IEEE Region 3 SoutheastCon Student Circuit Design Competition

Guidelines

1. About the Competition

The IEEE Region 3 Circuit Design Competition initiated in 2023, provides participating students with a circuit design challenge, all material needed to complete the challenge, a set of deliverables, and timeline at the start of the competition. Students will then use the set amount of time to solve the challenge and complete as many deliverables as possible to the best of their ability.

1.1. Overview

For this competition, teams will be provided with a technical problem to solve, all equipment and resources to be able to solve the problem, and an allotment of time in which they must complete the task.

1.2. Purpose/Objectives

N/A

1.3. Format

The competition will have 3 rounds (qualifying, semi-final, and finals). A lineup of time slots and team call orders will be provided and posted to the SoutheastCon website prior to the competition date. For qualifying and semi-final rounds, two boards will conduct runs simultaneously in 5- minute intervals. The final round will be held on Saturday night during the awards banquet on a single board.

2. Rules and Regulations

2.1. Eligibility

- Students can compete in teams of up to 3 undergrad students or 2 grad students. There is a finite number of resources and spots available for this competition.

- Students can expect the challenge and deliverables to be appropriate for students who have completed at least one year of EE/ECE classes.

- Each Region 3 branch is entitled to send one team for the main competition, securing a guaranteed spot. Additionally, branches have the opportunity to send extra teams to participate in an open bracket.

- Open bracket teams will be eligible to compete based on the availability of resources.

2.2. Guidelines

- Within a week after registration closes, teams that signed up for the open bracket will be contacted and informed if there is a spot for them to compete in the competition.

- For this challenge, you will be charged with developing a proof-of-concept prototype. Based on design criteria, this device will take some defined input, that input will be processed by a circuit you design and fed into an ESP32 board.

- The processor will manipulate that input with the code you write and the output will also have to be processed by another circuit you design. That output will then be fed into another device that is provided.

- Some programming will need to be done for the ESP32 using the Arduino IDE. Some example code will be provided to help you in that task.

- The processing of the input and output may require the use of interface modules, op-amps, and transistors as well as resistors and capacitors. Parts of this design may require a knowledge of filters and signal processing.

- Students are allowed to bring text books and any notes/papers they feel might be helpful. Teams may bring up to one laptop apiece.

2.2. Guidelines

- The software to be announced may be installed on one or all laptops. Laptops should have Wi-Fi capability as you will want to make use of the Internet for resources, however; AI applications such as ChatGPT are not allowed for this competition.

- This is a real-life simulation, and competitors are free to use outside knowledge resources but the work of the team must be your own. Competitors can phone a friend, but they can't do the work for competitors. Some of the software will require Windows 10/11 while others can use a Mac or Linux machine.

- Competitors will need to document your circuitry as well as to demonstrate its operation. A laptop will need to have a word processing program (Word or equivalent) and organizers will provide you the access to a student edition of OrCAD schematic design software with Spice (the software also does PCB layout but organizers will not be laying out a PC board). There is also a PC interface to the handheld oscilloscope / DMM that will be available.

- All software links will be provided to teams prior to the competition date.

2.3. Submission Requirements

Contestants will need to document their circuitry as well as to demonstrate its operation during the competition.

2.4. Timeline

- January: Registration for the Circuit Design Competition opens. Information on how to register for the competition will be posted on the SoutheastCon 2024 website.
- February: Registration for the Circuit Design Competition closes.
- March: Circuit Design Competition starts on-site at SoutheastCon.

2.5. Judging Criteria

This project, like any other, is on a budget. You will start out with a certain number of points.

Contestants will gain points by demonstrating each design challenge as well as documenting them. Contestants will be provided with a set of basic tools, supplies, and equipment as well as parts – but you may need to 'buy' more parts or equipment with points (including replacing parts you 'fried' by applying excess or improper voltage). Contestants can also gain points by completing your project early. And there may be the opportunity for extra points for adding 'enhancements' to the project. The exact criteria for all of these will be explained in detail at the project inception.

3. Logistics

3.1. Registration Process

Competition registrations happen through a Google form in the format of this <u>Team Registration Form</u>.

3.2. Location

Competition will be held on-site at the SoutheastCon.

Onsite Student Competition participant (one per branch) at $50/day, 2.5 days maximum. Further details on funding support can be found at <u>https://ieeesoutheastcon.org/travel-and-funding-support/</u>.

3.3. Requirements

All members of a team are expected to be present for the whole time slot unless they finish early with their design. The competition will be conducted for a duration of 3 hours.

3.4. Awards
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