

# CSCI-C 241 Discrete Structures for Computer Science

## Syllabus

Instructor: Erik Wennstrom

Fall 2018 (last updated: 2018/8/230)

2018/8/30 new TA added, office hours room changes  
2018/8/27 office hours added for Matt  
2018/8/26 TA office hours scheduled (temporary location)  
2018/8/21 office hours updated, new UI added, typos fixed  
2018/8/20 first version uploaded

## Course Description

This course is intended to help you learn some of the basic mathematical and logical concepts and skills that will be useful to you as a student of computer science. By the end of the semester, you should be able to solve problems, write proofs, and communicate about a variety of topics, including propositional and predicate logic, sets, relations, mathematical induction, and possibly recursive definitions (if we have time).

## Staff

Your primary sources for help with this course are the instructor (that's me: Erik Wennstrom), and the TAs for the course (listed below). The TAs are all either graduate students in CS (AIs) or undergraduate students who performed very well in C241 (UIs). All of them know their stuff, and they will be running the discussion section and grading most of the homework assignments and quizzes. Both the TAs and I will hold regular office hours where you can drop by without an appointment to get help on the assignments or answer any questions you may have.

You can also e-mail me or any of the TAs with questions, but if it's a question about a homework problem, you'll probably have better luck showing up to office hours. If you want to talk to someone specific and you can't make their office hours, please e-mail them to make an appointment. I won't make promises for everyone else, but I'm usually quite happy\* to schedule special office hours. However, you need to **give me at least 24 hours advance notice for an appointment**. That doesn't mean that you can e-mail me the night before and expect me to be there the next morning. You have to give me 24 actual hours.

\*Fair warning: this semester, I'm booked more or less solid on Tuesdays and Thursdays, so if you want an appointment, I recommend Monday, Wednesday, or Friday.

Pos.	Name	E-mail	Office	Office Hours
Instr.	Erik Wennstrom	ewennstr@indiana.edu	IF* 3138	2-3pm Mon.-Thu.
AI	Vikraman Choudhury	vikraman@indiana.edu	IF 3142†	M 2-3, Tu 2:30-3:30
AI	Yuhan Zeng	yuhzeng@iu.edu	IF 3070‡	Mon. 6-7pm
UI	Ethan Violette	eviolett@iu.edu	IF 3142†	Fri. 1-2pm
UI	Matthew "Matt" Hussey	mshussey@umail.iu.edu	IF 3142†	Mon. 2-3pm
UI	Eduardo "Lalo" Vidaurri-Rodriguez	eduvidau@imail.iu.edu	IF 3142†	Mon. 3-4pm
UI	Ian Bailey	icbailey@iu.edu	IF 3142†	Mon. 9-10am
UI	Canrong "Leo" Lin	lincanr@iu.edu	IF 3142†	Mon. 11:15-12:15
UI	Roy Sorce	rsorce@iu.edu	IF 3142†	Wed. 3:45-4:45pm

\*"IF" means Luddy Hall

† Luddy Hall "room" 3142 isn't technically a room. It's more of an alcove.

‡ After 5pm, some of the doors in Luddy Hall automatically lock, so Yuhan's office hours will be held in "room" 3070, which is really just a group of chairs and tables in the main hall, to your left as you come up the stairs to the 3rd floor.

## Lectures

There will be two lectures per week, on Tuesdays and Thursdays. There are two sections of the course, one meeting at 9:30am (section 9657, meeting in Swain East, room 140) and one at 11:15am (section 1633, meeting in the Geology Building, room 143). The material in the two classes will be the same. I won't be taking attendance, but if you miss a lot of class and start falling behind, don't expect much sympathy. I reserve the right to occasionally give quizzes or other in-class assignments that will count as part of your grade.

## Discussion Sections

There are five discussion sections for this course. Sometimes they get called "labs" or "recitations." You will be expected to attend all of the discussion sections. You will take your weekly quizzes during these discussion sections, and most weeks, you will be expected to work on your homework assignments here. You will be able to ask the TAs questions about the material from the lectures and get help on homework problems. The TAs won't do the problems for you, but they will try to get you started in the right direction and maybe even directly help you work through similar problems. The discussion sections will be much more effective if you come with questions to ask. This means you should start your homework *before* your discussion section (at the very least you should look it over to see if there's anything that looks tricky).

