

ECS 154A Winter 2022 Syllabus

Table of Contents

- [Table of Contents](#)
- [Goals](#)
- [Prerequisites](#)
- [Class Outline \(Subject to Change\)](#)
- [Staff](#)
 - [Communication](#)
 - [CampusWire](#)
 - [Email](#)
 - [Canvas Announcements](#)
- [Class Materials](#)
 - [Course Book](#)
 - [Cost](#)
 - [CampusWire Account](#)
 - [Cost](#)
 - [Posting on CampusWire](#)
 - [Answering questions](#)
 - [Staff Response Times](#)
 - [GradeScope Account](#)
 - [Cost](#)
 - [Discord](#)
 - [Cost](#)
 - [Zoom](#)
 - [Cost](#)
 - [Recordings](#)
 - [Etiquet](#)
 - [Logisim Evolution](#)
 - [Getting The Correct Version](#)
 - [Known Issues](#)

- [Lecture Notes, Slides, and Examples](#)
- [Office Hours](#)
 - [Location](#)
 - [Times](#)
 - [On Arrival](#)
 - [Rules On Asking Questions](#)
 - [How To Best Use Office Hours](#)
 - [What To Talk About](#)
 - [Build a Relationship](#)
- [Grades](#)
 - [Logisim Assignments](#)
 - [Where to turn it in](#)
 - [Number of Submissions](#)
 - [Submitted as a Group or Individually](#)
 - [Frequency](#)
 - [Late Days](#)
 - [Quizzes](#)
 - [Where to turn it in](#)
 - [Number of Submissions](#)
 - [Submitted Individually](#)
 - [Frequency](#)
 - [Late Days](#)
 - [Midterms](#)
 - [Where to turn it in](#)
 - [Number of Submissions](#)
 - [Frequency](#)
 - [Submitted Individually](#)
 - [Late Days](#)
 - [Final](#)
 - [Where to turn it in](#)
 - [Number of Submissions](#)
 - [Submitted as a Group or Individually](#)
 - [Frequency](#)

- [Late Days](#)
- [Study Group Participation](#)
 - [Where to turn it in](#)
 - [Number of Submissions](#)
 - [Submitted Individually](#)
 - [Frequency](#)
- [Survey Participation](#)
 - [Where to turn it in](#)
 - [Submitted Individually](#)
 - [Frequency](#)
- [Extra Credit](#)
 - [Incoming Student Survey](#)
 - [Kudo Points](#)
- [Groups](#)
 - [Study Groups](#)
 - [Group Forum](#)
 - [What You Can Discuss](#)
 - [Zoom Breakout Rooms](#)
 - [Group Rotations](#)
 - [Homework Groups](#)
 - [Group Size](#)
 - [Forming a Group](#)
 - [Creating a Group on GradeScope](#)
 - [Submission](#)
 - [Changing Groups](#)
- [Cheating](#)
 - [UCD Code of Academic Conduct](#)
 - [Some things that are always cheating](#)
 - [Some things that are not cheating](#)
- [Standout Students](#)
- [Tips for Success](#)
- [Letters of Recommendation](#)
- [Additional Resources](#)

- [Student Disability Center](#)
- [Student Health Center](#)

Goals

- Design Combinational Circuits to solve problems
 - Be able to simplify combinational circuits of up to 5 variables using Kmaps
- Design Sequential Circuits to Solve Problems
 - Be able to solve problems using both Moore and Mealy Designs
 - Be able to simplify a finite state machine to its simplest representation
- Caching
 - Learn the benefits of caching
 - Understand the design tradeoffs between different caching parameters (Replacement Policy, Size, Line Size, Mapping Strategies)
- Virtual Memory
 - Understand how Virtual Memory systems are implemented
 - Learn the benefits of the Virtual Memory System

Prerequisites

- ECS 50
 - Know the basics of how assembly code works
 - Be able to debug

Class Outline (Subject to Change)

Topic	Week	Chapter(s)
Abstraction and Design	1	1
Physical Aspects of Digital Circuits	1	1
Boolean Algebra	1	2
Combinational Circuits	2 - 3	2 + 5
Sequential Circuits	3 - 5	3
Basic CPU Design	6	6 - 7
Caching	8	8
Virtual Memory	9	8
SECD	10	None

Staff

Title	Name	Email	Office Hour Times	Office Hour Location
Instructor	Matthew Butner	mfbutner@ucdavis.edu	M - F 10am - 12pm	Discord
TA	Pavel Frolikov	psfrolikov@ucdavis.edu	TBA	Discord
TA	Kaustubh Chakravarthula	kchakravarthula@ucdavis.edu	TBA	Discord
TA	Oleg Igouchkine	oigouchkine@ucdavis.edu	TBA	Discord

Communication

CampusWire

Please use CampusWire as the normal way of getting in touch with us. This includes but isn't limited to

- Difficulty setting up a program
- Help with homework
- Questions about the course material
- Questions about course logistics that aren't covered here

Email

Email should be reserved for emergencies or situations that are only applicable to you. These include things like

- Family or medical emergencies
- Discussion about SDC accommodations
- Confessions of Academic misconduct
- Requests for letters of recommendation

Just make sure that if you are emailing me it is about something that applies only to yourself and no one else.

