



MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore - 575001)

Autonomous Institute affiliated to V.T.U., Belagavi, Approved by AICTE, New Delhi

Accredited by NAAC with A+ Grade, an ISO 9001: 2015 Certified Institution

Department of CSE (IoT and Cyber Security with Blockchain Technology)

CSE (IOT AND CYBER SECURITY WITH BLOCKCHAIN TECHNOLOGY)

CYBOTIC



Student's Association

ANNUAL REPORT
Academic Year 2024-25



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Department of CSE (IOT AND CYBER SECURITY WITH BLOCKCHAIN TECHNOLOGY)

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**Department of CSE (IOT AND CYBER SECURITY WITH
BLOCKCHAIN TECHNOLOGY)**

WORKSHOP ON **“ETHICAL HACKING”**



21/04/2025 to 23/04/2025

**In association with
Research Council, MITE**

**Sponsored by
CYBOTIC**





Title: “Ethical Hacking”

Date: 21 April 2024 and 23 April 2024

Time: 9:30 AM to 04:30 PM

Venue: SIEMENS II LAB, Post-Graduation Block.

About the Workshop:

The **Ethical Hacking Workshop** organized by the Department of CSE (IoT & Cyber Security with Blockchain Technology) was an intensive three-day hands-on training event. It aimed to provide students and professionals with a comprehensive understanding of cybersecurity principles and ethical hacking practices. The workshop enabled participants to grasp the real-world implications of cyber threats, defensive strategies, and offensive security techniques.

Participants were introduced to the ethical side of hacking learning to identify vulnerabilities and protect systems using industry-standard tools. Topics ranged from basic concepts like networking and Linux environments to advanced methodologies such as penetration testing, cryptography, and intrusion detection.

Workshop Outcome:

The workshop on "Ethical Hacking" successfully equipped participants with a strong foundation in Ethical Hacking. Through a combination of theoretical knowledge and hands-on practice, attendees gained proficiency in

1. Understood the fundamentals of ethical hacking and its ethical implications.
2. Gained insights into vulnerability assessment techniques and exploitation methods.



3. Became familiar with penetration testing tools like Metasploit, Nmap, and Burp Suite.
4. Performed hands-on exercises involving network scanning, vulnerability testing, encryption, and decryption.
5. Explored career opportunities in cybersecurity, enhancing their employability in the field.

About resource person for the Two day's workshop on "Ethical Hacking"



Ms. Swathi Kanthraj brought over 12 years of experience in cybersecurity, cloud security, risk management, and blockchain. Her career includes positions at IBM, Capgemini, Amazon, Tesco, and Infosys. She is certified in CISM, Security+, CCNA, Azure Fundamentals, and MS-900.

She is well-versed in a range of security domains, including application security, cloud compliance, endpoint protection, secure network design, and threat modeling. Swathi has delivered several keynote talks and workshops on blockchain and cybersecurity at premier institutions such as RVCE and NIE.

Her expertise greatly enriched the workshop, blending practical experience with academic depth.



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Day-1: Session-1 Introduction to Ethical Hacking (9:00 AM – 11:00 AM)

The workshop commenced on April 21st, 2024 (Monday) in the Siemens lab. The session began with a formal welcome by Mr. Poornachandra S Gowda, followed by a prayer. Dr. Shivanandha V Seeri, the HOD of the CSE-IoT department, delivered a keynote speech emphasizing the growing significance of Ethical Hacking. A brief introduction to Ms. Swathi Kanthraj, the workshop's key resource person, was provided by Mr. Abdul Khadar Jilani K K.

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INSTITUTION'S INNOVATION COUNCIL
OFFICE OF INNOVATION

DEPARTMENT OF CSE (IoT & CYBER SECURITY WITH BLOCKCHAIN TECHNOLOGY)
presents
Workshop on Ethical Hacking
in association with
RESEARCH COUNCIL, MITE

21st to 23rd April 2025 CAD Lab

Registration Link
<https://forms.gle/FZifuvGzsbP5gzCo9>



1st day Inauguration Session.