**There will be a quiz every week during the lab, so you are required to attend!** There are always some students who want to leave the discussion sections early, despite not being finished with their homework assignments. I don't directly penalize students for this, and this unfortunately creates the illusion that you're getting away with less work by leaving early. But don't fall for it!

**Leaving the discussion sections before you've finished your homework assignment is a stupid thing to do.** If you want to pass the class, you're going to have to do that assignment anyway. Going home early just means that you'll have to find another couple hours in your schedule later, probably on the weekend when you've got better things to do. Even if you don't need help to complete the assignment, you can at least check with a TA to make sure you haven't made any major blunders. That way, there won't be any surprises when you get your grades.

In previous semesters, I tried to force everyone to stick around for the whole lab, but I've decided to treat you like grown-ups and put the responsibility in your own hands. Just know that if you leave before you're done with your assignments, don't expect much sympathy if you run into trouble later. Monday office hours are often quite crowded.

Lab 1634	Thu 5:45-7:40pm	Luddy Hall (IF) - rm 0117	TBD
Lab 7910	Thu 5:45-7:40pm	Luddy Hall (IF) - rm 1104	TBD
Lab 9656	Fri 10:10am-12:05pm	Ballantine Hall (BH) - rm 304	TBD
Lab 10128	Fri 11:15am-12:05pm	Luddy Hall (IF) - rm 0117	TBD
Honors Lab	Fri 9:05-11:00am	Sycamore Hall (SY) - rm 137	TBD

## Quizzes

There will be a **quiz at the beginning of every discussion section**. They are meant to check your understanding of some of the material that we covered in the week. They will usually be short (usually about 10-15 minutes) and cover basic concepts and techniques, but this does not mean that they will be easy. If went to the lectures and you turned in the previous week's homework assignment, you shouldn't need to cram for the quiz.

Unless we tell you otherwise, quizzes are closed-book, closed-notes, closed-computer, closed-phone, and closed-neighbor.

If you do poorly on a quiz, don't panic! Use this as a warning sign to figure out what went wrong and make sure it doesn't happen on the test.

The quizzes will comprise **20%** of your final grade. **There are no make-up quizzes**, but you can miss two quizzes without any penalty to your grade. You do not need to provide me with any sort of excuse or justification; I will automatically drop up to two zero grades. **Warning!** The dropped quizzes are meant to be used for emergencies, so think carefully before skipping a discussion section. If you waste them on laziness and hangovers, they won't be there if you get sick later.

If you know *ahead of time* that you won't be able to attend a discussion section, then let me know in advance, and we may be able to fit you into one of the other sections.

# Homework Assignments

Most weeks, there will be a homework assignment, assigned no later than Thursday and due the following Tuesday before the lecture. Homework assignments will be submitted via Canvas and **must be in .pdf format**.

I recommend that you do your assignments by hand and then scan in the result. There are smartphone apps that you can use to take a photo and make a .pdf file from it. Always double check your files before sending them to make sure that they are easily readable, that the files are oriented in the correct direction, etc. You should only submit one file with each assignment unless otherwise instructed.

If you want to type up your answers, that's great! Just make sure you do it properly, using the correct symbols. Good:  $\forall x \exists y \neg (P(y) \wedge Q(x, y))$  Bad:  $\forall x \exists y \sim (P(y) \wedge Q(x, y))$

If you've used LaTeX before, that would be best. The initial learning curve is pretty steep, but it's an important skill to learn if you want to go into any kind of technical research. I'll be happy to help you out if you have trouble.

Homework assignments will comprise **25%** of your final grade.

## Late Submissions

If you have missed the assignment deadline for any reason, you may still submit the assignment for partial credit. The later your submission, the larger the penalty. You do not need to provide any excuses, justifications, or documentation. I handle all late submissions the same, regardless of the reason. (I'm not completely heartless; see the section below about "penalty refunds".)

For assignments that are less than 24 hours late, there is a 5 point penalty (out of 100). Assignments more than a day late, but less than a week late, will be penalized 10 points. Assignments one to two weeks late will receive a 20 point penalty. Assignments two to three weeks late will receive a 30 point penalty. Assignments three to four weeks late will receive a 40 point penalty. Any assignment that is late by four weeks or more will receive a 50 point penalty.

If you're not going to make the homework deadline, I strongly recommend that you **do not turn in an incomplete assignment**. You'll earn more points by taking a few extra days and finishing the assignment.