You may email TAs only about something you want to bring up with me but do not feel comfortable doing so directly. **Do NOT email them about anything else, especially asking them to look over your code.**

Canvas Announcements

I will use Canvas to make announcements about things I think the whole class needs to know, so make sure to pay attention to them.

Most of these announcements are about one of the following

- Course logistics
- Corrections to homework problems
- Changes to due dates
- Solutions/tips to problems that most of the class is encountering

Class Materials

- Course Book
- CampusWire Account
- GradeScope Account
- Discord
- Zoom
- Logisim Evolution

When signing up for any of the accounts you **MUST use your UCD Email and name as it appears on Canvas**. This is not only so that we can recognize who you are but also ensure that your grades are transferred correctly to Canvas. We use a program to transfer your grades from the other websites so if the information doesn't match your grades don't transfer and you'll end up with a 0.

Course Book

Digital Design and Computer Architecture 2nd Edition by Harris and Harris. It is available for free through the UC Library at

https://search.library.ucdavis.edu/permalink/f/u9eqg/01UCD_ALMA51358275240003126

After clicking on the link

1. Click "See all Versions"
2. Click on "Online Access" under the Second Edition. It's the green one.



Cost

Free

CampusWire Account

When signing up for your account make sure to use your **UCD email and name as it appears on Canvas**.

This is our course forum where you can ask questions to and answer questions from the entire class. You should have already been added to the course but if you haven't you can join by clicking this link: <https://campuswire.com/p/GABA4D203>. If it asks for a course code ours is **7951**.

Cost

Free

Posting on CampusWire

By posting to CampusWire you agree to the following rules

1. You have already searched for the answer on the internet and failed to find it
2. You searched your question on CampusWire and no one had already asked it
3. You asked your [Study Group](#) and they were unable to provide an answer
4. If your question was related to logistics, you checked the [Canvas Annoucments](#) already.
5. If the answer you receive on CampusWire is insufficient you will toggle the question back to "Unresolved" by clicking the button in the upper right corner labeled "Resolved" to let us know you need more help.
6. It does not contain any code related to homework assignments. (This is to protect you from others copying your code and you both ending up in SJA)

These rules are here to

1. Save everyone, including you, time
2. Grow your search skills
3. Prevent CampusWire from being filled with duplicate questions

Answering questions

Please be polite to each other when answering questions. Do your best to avoid being discouraging; unintentionally or on purpose. We are all here to learn but being put down kills motivation.

If you are the type of person that likes to answer questions on class forums, I ask that you show a little restraint in answering questions. I know this can be hard, but holding back encourages responses from more people which helps build a stronger community. So if you love answering questions try and wait an hour or two before responding so we can hear more voices.

Staff Response Times

We will do our best to respond to questions in office hours within 24 hours and promise to have your question answered with 48. If you are posting questions late at night, expect longer delays as we will

likely be asleep.

GradeScope Account

GradeScope is where you will be submitting your Logisim Homework.

If you join the course late and find you aren't on our class GradeScope let me know and I will add you.

Cost

Free

Discord

You may use any email account to sign up for Discord. You can join our Discord server by clicking: <https://discord.gg/W8TrVqC7RD>. After joining please **change your nickname on the server to be your name**. This helps us recognize who you are better and build a better relationship with you.

We will be using Discord to host office hours. There is a bot there that helps us manage the queue and which you must interact with to "get in line" for help. Please watch <https://youtu.be/LQYg7t09pqE> to learn how to interact with our bot.

Cost

Free

Zoom

Live, interactive lecture will be held on Zoom. Links to lecture and discussion can be found on Canvas.

Please download and use the Zoom desktop client. We've found that not all features are available using the browser client.

Cost

Free

Recordings

Recordings will be made available after lecture and you should be able to find them under the Video Guide Wiki.

