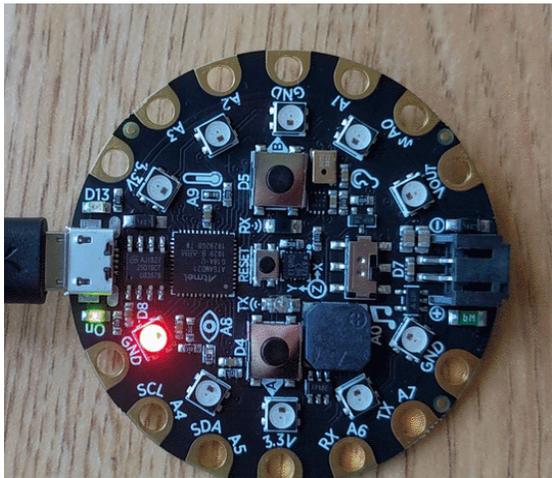


# UC San Diego, ECE

# ECE 198: K-12 Outreach

## Syllabus + Lesson Plan



**Application Form:** <https://forms.gle/45AgkMXeAGTjEKp77>

*Girish Krishnan*

*ECE Outreach Chair, 2022-23*

*Eta Kappa Nu (HKN)*

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## Introduction

The ECE 198 course prepares students to plan, design, and teach ECE lessons to elementary, middle, and high school students. The main goal of ECE 198 is to encourage children in socioeconomically disadvantaged areas to consider a career in engineering. This document will explain all the plans and logistics of ECE 198.

## Goals of ECE 198

- To provide teaching and volunteering opportunities to the students taking ECE 198.
- To develop soft skills such as teaching, public speaking, and communication among ECE 198 students.
- To spark interest in STEM among K-12 students in socioeconomically disadvantaged areas, and give them an insight into the different career opportunities in the field of ECE.

## ECE 198 Class Structure

The main organizers of ECE 198 are:

- **Girish Krishnan:** Girish is the ECE Outreach Chair at HKN. He will direct the weekly meetings, and supervise all the tasks that need to be done to develop all the outreach lessons. He will organize outreach lessons with the partner high schools.
- **Tara Len:** Tara is the Outreach Vice-President at HKN. She coordinates outreach events across the ECE, MAE, and CSE departments.
- **Prof. Truong Nguyen:** Prof. Nguyen is the faculty advisor for ECE 198. Prof. Nguyen will read your final reports and give you a final grade (P/NP) for the course.

Here is a breakdown of everything in ECE 198:

- **Weekly Meetings:** There will be **hour-long** weekly meetings to discuss current progress on developing outreach events, work together on designing outreach lessons, and practice presenting the lessons.

To provide flexibility, the meetings will be **hybrid**.

- Location: **ECE Conference Room at EBU1 - 3311** (in-person) OR **Online** (Zoom)
  - You can attend either in person or online. Attending in person is strongly recommended, but it is optional.
- Time: **3:00-4:00 PM on Saturdays**
- Alternative Time: **10:00-11:00 AM on Thursdays (on Zoom)**
  
- **Group Work:** Outside weekly meetings, you will work along with the other students on the following:
  - Prepare outreach lesson material, such as lecture slides, activities, and hands-on projects.
  - Test the lessons, and check whether the projects work correctly as expected.
  - Brainstorm ideas and possible improvements to the lessons.
  
- **Outreach Volunteering:** You will be expected to volunteer for at least 10 hours in total over the quarter off-campus. Volunteering includes teaching lessons and assisting with activities in the classroom. Every time you volunteer, we will send you a form to log your hours.

All our rides to the high schools are provided by volunteers.

**If you have a car and if you are willing to drive, please let us know ASAP. Drivers will receive reimbursements for gas.**

- **Final Report:** At the end of the quarter, all students will write an *individual* report (1-2 pages) about their experience with ECE 198 including, but not limited to:
  - The design of outreach lessons.
  - The delivery of these lessons at schools.
  - Feedback on outreach lessons and ECE 198.
  
- **Final Presentation:** At the end of the quarter, all students will work together on a single group final presentation that highlights the outreach work completed throughout the quarter. The presentation will include:
  - A brief description of the lessons designed.
  - A brief description of the delivery of these lessons at schools, and any reflections or feedback on the lesson delivery.