## Rejections

It's totally normal to only have a vague idea of what's going on when you start the assignment (that's why the discussion sections are there). I expect you to do most of your actual learning *while you are working on the homework assignment*. So by the time you've finished the assignment, you should have a pretty good grasp on the material.

Of course, sometimes something goes wrong, and a student has completely the wrong idea about how to do all or part of the assignment. Ideally, this will get caught when they talk to a TA during their discussion section, but many students don't do this (or they can't because they put the assignment off until later). In this case, it's important that the misconceptions are fixed as quickly as possible, so that the problem doesn't get worse in following weeks.

In order to make sure your assignments get graded quickly, and to make sure you fix any major problems, I have given your grader strict instructions to *reject* an assignment whenever there is a major problem. (You'll be expected to redo any rejected problems.) Valid reasons for rejections include, but are not limited to:

- Major misconceptions.
- Small errors that I've decided need to be dealt with early.
- Misunderstood instructions.
- Hard-to-read handwriting.
- Incorrect file format.
- Extremely bad formatting.

Your graders may reject single problems or entire assignments, depending on the specific problem. You will initially receive 0 points for any rejected problems or assignments. But don't panic! When we reject an assignment, we expect you to fix the issues and *resubmit* the assignment as quickly as possible.

## Resubmissions

Any time you have problems rejected, you are expected to redo those problems and resubmit the assignment, but you are allowed to resubmit any assignment you want (even if there are no rejections). Any time you score less than 80% on an assignment, I recommend fixing the problems and resubmitting.

As with late assignments, there will be a penalty for resubmissions. The penalties for resubmissions are similar to those for late submissions. But all resubmissions will have at least a 20 point penalty.

The details: Any resubmission that is received between 1 and 2 weeks after the due date (that's within a week of when it was graded) will receive a 20 point penalty (out of 100). If it's received between 2 and 3 weeks after the due date, there will be a 30 point penalty. If it's between 3 and 4 weeks after the due date, the penalty is 40 points. And any resubmission that is turned in 4 weeks (or more) after the due date will be penalized 50 points.

Exceptions can be made if the assignment isn't graded within a week, but this might not happen automatically, so let me know if this happens. I always want to know if your grader takes more than a week to grade anything.

**No late submissions or resubmissions will be accepted after Monday, December 3rd, 11:59pm.**

There is an exception for assignments that are due during the last week of classes. Those assignments may be submitted up until Sunday, December 9th. For obvious reasons, homework assignments due during the last week of classes cannot be resubmitted.

## Mini-Homework Assignments

Most weeks, I will assign a very short assignment on Tuesday, which will be due before the next lecture (on Thursday). These are worth much less than the full homework assignments (6 points versus 100 points). If you turn one of these in late, you'll lose 3 points, but you will not receive points for any mini-homework assignment that is more than a week late. Mini-assignments are not eligible for resubmissions.

## The Penalty Refund

I understand that occasionally you will miss a due date for reasons that are beyond your control. Maybe the power went out. Maybe someone spilled coffee all over your assignment before you could scan it in. Maybe you just accidentally attached the wrong file or Canvas was down. Maybe you had to go to the hospital or had a family emergency.

Since I don't want to have to be the one to judge whether your excuse is "valid" or not, I will automatically refund everyone up to 50 penalty points, no questions asked. If you turn in your late submissions and resubmissions as soon as possible, that's enough to cover two cases of the flu, one incorrectly attached file, one bad internet connection, and one case of completely misunderstanding the instructions. Of course, if you end up wasting your 50 points on a two-week procrastination binge, then don't complain if Canvas goes down at an inconvenient time later.

Refunded penalty points will appear in a separate item in the gradebook, to make it easier to keep track of them.

If you have some sort of long-term problem, let me know as soon as possible, and we can discuss our options.

## Tests

There will be two in-class midterm exams and a comprehensive final exam. The midterm exams will be held during your discussion section and the final exam will be held in the normal classroom for lectures. The tests help me determine how much you've actually learned. The problems will be longer and more involved than those on the quizzes. As with the quizzes, you will not be allowed to use your book, notes, computers, phones, or friends to help you on them, except for whatever notes you can fit on a single 8.5"×11" sheet of paper. I will announce the midterm test dates when we get a little closer to the time, but I will give you at least a week's notice, hopefully more.