Ettiquet

- When I ask a question in class please press the yes/no buttons to provide me feedback. I need this explicit feedback to know whether you are tracking or not because I cannot see your face

- If you have a question and would like to ask it verbally, press the raise hand button to let me know. I'll unmute you and then you can ask your question.
- If you want to ask a question in chat, please do. I am generally very good at responding to questions there.
 - If you want to be anonymous when asking a question please feel free to edit your name on Zoom to be something else that is **not** my name. This can be a double edged sword because if you are asking good questions I won't know they are coming from you.
- If your bandwidth permits, please turn on your video. It is really helpful to see your faces. If you aren't able to or choose not to turn on your video, please set your profile picture to be a picture of your face.
- Don't spam chat
- Keep conversations on chat limited to what we are covering in class

Logisim Evolution

This is our circuit drawing and simulation tool.

Getting The Correct Version

There are many versions of Logisim-Evolution and not all of the work. Please use the version that you find on our [Class Google Drive](#).

Known Issues

- Logisim Evolution requires at least Java 9 to run but by default most systems have Java 8 installed. You can install the newest version of Java (Java 15) at <https://www.oracle.com/java/technologies/javase-jdk15-downloads.html>
 - Chrome doesn't seem to want to download the file, so please use another browser to download it
- If you are on Mac you may need to launch logisim-evolution from the command line. To do so type `java -jar <path_to_logisim-evolution.jar>`
 - `<path_to_logisim-evolution.jar>` should not be entered literally but should be replaced with the path to your logisim-evolution.jar, wherever that happens to be
- All labels within a subcircuit must be unique. This means you can't have a tunnel and another element share the same name.
- You cannot label any element halt. If you do, this will break the testing.

Lecture Notes, Slides, and Examples

Notes, slides, and examples can be found on our course Google Drive at

https://drive.google.com/drive/folders/1bige_gsgiT04cO4sZJG-wkPiZwdpbmo6?usp=sharing

Office Hours

Location

Office hours will be held on [Discord](#).

Times

Our times are listed on our Discord Server under the schedule channel. You can also find them at the [top of the Syllabus](#).

Times are subject to change. If they do change we will post an announcement about our changes to Canvas.

On Arrival

1. Join the Waiting Room Voice Channel.
2. Use the Office Hour bot to enqueue yourself in the help queue
3. Remain in any voice channel on the server and we will pull you into our room when your turn comes up. Students will be seen in the order that they arrive.

While you wait I recommend chatting with the other students in line like you would do if you were in person and see if anyone else has your same question. If your conversation is going good, please make a breakout room and continue your chat there so as not to annoy the other people in the room.

Rules On Asking Questions

1. Any question is fair game.
2. We will answer either 1 question or answer questions for 10 minutes, whichever takes **longer**. After this, you will need to get back in line for more help.

As an example, if you asked a question that required us to help you for 15 minutes, we would help you for the full 15 minutes. If you still had more questions after that you would need to get back in line.

The reason for rule 2 is just to keep the queue following and ensure that we can help everyone.

How To Best Use Office Hours

1. Come. 10 minutes in office hours can save hours worth of work.
2. Come prepared. Make sure you have all files and applications open and ready to go to avoid wasting your limited time
3. Come early. Help at the beginning of an assignment goes farther than help at the end.
4. Come often. Short discussions over multiple days are more helpful than a long discussion at the end.

What To Talk About

We are happy to answer any and all questions during office hours; including but not limited to

- What's got you stuck on your homework
- Questions on quizzes
- Questions about course content or readings
- Classes
- Graduate School

The above are all great questions but I believe our help is most beneficial when you are in the planning phase of your program. Please come to us with your program outlines so that we can make sure you are on the right path and aren't headed into any traps. If you have a good plan you will shave hours off your homework assignment while a bad plan will add hours to it.

Build a Relationship

Office hours are also a great time to build relationships with your instructor. This is important if you ever want a letter of recommendation from us as it allows us to say more than, "They took my class and got a good grade in it."

Grades

Category	Weight
Logisim Assignments	32%
Quizzes	30%
Midterm(s)	12.5%
Final	15.5%
Study Group Participation	5%
Survey Participation	5%
Extra Credit	Up to 3.5%

Logisim Assignments

Where to turn it in

Logisim Assignments are submitted on GradeScope.

Number of Submissions

Unlimited until I figure out how to limit them, then about 10 - 15 per assignment.

Submitted as a Group or Individually

Homework assignments are submitted as a group or you can work on them individually.

Frequency

One homework assignment every 1.5 - 2 weeks.

Late Days

You can submit logisim assignments up to 2 days late. There is a 1% penalty per day you submit late.

