2024 IEEE REGION 3 SOUTHEAST CON

I. STUDENT CIRCUIT DESIGN COMPETITION RULES

The **IEEE Region 3 Circuit Design Competition** will provide 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.

Competition Timeline

January 15, 2024	Registration for the Circuit Design Competition opens. Information on how to register for the competition will be posted on the SoutheastCon 2024 website
February 15, 2024	Registration for the Circuit Design Competition closes
March 22, 2024	Circuit Design Competition starts on-site at SoutheastCon in Atlanta. The competition will start at 1:00 PM and will end at 6:00 PM on Friday, March 22nd 2024

Competition Process

Below is a breakdown of the competition process. The remaining section of this document will address the details needed to complete each step:

1. **Create your team and register for the competition at**
   https://docs.google.com/forms/d/e/1FAIpQLScidtCHIi6t9ry9MdPhUzgASMrPi1p-xuD6rFAgEhMOsxXY2Q/viewform?usp=sf_link
   Students can compete in teams of up to 3 undergrad students or 2 grad students.

2. **Arrive at SoutheastCon 2024 by noon on March 22nd 2024 to compete**
   Details on the competition timeframe will be posted with the SoutheastCon 2024 agenda and will be available on the website as we get closer to the due dates.

What to expect

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

Team sizes

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. 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. 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.

What to bring

Students are allowed to bring text books and any notes/papers they feel might be helpful. Teams may bring up to one laptop apiece. 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 you are free to use outside knowledge resources but the work of the team must be your own. You can phone a friend, but they can't do the work for you. Some of the software will require Windows 10/11 while others can use a Mac or Linux machine.

You 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 we will provide you the access to a student edition of OrCAD schematic design software with Spice (the software also does PCB layout but we 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 on Friday, March 15 2024 by 5:00 PM EST.

Scoring

This project, like any other, is on a budget. You will start out with a certain number of points. You will gain points by demonstrating each design challenge as well as documenting them. You 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). You can also gain points by completing your project early. And there may be the opportunity for extra points for adding 'enhancements' to your project. The exact criteria for all of these will be explained in detail at the project inception at 1:00 PM Friday March 22nd 2024.