email), hand them in via mailing them, before the deadline, to (use this EXACT address, in full, every time please, except of course replace “at” with the symbol @) cs200 “at” cs.rochester.edu (only one person from each group should mail in the group's project). *You are required to (1) send a non-blind carbon-copy of that email (that very email, right at the same moment you send it to us!) to yourself and every member of your group, and (2) save a copy of everything you turn in.* Do not forget item (1)—yes, I know you think you'll remember it, but every year people forget.

Research papers often build on earlier work and, ideally, inspire new directions and extensions. Many of the most thrilling advances in computer science came from long chains of papers, each building on the earlier ones, and moving the field's knowledge forward. For example, the proof of Mahaney's Theorem (which says that there is no sparse NP-complete set unless $P=NP$) built on Fortune's Theorem, which itself built on Berman's Theorem. To model the fact that papers often build on top of earlier work, we might in future years want to ask classes to pick up where you left off on a particular challenge, and to seek new, stronger insights or results, or perhaps to look at the problem in a more general setting (i.e., we might look at a multidimensional analog of a problem done this year in one dimension, or we might enrich a parameterization), and if so, it would be great to be able to make your projects available to those classes, as part of the “existing literature” on the problem. Of course, any future classes that used earlier work in any way (whether the work was from the real-world literature or from a paper that had been done by an earlier CSC200 group) would be ethically obligated to cite/attribute/credit the earlier work. On the other hand, I certainly don't want to make your work available to (hypothetical) future classes unless that is fine with you (and of course, this has no effect on your grade either way). So, I'll do this: If on a project a group does not want its project to be made available in the (actually not wildly likely) case that some future class does a project closely related to that project, then at the very start of your email submitting it and also as a footnote to the paper's title please make absolutely sure to include a sentence of the form “Please do not make this project available to any future classes.” And that way, if I come back in future years and look at what groups' projects can and cannot be shared with that year's class if there is a closely related project, I'll be able to easily see that.

On the projects and indeed in all aspects of the course, it is very important to follow appropriate norms of academic honesty and professional conduct, most importantly including those regarding plagiarism; do not plagiarize.

The Special Project(s) for CSC200H Students: CSC200 students do not do this paper. However, students who are taking this course as CSC200H (honors) have to (in addition to all the work CSC200 students do) write a special project, which is worth 100 points, and that will be on a topic assigned by me. I will assign the project(s) (and different groups will typically have different honors projects) and the groups for this special project when I give out the assignment to each given group. Not all honors groups will necessarily be doing their honors projects at the same time, so a first-to-go honors group may already

have finished its project before some other honors students have started their project. You will have a specified time period from when you are given the project to the day the special project is due (each group hands in one paper/project for the whole group, and the entire group gets the same grade on the project); I'll let you know that time period when I give you your project, but it will be 2–4 weeks, and most typically is 3 weeks. Note that doing this special project does not excuse you from any of the other expectations and requirements of the course; it is rather something that is an additional requirement (though I expect you'll also learn from doing the special project, so I don't mean "requirement" in a bad sense) to be done by the CSC200H (though not the CSC200) students.

WARNING: *The honors projects are **extremely** demanding.* I choose and assign the projects, and they will vary by group. Here are some examples, which might or might not capture what projects I'll assign this year. As an example, it is possible that I'll assign a group of honor students to take, after a class project, all the papers of the entire class, and then build a single paper of the highest possible quality, reflecting the best insights of all the groups' work and papers and of all the class discussions; such a paper, if done extremely well, might become a technical report, authored by the entire class, the TA, and myself, at URCS or even (if extraordinarily good) at [arXiv.org](https://arxiv.org). Another type of project that I might possibly assign one or more or all groups is that I might require your group to master extremely advanced material that is new to you, and then to critique (and often utterly shatter and refute) existing research publications (I'd tell you which publications are the ones your group is assigned) on that topic, and then for your group to: write your critique/refutation up as a paper suitable for publication and hand it in by the (usually three-week limit), and then (if I judge this to be appropriate for the paper) to immediately (I'd include the precise time deadline along with the feedback) revise the paper to include any feedback from me or the TA and then to make your work available to the research community via the venue I point out (as a URCS technical report or, if it is extraordinarily strong, at [arXiv.org](https://arxiv.org)).