Quizzes

Where to turn it in

Quizzes are submitted on Canvas.

Number of Submissions

3

Submitted Individually

All quizzes should be worked on individually.

Frequency

- Quizzes: One quiz every 1 - 2 weeks

Late Days

None

Midterms

Where to turn it in

- Canvas

Number of Submissions

- 3
-

Frequency

- Once

Submitted Individually

All Midterms should be worked on individually

Late Days

None

Final

Where to turn it in

GradeScope

Number of Submissions

Unlimited

Submitted as a Group or Individually

You may work on the Final in a group of 2.

Frequency

Once, at the end of the quarter.

Late Days

None

Study Group Participation

You are required to interact with your study group at least **20 minutes a week OUTSIDE of class**. This interaction can be either asynchronous or synchronous.

At the end of the week, you will submit a **short** report listing the interactions you had with your group members.

Where to turn it in

Canvas

Number of Submissions

Infinite

Submitted Individually

Every member of your group must turn in their own report listing the interactions they had.

Frequency

Every week

Survey Participation

Every 1 - 2 weeks you will be sent a survey asking you how the class is going and what I can do to help improve it.

Where to turn it in

You will be sent an email from Qualtrics with a link to the survey to fill out

Submitted Individually

Each of you has to fill out the survey. Make sure you use your personal link as that is how we know who has completed the survey.

Frequency

Every 1 - 2 weeks.

Extra Credit

Incoming Student Survey

If you complete the incoming student survey you will receive 0.5% extra credit

Kudo Points

You have an opportunity to earn up to 3% extra credit in the class by being an awesome study group partner. At the end of each week, you have 2 "Kudo Points" that you can give out to the partners in your study group as thanks for being helpful.

- Each kudo point is worth 0.3% extra credit in the class.
- You can give your kudo points to two different people or give them both to one person if you found them to be especially helpful that week
- You do not have to give out all or any of your kudo points. If you didn't give out any that means you didn't think anyone was helpful at all that week
- You cannot give a kudo point to yourself
- You cannot give a kudo point to someone outside of your study group
- Your team members will not know who you give your kudo points to
- Do not ask or pressure anyone to tell you who they gave their points to
- Once you reach 3% you can still receive kudo points but you will not receive any more extra credit

Groups

Study Groups

To encourage a sense of community and provide you with some peer-to-peer interaction you will be assigned to a study group. You must interact with this group at least **20 minutes a week OUTSIDE of class.**

Interactions can be synchronous or asynchronous and include things such as

- Meeting via Zoom, Google Hangouts, Discord, phone call, etc.
- Responding to each other's questions on your group forum
- Talking with each other via text, CampusWire chat rooms, Slack, etc
- Playing video games with each other

Your interactions do **NOT** have to be about this class if you don't want them to. I just want you to spend some time interacting with other humans.

Group Forum

Each of your groups has a group forum inside of Canvas. You **must** post questions that you have about this class to that forum first before asking questions on CampusWire. If you post a question on CampusWire without asking your group (and giving them enough time to respond to it), we will not answer your question and tell you to post to your group first. The only exception to this rule is if your question is about homework and there are less than 24 hours until the assignment deadline.

When you see someone post a question on your group forum, do your best to answer it as quickly as you can, as that is what you would want your group to do when you have questions. If you don't know the answer to their question, **respond to it saying that you don't know**. Just like me, your partners need explicit feedback because otherwise they won't know if you haven't seen the question or don't know the answer to it.

What You Can Discuss

You can discuss the following with your study group and it will **NOT** be considered **cheating**

- High-level concepts related to homework
- Course material
- The mechanics of how to solve problems on quizzes

You cannot do the following with you study group

- Share code related to the homework regardless of whether it works or not
- The exact answer to questions on quizzes

Zoom Breakout Rooms

We will use your study groups for breakout room assignments in Zoom. Hopefully, this will cut down on awkward silence because you know the people in the group.

Group Rotations

Study groups change every 2 weeks to help introduce you to more people in the class. If you do find someone that you really like from a previous group, I encourage you to keep interacting with that person.

Homework Groups

Group Size

A **total** of 2 people.

Forming a Group

Take finding a group member as serious as finding someone to marry. A good group member can make the experience great. A bad group member will make the experience terrible.

The best groups

1. Have members of equal skill level
2. Have members with the same work ethic
3. Meet together regularly
4. Work on the assignments together instead of splitting them up into parts
5. Communicate with each other

Creating a Group on GradeScope

When you submit your assignment you add your group member. **Don't forget to do this or they won't get credit!** If you aren't the person submitting, double check your submission on GradeScope to see if your partner added you and you are getting the correct grade.