The first session of the workshop began with an insightful introduction to *Ethical Hacking*. Ms. Swathi Kanthraj laid the foundation by explaining the need for cybersecurity in today's digital age, emphasizing how ethical hacking differs from malicious hacking. She discussed the roles and responsibilities of ethical hackers in protecting IT infrastructure and highlighted the basic principles of cybersecurity. Participants were made aware of the legal aspects of hacking, especially in the Indian context, and the relevance of ethical hackers in organizations across various sectors. The session also touched upon real-world case studies of major cyber breaches and how they could have been mitigated through proactive security practices.

The Second Session Black Hat, White Hat, and Grey Hat Hackers (11:15 AM – 12:45 PM) explored the different types of hackers: *Black Hat*, *White Hat*, and *Grey Hat*. Ms. Swathi gave real-life examples of each type and explained their characteristics, motivations, and implications on cybersecurity. She engaged participants in interactive discussions on the ethical boundaries of hacking and illustrated the thin line that separates ethical from unethical behaviour in cyberspace. The session served to clarify misconceptions and brought focus to the ethical and lawful responsibilities of white hat hackers.

In the **Third Session Hacking Phases – Reconnaissance, Scanning, Access (1:45 PM – 3:15 PM)**, the focus shifted to the *phases of hacking*: reconnaissance, scanning, gaining access, maintaining access, and covering tracks. Ms. Swathi provided a detailed explanation of each stage of a cyberattack from an attacker's perspective. During the reconnaissance phase, techniques like passive and active information gathering were demonstrated. Scanning methods using tools such as Nmap and Wireshark were introduced. The session then covered exploitation techniques, ways attackers gain unauthorized access, and how they maintain persistence within a system. The concept of "covering tracks"

through log deletion and anti-forensics was also discussed, emphasizing why understanding attacker methods is vital for defense.



“Highlights from day 1 Session 3: Ethical Hacking”

The **fourth session Hands-on – Setting Up Linux Environment (3:30 PM – 4:30 PM)** of the day was a *hands-on lab* session in which participants learned to set up a *Linux-based ethical hacking environment*. Guided by Ms. Swathi, they installed and navigated Kali Linux using VirtualBox, and were introduced to basic terminal commands, file system structure, and networking setup. This practical exposure helped participants prepare their systems for upcoming technical exercises involving real-world tools.



Day 2: 22nd April 2025

The second day **Vulnerabilities & Assessment Methodologies (9:00 AM – 11:00 AM)** commenced with an in-depth session on *vulnerabilities and assessment methodologies*. Ms. Swathi introduced the **OWASP Top 10** vulnerabilities such as SQL Injection, Cross-Site Scripting (XSS), and Insecure Deserialization. She explained how vulnerabilities are discovered, analysed, and prioritized using frameworks like CVSS (Common Vulnerability Scoring System). The importance of vulnerability management in securing modern IT infrastructure was stressed, and participants were introduced to databases like CVE and NVD to research known vulnerabilities.

Following this, the **Second Session Hands-on – Vulnerability Scanning with Nmap (11:15 AM – 12:45 PM)** featured a *hands-on demonstration using Nmap*, a powerful network scanning tool. Ms. Swathi guided participants through live scanning exercises where they learned to discover open ports, running services, and system versions on a local network. The results were interpreted, and common vulnerabilities were discussed based on scan outputs, helping participants understand how attackers identify weak points in networks.

In the Third Session **Web App Vulnerabilities & Testing (1:45 PM – 3:15 PM)**, the focus shifted to *web application vulnerabilities*. Ms. Swathi discussed how websites are common targets for cyberattacks and demonstrated typical security flaws such as authentication bypass, broken access control, and session hijacking. Using simplified examples, she showed how improper input validation leads to SQL injection and how JavaScript-based XSS attacks can compromise user data. The participants learned how to detect these flaws manually as well as using security tools.

