TKM INSTITUTE OF TECHNOLOGY
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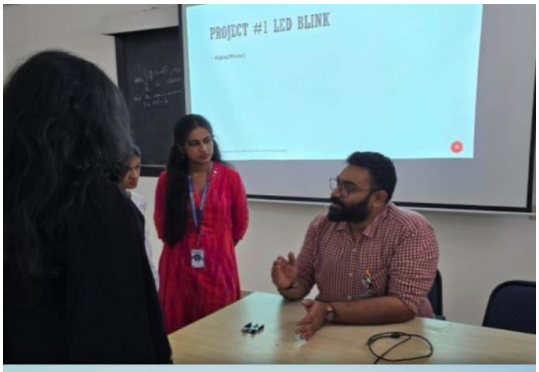
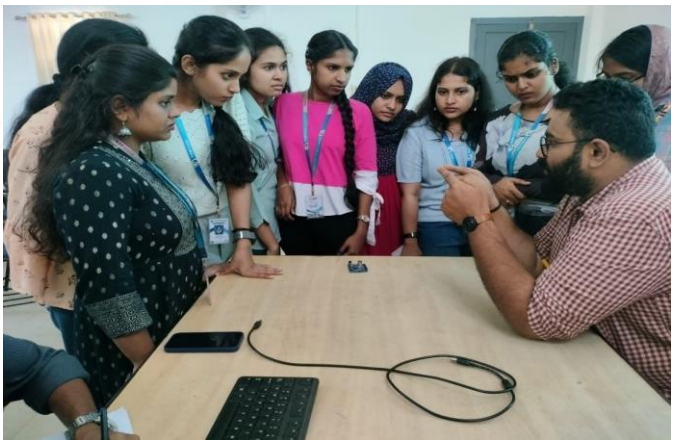
NATIONAL BOARD OF ACCREDITATION
BLAZE Biomedical League for Advancement to Zenith Excellence

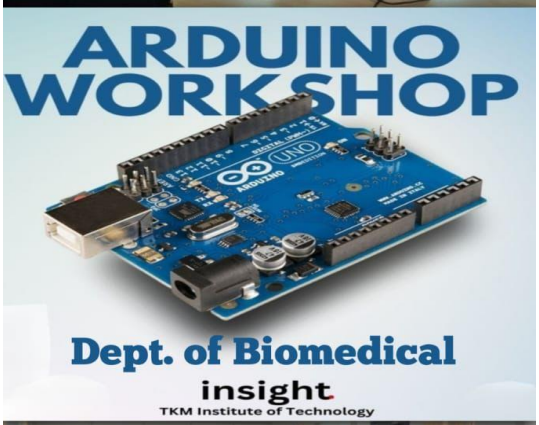
DEPARTMENT OF BIOMEDICAL ENGINEERING

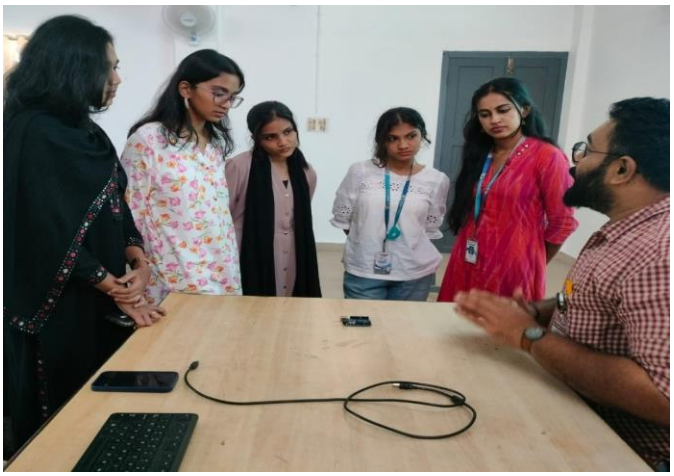
Report on Hands-on workshop in Introduction to ARDUINO Microcontroller

