Aim of Embedded Systems and IoT Lab- (EC1424 /19EC424)

The aim of the Embedded Systems and Internet of Things (IoT) Lab is to provide students with practical knowledge and hands-on experience in designing, programming, interfacing, and implementing embedded systems using development boards such as Arduino UNO, ESP32, and Raspberry Pi. The lab enables students to interface various sensors, actuators, and input/output devices, implement hardware and software interrupts, communicate with computers, and develop IoT-based applications for real-time monitoring, automation, and control.

Features of Embedded Systems and IoT Lab

1. Embedded System Development: Hands-on experience with Arduino UNO, ESP32, and Raspberry Pi development boards for embedded system design and programming.

2. Interrupt Handling and Timer Programming: Implementation of external interrupts and timer interrupts to control LEDs, buzzers, and other devices based on button presses and timed events.

3. Peripheral Interfacing: Interfacing keyboards, stepper motors, LEDs, buzzers, and other input/output devices with microcontrollers.

4. Sensor Interfacing and Monitoring: Integration of temperature and humidity sensors such as LM35, DHT11, and DHT22 for real-time environmental monitoring.

5. Light Intensity Measurement: Interfacing LDR sensors to detect variations in light intensity and measure corresponding voltage changes.

6. Motion Detection and Security: Using PIR motion sensors to detect human movement and activate LEDs or buzzers for security applications.

7. Serial Communication: Establishing data transmission and reception between microcontrollers and computers for monitoring, debugging, and control.

8. Air Quality Monitoring: Interfacing gas sensors with ESP32 to monitor air quality and develop environmental monitoring applications.

9. IoT-Based Home Automation: Designing smart home applications to monitor and control electrical appliances remotely through internet-connected devices.

10. Real-Time Data Acquisition and Control: Collecting sensor data, processing inputs, controlling outputs, and developing automated systems for practical applications.

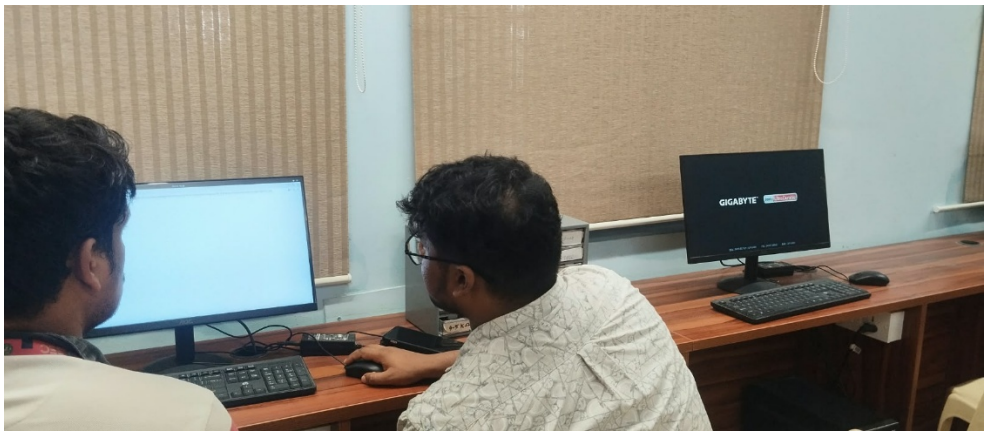
11. Hardware–Software Integration: Developing skills in embedded C/C++, microcontroller programming, circuit design, troubleshooting, and system integration.

12. Practical Problem-Solving: Encouraging students to design, implement, test, and evaluate embedded and IoT solutions for real-world applications.








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