Day 1 February 23rd (9:30AM-2:30PM)

9:00AM-9:30AM – Arrival/Drop-Off

9:30AM-10AM – Kick-Off

- Introductions:
    - (10mins) Cherokee County/Cobb County Schools - Welcome and cover logistics
    - (15mins) T-Mobile
    - (5mins) Kennesaw State University: Dr. Kihei welcome and overview

10AM - 10:30AM - Activity 1

- Assemble into groups
- Pre-diagnostic survey to students
- Rock paper scissors ice-breaker

- Come up with Team Name

10:30AM - 12:00PM - Activity 2

All modules can be found online:

https://github.com/Intelligent-Mobile-Device-Lab-at-KSU/stem-camp

Start with: STEM Camp Overview.pdf

- What are we building today? Block diagram of robot car.
- Go over a high level of components.

Then review: GettingStartedESP32.pdf

- What is a microcontroller? What is the ESP32? What is Coding?

Complete these modules:

Module 1 - Construct the chassis

Module 2 - The battery switch

Module 3 - LEDs

- Light up an LED using just a resistor (use Ohm's Law).

Module 4 - Blinking an LED

- Light up an LED using the ESP32, discuss the differences.

Module 5 - Measuring battery voltage

Asynchronous Challenge 1:

There will be a track to drive RC cars.

Groups should take turns driving RC cars.

Select one group member to compete in the time trial event.

12:00PM - 12:30PM Lunch

Guest speakers

12:30PM-2:30PM - Activity 3

Module 6 - USB power or battery

Module 7 - Ultrasonic sensor

- Write code to obtain obstacle distance from the ultrasonic sensor. Explain its operation.

Module 8 - DC Motors

- Actuate the motors using a AA battery.
- Soldering at the soldering stations
  - Explain what soldering is and how to solder
  - Solder wires to the motor leads
  - Solder the battery leads to jumper wires
  - Solder the battery switch to the battery circuit

Module 9 - DC Motor driver

- Interface the motor driver module to the ESP32
- Explain the need for a motor driver
- Actuate the motors using the ESP32 (via a motor driver).
- Explain its operation.

Day 1: Challenge: Day 1 Challenge.pdf

- Write a script to have the robot traverse a track.

End Day 1: Clean up and tidy.

2:30PM-3:00PM – Departure/Pick-up

Itinerary - Day 2 February 24th (9:30AM-2:30PM)

9:30AM - 12:00PM – Activity 1

Complete any Modules that were not completed on Day 1.

Module 10 - Adding back the ultrasonic sensor

Module 11 - Tachometer

- Write code to obtain data from the "speed" sensors. Explain its operation.

Module 12 - Networking

- Connect to your vehicle over Bluetooth with the supplied .ino file
- Open the STEM camp website on the smartphone
- Control your robot remotely from the web-page
- Practice working with the robot against the other teams!

Have the teams decorate the vehicle

If you finish early:

- Write code to stop the motors when an obstacle is detected.
- Interface more LEDs to the robot
- Let the kids enjoy driving their robot cars

12PM - 12:30PM Lunch

    Guest Speakers

12:30PM - 1:30PM - Activity 2

    Remote racing!

1:30PM - 2:00PM - Critical Reflection

    Tell Us What You Learned

2:00PM - 2:30PM - Final Awards

    Giveaways and dismissal

    Post-Diagnostic Survey to High School Students and KSU Undergraduate