I'll typically assign an honors project's grade only after that entire process of that group completes (e.g., if I decide it should become a technical report, then after the technical report has appeared), and each group absolutely must meet all the time frames. If the number of honors students is quite small, it could be the case that all the honors students will be in one group for this project.

Lateness Not Allowed: *Late projects will not be accepted.* (The origin of this was that they are usually due just before class, and the answers will usually be discussed right after the due time, but this rule applies whether or not any of that happens.) *So it is crucial that you always submit your projects strictly on time. Hint: Start early... meet daily... try to complete them with a few days to spare. Again: late equals zero credit, so make sure never to be late, and instead turn in on time whatever you have.*

Texts (NOTE: Most or all are available on reserve in the library):

- Required Texts: None.
- The following are listed at the bookstore as recommended but not required, but what

that means is I've when possible put them or similar books on reserve in the library so you can use such books there if you like and so can save some money if you choose... however, you certainly will want to own good books on LaTeX, C++, and Java if you don't already have such, so in that case these are strong choices.

- *More Math Into LaTeX*, 4th Edition, George Grätzer, ISBN-10: 0387322892, ISBN-13: 978-0387322896, Springer. A well-liked resource for L^AT_EX, which is what research computer scientists (and many, many others) use for their papers; L^AT_EX handles math very well.
- *C++ programming language*, Bjarne Stroustrup, Special 3rd edition, ISBN: 0201700735. This is getting C++ from the horse's mouth! If you already own a great C++ book you don't need to buy this one. Note: You'll quite probably want to use C++ or Java for some or all of your programs (although this will depend on what the projects are of course, and what language's their statements require/allow you to use, and your own taste), so you'll probably want to know at least one of these two languages, and in fact, to be able to work with all your fellow students, you'll I suspect want to know both.
- *Java, How to Program*, Deitel and Deitel, 8th edition's "Early Objects version," ISBN (Pearson) 978-0-1-36053606. NOTE: please do not confuse with their many other similar books. A good (though not at all short) Java book. If you already own an (up-to-date) Java book you're happy with, you don't need to buy this one. Note: See the note attached to the previous book.

Library Reserves: Carlson Library has been asked to put most of the above books—and a large number of others that are relevant or just plain interesting—on reserve.

Newsgroup: We will not use a course newsgroup or the discussion features of BlackBoard.

Fun with Numbers: Although the course is both CSC200 and CSC200H, depending on which you are registered under, I'll often just refer to it by one or the other of the numbers (or sometimes as CSC200/200H). As noted above, the CSC200H students have a very demanding extra paper/project that the CSC200 students do not have.

Email: ALL course-related email must be sent to cs200 "at" cs.rochester.edu (yes, the account name is cs200, not csc200). When sending a binary file, make sure to uuencode or, far better, mime-attach it, and when sending a large number of files, you'll probably want to turn them into a single file with zip or tar and then mime-attach that single, binary file. If the attachments would be make your email too large (say, over 3MB), then you had best submit the given assignment by making a single zip archive containing all those attachments, and email to the above address the URL from which we can copy that zip archive (and please make SURE it is readable, so that we can copy it!).

Web: The course web page is www.cs.rochester.edu/courses/200/spring2011/, and you can find the syllabus and some helpful links here. In some years, I may also have a blog at www.cs.rochester.edu/u/lane/=blog/home.html. In such years, you should look

as often as possible (daily or ideally more—perhaps make it your homepage if you’re very enthusiastic) at the blog; as such a blog would have actual student names and my comments on how people’s/groups quizzes/discussions/projects went, I’ll make sure it doesn’t persist on the URCS web site beyond the end of the course.

Please make sure to set your browser’s preferences so that it does not cache old pages/files, or at least that it checks up-to-dateness every time, as not doing so could lead to your not seeing the most recent revisions of course documents.

A Final Comment: Research is very demanding and challenging. Most lines of research attack fail, though some failures themselves lead to new partial results. So don’t be discouraged to find that research can be amazingly difficult. And don’t be surprised if you find some small sense of satisfaction, at some time during the course, over discovering that some failed research line that you’ve followed does yield some partial result. So follow the rules (of the course), be creative (in research), and (I hope you will) enjoy (the lectures on doing research, and even more so, doing research yourselves)!