- Venue : Biomedical Engineering department seminar hall
- Date : 10th February 2025
- Time : 10:00 am
- Participants : 72
- Volunteers : 3









In view of the **IEDC** flagship event **INSIGHT'25** , the **Department of Biomedical Engineering** planned and successfully conducted a hands-on Workshop on introduction to Arduino microcontroller on **February 10, 2025**.The objective of the workshop was to provide participants with a basic understanding of the Arduino microcontroller and to help them develop practical skills in using Arduino for building simple electronic projects. By the end of the workshop, participants were expected to gain the knowledge to begin their journey in the world of embedded systems and electronics.

Introduction to Arduino Microcontroller:

The workshop began with an introduction to the **Arduino platform**, which is an open-source electronics platform based on easy-to-use hardware and software. It is widely used for creating interactive projects, with the core of the system being the **Arduino board**—a microcontroller that can be programmed to control hardware components.

Topics Covered:

1. **What is Arduino?**
    - Brief history and evolution of Arduino.
    - Overview of Arduino IDE (Integrated Development Environment) for writing and uploading code to the Arduino board.
2. **Arduino Components:**
    - Introduction to the basic components required for Arduino-based projects: Arduino boards, sensors, actuators, and other peripherals.
    - Overview of different Arduino boards like **Arduino Uno**, **Arduino Nano**, and **Arduino Mega**.
    - Explanation of input and output pins, power supply, and communication protocols.
3. **Basic Electronics:**
    - Introduction to basic electronic components such as **LEDs**, **resistors**, **buttons**, and **potentiometers**.
    - How to read and interpret simple circuit diagrams and the significance of **Ohm's Law**.
4. **Programming the Arduino:**
    - The structure of an Arduino program: **Setup()** and **Loop()** functions.
    - Introduction to basic programming concepts such as variables, loops, and conditionals in Arduino.
    - Writing the first Arduino program (e.g., making an LED blink).
    - Uploading code to the Arduino board via the Arduino IDE.
5. **Hands-on Projects:**
    - **Blinking an LED:** Participants connected an LED to an Arduino and wrote code to make it blink at specific intervals.
    - **Using Buttons and LEDs:** A simple project where participants used a button to control an LED, learning how to read digital inputs and control outputs.

    - **Analog Sensors:** Participants connected a potentiometer to an analog input pin and used code to read the values and control the brightness of an LED based on the input.
6. **Troubleshooting and Debugging:**
    - Common issues faced during Arduino projects and how to troubleshoot them effectively.
    - Using the Serial Monitor to output values and debug programs.

Learning Outcomes:

- **Understanding Arduino Basics:** Participants gained a fundamental understanding of how the Arduino platform works, including its hardware and software components.
- **Hands-on Experience:** By building simple projects, participants gained confidence in using the Arduino board, sensors, and actuators.
- **Programming Skills:** Attendees learned how to write, debug, and upload code to the Arduino board, and how to interface with various sensors and actuators.
- **Problem-Solving:** Participants encountered real-world problems, which helped them develop problem-solving and critical thinking skills when dealing with hardware and software.

Conclusion:

The hands-on workshop was a success, with participants actively engaging in the projects and discussions. By the end of the session, all participants had built and tested simple circuits using Arduino and were able to write basic programs to control their projects. This workshop served as an excellent starting point for anyone interested in pursuing further studies in electronics, embedded systems, and microcontroller programming.

Feedback:

- Participants appreciated the interactive nature of the workshop and the clear explanations of complex concepts.
- Some participants expressed interest in more advanced topics such as integrating Arduino with other communication protocols like Bluetooth and Wi-Fi.

Future Recommendations:

- Organize more advanced workshops that explore deeper concepts of embedded systems, including wireless communication, sensor networks, and Internet of Things (IoT) applications.
- Provide more time for hands-on experimentation and project development.

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