## Everything You Need

To ensure that everything in ECE 198 goes smoothly, here are the main things you need to keep consistent track of:

- **Discord:** This is our primary communication channel. All updates, reminders of deadlines, and group discussions occur here. The Discord also provides an efficient way to work with your fellow ECE 198 classmates on designing outreach lessons. The Discord also helps with organizing rides and giving live updates during outreach events.
  - Link to discord: <https://discord.gg/8FVepFHEu6>
  
- **Google Drive:** This contains all the resources for ECE 198, including:
  - Meeting notes from our weekly meetings
  - All the outreach material, such as the lecture slides for our lessons.

- Link: <https://tinyurl.com/ECE-198-Outreach>

## Tentative Lesson Plan for Winter and Spring 2023

In Winter and Spring 2023, the lessons that we will design and deliver to the students are:

- Making a simple Arduino project
- Colab with CSE and MAE 198: Candy Dispenser Project
- Intro to Raspberry Pi and IoT
- Intro to Computer Vision and ML in Python using Google Colab
- ...your ideas

As time permits, we may add some more topics depending on the ECE 198 students' preferences and expectations.

## Tentative Lesson Plan for Fall 2022

In Fall 2022, the lessons that we will design and deliver to the students are:

- The basics of electric circuits - electric current, voltage, and resistance.
- The basics of sensors and actuators.
- The basics of microcontrollers and the Arduino:
  - Making a simple Arduino project (e.g. a blinking LED, or a circuit with pushbuttons and a photoresistor).
  - Using the serial monitor and the serial plotter.

As time permits, we may add some more topics depending on the ECE 198 students' preferences and expectations.

## Outreach Events Off-Campus

Here is a list of all the outreach events we are going to conduct off-campus:

**Fall 2022:** [📄 HKN Outreach Fall 2022 Logistics](#)

**Winter 2023:** [📄 HKN Outreach Winter Logistics Spreadsheet](#)

**Spring 2023:** [📄 HKN Outreach Spring Logistics Spreadsheet](#)

## Grading

ECE 198 is a **2-unit** course graded **Pass / No Pass**. In order to receive a passing grade,

- You must be present at all the weekly meetings, and you must **inform Girish in advance of any absences**.
- You must volunteer for **at least 10 hours in total throughout the quarter**.
  - If you cannot meet the 10-hour requirement, you will be asked to complete a small outreach-related project supervised by Girish.
- You must respectfully work with your teammates / ECE 198 classmates.
- You must complete the final report/reflection and the presentation.

Since this is an experiential learning course, there is no hard numerical cutoff for a passing grade. If your progress in the course falls short of a passing grade, then we will remind you in advance and help you catch up. We want you to learn a lot, have fun, and succeed in ECE 198!

If you are an **Electrical Engineering** major, then **4 units** of ECE 198 can satisfy one **technical elective**. Since ECE 198 is a 2-unit course, you will need to take ECE 198 twice (i.e. maybe once during Fall and once during Winter, for example) so that you get 4 units of ECE 198 in total to satisfy a technical elective.

**Important Note: To get ECE 198 credit added to your tech electives in your degree audit, please send a message to the Virtual Advising Center (VAC).**

If you are in **Sixth College**, then **4 units** of ECE 198 can satisfy your Experiential Learning / Practicum GE requirement. Since ECE 198 is a 2-unit course, you will need to take ECE 198 twice (i.e. maybe once during Fall and once during Winter,

for example) so that you get 4 units of ECE 198 in total to satisfy this requirement. **If you want to use ECE 198 to satisfy your Sixth College Practicum requirement, please reach out to Girish Krishnan as soon as possible.**

## HKN Induction Perks for ECE 198 Students

If you are interested in joining HKN (Eta Kappa Nu, the honor society of IEEE), you must follow the instructions provided on this page:

<https://hkn.ucsd.edu/hkn-membership/>.

**This year, taking ECE 198 makes it easier for you to join HKN!**

Here are the HKN induction perks provided to ECE 198 students, provided that they receive an invitation from HKN (based on GPA):

- **5 technical points for completing two quarters of ECE 198:** See the link above for more information on induction points.