**Introduction to Peripherals, Interfacing and Embedded Systems**

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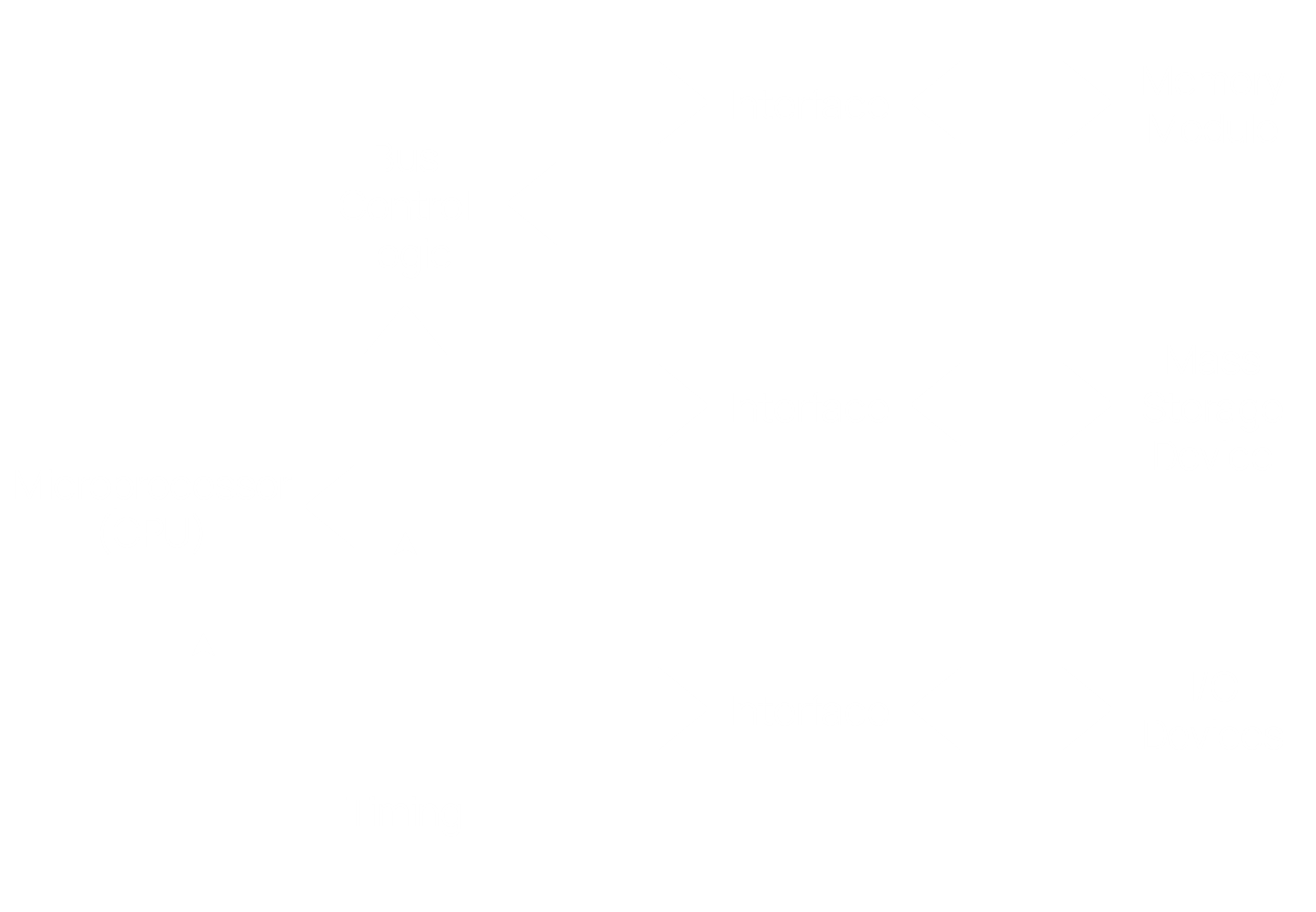
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This course has 3 parts, Peripherals, Interfaces and Embedded Systems.

**Peripherals** are the external devices that we connect a microprocessor to, such as memory, input devices and output devices.

**Interfaces** are what allow us to connect peripherals to the microprocessor. They allow interaction between the Microprocessor Unit (MPU) and the peripherals. Interfaces can be of several types such as USB, HDMI, NIC (Ethernet, Wi-Fi Interface, Bluetooth), Fibre channel, Firewire, etc. Interfaces can connect to external devices or internal ones that are inside the motherboard. The examples listed above are all external devices.



**Embedded Systems** combine multiple hardware and software elements. To be able to fully appreciate what embedded systems do, we first need to understand microprocessors and microcontrollers.

## Microprocessors and Microcontrollers

We already understand what a **microprocessor** is. It is simply a **CPU**, which cannot really do anything on its own. It needs input from external devices and it needs external devices to show us its output.

A microprocessor is pretty generic. We can do basically anything we want with it. A **microcontroller** on the other hand, achieves a specific task. For example, we could have a device that has a sensor to read the current temperature, a processor to convert this analogue data into digital form and finally a display to show the temperature digitally. This is a microcontroller.

## Embedded Systems

So, a microprocessor is a CPU and a microcontroller is a combination of CPU, memory and peripherals. An **embedded system** goes one step further and combines multiple different smaller applications and hardware.

An easy example is a tape recorder that can also play the recording, thus fulfilling the requirements of two different devices. A less obvious example is a smart phone, which combines multiple different devices and applications together. Calculators, cameras, lights, radios, recorders, etc. all could potentially be embedded systems. These are all small-scale embedded systems. We have large scale ones as well that are even less obvious, such as satellites.