Submission

Only one person in the group needs to submit. That submission is used for all members. The submission limit is per group. So if an assignment says you have 10 submissions that is 10 submissions for the group, not 10 submissions for each member in the group.

Changing Groups

You can change homework groups after each homework assignment. If your group isn't working out for you I highly recommend you switch.

Cheating

With so much collaboration allowed, you might be wondering if it is possible to get in trouble for cheating in this class. Yes, it is still possible. The point of collaboration is to help each other **learn**. If your assistance **shifts away from learning and into giving answers you have crossed the line from allowed collaboration into cheating.**

To help you avoid cheating ask yourself the following questions

1. Is my assistance focusing on learning or answers?

- If it is on learning you are **not** cheating. If you are just giving them the answer then it is **cheating** as they will not be learning.

2. After assisting the other student would they be able to solve a similar problem by themselves?

- If they would be able to solve a similar problem by themselves it is probably **not** cheating. If they couldn't solve a similar problem by themselves then it is **cheating**.

Another tip to avoid cheating is when someone asks you for help to **ask them questions instead of talking about answers**. By asking questions, you require the other person to think and therefore learn. If, however, you just show them the answer and explain how to get to the answer they will not learn as there is a huge difference between *understanding the answer* to a question and being *able to come up with an answer* to a question.

UCD Code of Academic Conduct

You are required to read and will be held responsible for everything in the UCD Code of Academic Conduct. You can find a copy of it at https://ossja.ucdavis.edu/code-academic-conduct?utm_source=sja&utm_medium=redirect-page

Some things that are always cheating

- Plagiarizing/Copy code
- Searching for solutions online
- Attempting to trick the autograder instead of solving the problem
 - This normally takes the form of if the input is test 1 print answer 1 but if the input is test 2 print answer 2, ...
- Looking for or obtaining past exams, homework, quiz problems, etc
- Hiring someone to do your work
- Asking online how to solve your homework problem
- Receiving or providing code to someone outside of your group
- Posting code directly related to a homework or quiz problem on any forum **even if that code does not work**
 - This is to protect you from having someone copy your code after someone has told you how to fix it.
 - If you need to post code on CampusWire, make your post Private so that only myself and the TAs can see it.

This is not an exhaustive list. If you are ever in doubt please ask us first about what you want to do.

Some things that are not cheating

- Discussing high-level concepts with others

- Searching for **pseudo** code online
- Doing examples together that are **similar** to homework or quiz problems
- Asking online for how a function/keyword works
- Asking for help on what an error message means

Standout Students

If you show yourself to be a standout student I will invite send you an invite to be a Student Assistant for this class or work on any projects I may have. This work is never paid, as I don't have any funding for it, but you can earn course credit for it, looks good on a resume, and helps me write you a better letter of recommendation if you ever need one.

If you want to standout

- Answer questions in class and on our course forum
- Ask questions in class and office hours about the material we are covering
- Show an interest in learning

Tips for Success

1. Start assignments early. On average most students spend between **10 - 20 hours per assignment**. You need to start early so you have the time to work past sticking points, fix the mistakes we all inevitably make, and get answers to your questions.
2. Come to office hours, they will save you a lot of time.
 1. To make the best use of office hours come in and talk with us about your plan to solve the problem. Time spent in office hours here will save you more time than us helping you to fix a bug.
3. Ask questions when you have them. Questions are the pathway to answers and the key to learning.
4. If you ever start doing worse in the class than you like, **come talk to us immediately**. The earlier we know about your problems the more we can do to help you. If however, you wait until the end of the quarter and tell us you are failing, all I can do is agree that you are failing, as you haven't left me any wiggle room to help you.

Letters of Recommendation

I only write letters of recommendation for students that either work with me as an SA or I have invited to work as an SA. The reason for this is that I actually need to know you and have a relationship with you to be able to write anything about you.

Additional Resources

Student Disability Center

If you have test-taking anxiety or have anything else going on in your life that is preventing our examination of you from showing what you truly know please contact the Student Disability Center at <https://sdc.ucdavis.edu/students>. They can get you set up with additional accommodations to help you learn better and better display your learning to us. Your interactions with SDC are confidential. The only information that is shared with me is what accommodations you need.

Student Health Center

Life, school, and this class can be stressful. If you are feeling overwhelmed please contact Student Health and Counseling Services at <https://shcs.ucdavis.edu/> for help. Don't be afraid to reach out to them as there is nothing wrong with needing support. The earlier you reach out the better off you will be.