The **final exam** date is set by the school (**Thursday, December 13th, 8:00-10:00am** for the 9am lecture and **Tuesday, December 11th, 12:30-2:30pm** for the 11:15am lecture). The tests will be held in the same room as the lectures. Barring major catastrophe, the final exam dates will not be moved.

Unless there is no other option, I will not allow students to switch final exam dates.

The two midterms are each worth **15%** of your grade (30% total) and the final exam is worth **25%** of your final grade.

I am much stricter when it comes to missed tests than I am for missed homework. Early tests are easy, provided you give me some advance notice, but **I will only give make-up tests in case of unforeseeable emergencies**, and only then if you let me know as soon as possible *and* you provide some sort of documentation to prove that you couldn't make it. "Unforeseeable" means that there was no way you could know about it ahead of time. If your car breaks down, or you get sick or injured right before the test, or you're snowed in, then we can discuss a late exam. But if you've got some sort of trip planned, or if there's a schedule conflict, don't tell me about it after the test is over; arrange to take the test early.

And as for the final exam, you better have a really good reason for not being able to make it. **Non-refundable plane tickets are not an acceptable reason for rescheduling the final exam.** The final exam schedule was fixed before the semester even started, so plan your winter vacation accordingly.

## Grades

Here is a breakdown of how your grades will be determined:

Homework Assignments:	25%
Quizzes:	20%
Tests:	30%
Final Exam:	25%

There may be a slight "curve" on test grades or final grades, but you can expect them to be close to the usual 60/70/80/90 standard.

## Resources

The official textbook for the class is *Essentials of Discrete Mathematics* (Third Edition), by David J. Hunter. We will also be using other materials, especially during the logic portion of the course, but you will need to pick up a copy of the official textbook. The school bookstore may or may not have copies, but it can also be purchased or rented online.

Other resources, such as my own lecture notes will be made available on Canvas.

## Notifications

Whenever I need to make an announcement about a change in the course, such as unusual due dates, rescheduling, corrections, or class cancellations (don't hold your breath), I will do so using the "Announcements" tab on Canvas. If you haven't changed your Canvas notifications settings, this will send a message to your IU e-mail address. It is your responsibility to check your IU e-mail inbox at least once a day. If you've changed your notification settings, then it's your responsibility to check at least once a day to see if any important announcements have been made.

## Contact

If you need to contact me or one of the TAs for any reason, the best way to do this is via e-mail (our addresses are at the top of the syllabus). Please mention which course you are in (C241) and which lecture or discussion section you're signed up for. If you need me to do something for you (such as fix a grading error or reschedule a quiz for you), it's better to use e-mail than to talk to me in person, so that I have the communication in person.

If you have questions about homework problems, the best place to get help is in your discussion section. The second best place is during office hours. *Sometimes*, I will answer questions about the homework assignments via e-mail, but it's really hard to give homework help over e-mail, so I make no promises.

## Academic Dishonesty

I'd like to pretend that this doesn't happen very often, but just about every semester, someone tries to pass off someone else's work as their own. **Don't copy your classmates' work. Don't copy work you find on the internet.** When you turn in an assignment in this class, you are claiming that the work is yours, and if some of that work was written by someone else, then that's *plagiarism*.

Helping your fellow classmates is a good thing and I encourage you to work in groups. It's even okay to get help from the internet. But never show your solutions to another student if they haven't finished that problem yet. If you stumble across a solved problem on the internet that happens to perfectly answer a question from your homework assignment, then don't just copy down that solution. In fact, don't even look at it! It's fine to look at similar problems to get a feel for things, but even then, don't do any copying at all. A good rule of thumb is to close the book or website that you're reading before you start to write your own solution to the problem. If you can't solve the problem without looking at someone else's work, then you're not really solving the problem at all.

Just about every semester, I have to deal with some kind of cheating. I will *always* report incidences of cheating or plagiarism on tests, quizzes, or major assignments to the dean according to the IU Code of Student Rights, Responsibilities, and Conduct, which (if it's not a first offense) may result in lost scholarships, suspension, or other penalties. In addition, I will also personally issue some sort of penalty (such as being given a zero for an entire test score or being asked to withdraw from the class). It's never good for anyone.

## Special Needs

If you have any special needs, such as wheelchair-accessible seating, large print resources, quiet testing conditions, or anything else related to any mental or physical disability, let me know during the first couple days of class, so that we can make any necessary arrangements as soon as possible. If something comes up during the middle of the semester, let me know as soon as you can.