REPORT ON LED WORKSHOP

Objective of the workshop:

To educate participants on the fundamentals of Light Emitting Diodes (LEDs), their working principles, applications, and practical implementation in electronic circuits. The workshop aims to develop hands-on skills in designing, assembling, and troubleshooting simple LED-based projects, thereby enhancing understanding of basic electronics and energy-efficient lighting technologies**.**

Venue: Analog lab of Electrical and
Date: 05/04/2024
Electronics Department, MBCCET
Co-ordinated by :Asst. proff . Shehnas k salim, EEE Department
Conducted by: Nithin Rajesh, Jiss M Scaria, Akhil Padmajan
No of participants=200

Coverage of workshop:

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DAY:1-Understanding LEDs and Their Basics

The workshop started at 9:00 am and was inaugurated by HOD Prof. Resmara S. Class Coordinators and Faculty members were present during the event.

On the first day of the LED workshop, students were introduced to the world of LEDs in a fun and simple way. The session began with an explanation of what an LED is. The instructor told us that LED stands for Light Emitting Diode, which is a small electronic light that glows when electricity passes through it. It is much safer and uses less energy than old-style bulbs, and that's why LEDs are used everywhere today — in TV remotes, traffic signals, torches, and even fairy light.

We learned that LEDs are special because they only work when electricity flows in one direction. This is why they have two legs – a longer leg, which is the positive side (called the anode), and a shorter leg, which is the negative side (called the cathode). If we connect them the wrong way, the LED won't glow.

Next, the teacher explained some simple things about electricity, like voltage (which pushes electricity), current (which is how electricity flows), and resistance (which controls how fast or slow electricity moves). We also found out that we need a small part called a resistor to protect the LED. Without it, too much electricity might flow and damage the LED. After the explanation, we moved on to a hands-on activity. Everyone got an LED, a battery, a resistor, and a breadboard — which is a plastic board lets us connect electronic parts without using any wires or

soldering. We carefully connected the battery, resistor, and LED, and it was exciting to see our own LED light up! We also tried different colors of LEDs like red, green, and blue, and checked how each one looked when it glowed.

By the end of the day, we understood what an LED is, how to connect it correctly, and why we use resistors to keep it safe. It was a fun and interesting start to our LED workshop, and we were all excited for what we would learn in the coming days.

DAY:2-Learning to make led Circuits

On the second day of the workshop, we learned how to build proper circuits using LEDs. First, the teacher explained how LEDs can be connected in different ways. One way is called series, where the LEDs are connected one after another, and the other is parallel, where the LEDs are connected side by side. We saw how the brightness changes depending on how we connect them.

We also learned something very important – how to choose the right resistor for the LED. The teacher reminded us of Ohm's Law, a simple rule to help us figure out how much resistance we need. It sounds hard, but they made it easy for us to understand with example.

After that, we did a practical activity. Using a breadboard, we built small LED circuits on our own. We carefully placed the resistor, the LED, and the battery in the right places. Some of us made one LED glow, and some tried two or more in series or parallel. It was exciting to see how different setups changed the brightness.

By the end of Day 2, we were more confident in handling electronic parts and making real circuits by ourselves.

DAY:3-Soldering and Making of first LED product

The third day was the most exciting so far because we learned about soldering! Soldering is the process of joining parts together using a hot metal tip and a material called solder wire. Before we started, the instructor explained all the safety rules, like wearing safety glasses and not touching the hot tip.

First, we were shown how to hold the soldering iron, how to heat the metal legs of the LED, and how to melt the solder to stick it to the PCB (Printed Circuit Board). It looked a little tricky at first, but once we tried it, it felt like magic — the LED legs were stuck to the board just like they do in real electronic devices!

After practicing, we made a small LED project, like a glowing nameplate, flower design, or mini decoration light. We used colorful LEDs, resistors, and wires, and we soldered everything neatly on the board.

By the end of the day, we proudly held in our hands our very own LED project — made with our own hands!

