Component Overview: ESP32 Module (Devkit V1)

# What is ESP32?

ESP32 as the brain of 5our Smart Mining Helmet. It’s a tiny, smart chip that helps your helmet do important tasks—like talking to Wi-Fi and checking signals around it. Just like how our phone connects to Wi-Fi.

# What does it do in our project?

In our Smart Mining Helmet project:  
- The ESP32 keeps looking for nearby Wi-Fi signals.  
- Based on the strength of those signals, it guesses where the person (the miner) is.  
- So, if Wi-Fi 1 is the strongest, the helmet thinks, “Okay, I must be near Zone A!”  
- This way, you can track where the miner is, just using Wi-Fi—no internet needed!

# Power Supply Required

• ESP32 needs 3.3V to 5V to work.  
• You can use a battery pack or a USB adapter to give it power.  
• Most of the time, people power it with a normal phone charger cable (USB to micro-USB).

# Wi-Fi Range

• The ESP32 can connect or scan Wi-Fi signals up to around 50 to 100 meters indoors.  
• But the stronger the Wi-Fi signal, the more accurate it will be.  
• In your helmet project, you're using 4 Wi-Fi spots in a room to find the zone. More spots = more accuracy!

# Working Conditions

ESP32 works best when:  
• The temperature is between -40°C to +85°C (you’re using it indoors, so it’s fine).  
• It’s kept dry and not exposed to too much dust or heat.  
• It’s placed safely on a breadboard or circuit so the wires don’t get loose.

# Why is ESP32 perfect for this helmet?

• It can scan Wi-Fi networks super fast.  
• It’s cheap and easy to program.  
• It doesn’t need the internet—just Wi-Fi signals  
• It helps us track the miner’s location easily.