DAY:4-Controlling LEDs with a Microcontroller

On Day 4, we were introduced to something new: microcontrollers. The teacher explained that a microcontroller is like a tiny brain that can control lights, fans, or machines when we give it instructions.

We used a board called Arduino, and we learned how to write a simple program to make an LED blink. It was just a few lines of code, but it felt really powerful. The teacher helped us understand what the code means — how we tell the LED when to turn on and when to turn off.

Then, we connected the LED to the Arduino board and uploaded the code from the computer. Watching the LED blink on its own, without pressing any switch, was really fun! Some of us even tried patterns like slow blinking or blinking two LEDs one after another.

It was like bringing the LED to life. Day 4 showed us how electronics and coding can work together to do amazing things.

DAY:5-Final Project and Presentation Day

The last day of the workshop was a special one. We were divided into small groups, and each group was asked to build a small LED project using what we had learned over the past four days. Some teams made LED decorations, others made traffic light models, and a few even tried making an LED cube or blinking name board.

We had some time to finish the projects, test them, and make sure everything worked. If something didn't light up, we used the skills we learned to fix it — checking connections, replacing resistors, or re-soldering.

After finishing, each group got a chance to present their project in front of the class. We explained what we made, how it works, and what problems we solved. It was fun to show off our hard work, and we all clapped for each other.

Finally, we had a short feedback session, where we shared what we liked most about the workshop. Everyone got a certificate for completing the workshop, and we took a group photo with our projects. It was a proud and happy moment.

POSTER:


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WORSHOP GLIMPSES:

PO JUSTIFICATIONS

PO1 – Engineering Knowledge:

Students apply the foundational knowledge of electrical and electronics engineering (semiconductors, circuits, LED technology) during the workshop.

PO2 – Problem Analysis:
Troubleshooting LED circuits or identifying faults during fabrication develops analytical skills.

PO3 – Design/Development of Solutions:
Students design basic LED lighting systems or drivers tailored to application needs (e.g., power rating, color temp, efficiency).

PO4 – Conduct Investigations:
Investigating parameters like brightness, efficiency, and thermal characteristics helps students explore real-world performance issues.
PO5 – Modern Tool Usage:
Using PCB design tools, soldering stations, thermal testers, or simulation software to design and test LED systems aligns with this PO.

PO6 – The Engineer and Society:
Understanding how LED technology contributes to energy saving, safety, and better living standards ties into societal impact.

PO7 – Environment and Sustainability:
LEDs are energy-efficient and eco-friendly; students learn their environmental benefits compared to conventional lighting.

PO9 – Individual and Team Work:
The workshop encourages both individual tasks (e.g., soldering, assembling) and group activities (e.g., system integration, troubleshooting).

PO10 – Communication:
Preparing reports, presenting outcomes of the workshop, or documenting fabrication processes improves technical communication.

PO12 – Life-Long Learning:
Exposure to current manufacturing trends and sustainable lighting technologies promotes interest in self-learning and upskilling.

🔹 Justified PSOs:
PSO1 – Design, Analyze, and Test Components and Systems:
The workshop directly involves the design, analysis, and testing of LED systems using electrical/electronic tools and equipment.

PSO2 – Specify Electronic Systems for Control & Signal Processing:
If the LED systems include controllers (e.g., dimming circuits, driver ICs, microcontrollers), students are exposed to control and digital signal handling aspects.

CONCLUSION

The 5-day LED workshop concluded successfully, offering participants a comprehensive understanding of Light Emitting Diodes (LEDs) and their

applications. Through a blend of theoretical sessions and hands-on practice, attendees gained valuable insights into the working principles, circuit design, energy efficiency, and real-world uses of LED technology.

The workshop fostered creativity, teamwork, and technical skill development, especially in areas like soldering, prototyping, and basic electronics. By the end, participants were able to confidently design and build their own functional LED-based projects, demonstrating both knowledge and innovation.

Overall, the workshop not only enhanced the technical capabilities of the participants but also encouraged sustainable and energy- efficient thinking, aligning with modern technological trends.