The final session of Day 2 **Hands-on – Burp Suite for Web Scanning** (3:30 PM – 4:30 PM) was another hands-on lab, where participants used **Burp Suite** to conduct *vulnerability scanning on web applications*. They learned to intercept HTTP requests, manipulate parameters, and simulate attacks such as XSS and SQL injection. Ms. Swathi demonstrated the usage of Burp’s Repeater and Intruder modules to automate brute-force attacks and input manipulation. This interactive session gave attendees a realistic experience of how ethical hackers test and secure websites.



“Highlights from day 2 Session 3: Ethical Hacking”



Day 3: 23rd April 2025

Day three began with **Hands-on – Penetration Testing with Metasploit (9:00 AM – 11:00 AM)** a highly practical session on *penetration testing using Metasploit*. Ms. Swathi introduced the **Metasploit Framework**, a widely-used tool for ethical hacking. Participants learned to launch simulated exploits against intentionally vulnerable machines (e.g., Metasploitable2). Ms. Swathi explained the use of payloads and listeners, particularly through msfconsole and msfvenom. The concept of Meterpreter shells and post-exploitation actions like privilege escalation and keylogging were also demonstrated. This session highlighted the importance of responsible penetration testing in identifying weaknesses before real attackers exploit them.

The **second session IDS & IPS Systems (11:15 AM – 12:45 PM)** focused on *Intrusion Detection and Prevention Systems (IDS/IPS)*. Ms. Swathi explained the differences between IDS and IPS, and described their roles in network defense. She introduced tools such as **Snort** and **Suricata**, explaining signature-based and anomaly-based detection techniques. She also showed how logs generated by IDS can be used for alerting and forensic analysis. Participants gained a deeper appreciation for how organizations use such systems to monitor and respond to real-time threats.

In the afternoon, **the third session Cryptography and Techniques (1:45 PM – 3:15 PM)** delved into the topic of *cryptography*. Ms. Swathi explained the principles and types of cryptography, including symmetric (AES) and asymmetric (RSA) encryption, as well as hashing algorithms like SHA-256 and MD5. She highlighted the importance of cryptographic methods in secure communications, password storage, and data integrity. Concepts like digital signatures and public

key infrastructure (PKI) were discussed in relation to secure web applications and blockchain.



“Highlights from day 3 Session 3: Ethical Hacking”

The **final session Hands-on – Encryption with OpenSSL (3:30 PM – 4:30 PM)** of the workshop concluded with a hands-on lab on *encryption and decryption using OpenSSL*. Participants performed encryption and decryption tasks on files and messages using commands like `openssl enc`, `openssl genpkey`, and `openssl rsautl`. Ms. Swathi guided them in generating RSA key pairs, encrypting sample text, and verifying data integrity through hashing. This session brought together the theoretical and practical knowledge of cryptography, giving students a concrete understanding of its implementation in real-world systems.



Workshop Conclusion

The three-day workshop on Ethical Hacking concluded on a positive note. Ms. Sakshya Rai delivered a heartfelt vote of thanks, expressing gratitude on behalf of the students for the valuable insights and knowledge shared by the resource persons. The Head of the Department, Dr. Shivanandha Seeri, and the workshop coordinator, Mr. Sandeep Naik, presented letters of appreciation to the resource persons, formally acknowledging their contributions to the event's success. The closing ceremony marked the end of a productive and informative workshop.



Glimpses of the Workshop.

Coordinator

R&D, MITE

Head of Department



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**Department of CSE (IOT AND CYBER SECURITY WITH
BLOCKCHAIN TECHNOLOGY)**

TECHNICAL EVENT

“CODE CREST-BID BUILD BREAK”



25/04/2025 to 26/04/2025

**Sponsored by
CYBOTIC**





TECHNICAL EVENT REPORT: CODE CREST

Date: April 25th – 26th, 2025

Time: 1:00 PM (25th April) – 10:30 AM (26th April)

Venue: IoT Lab, PG Block, 2nd Floor

Organized by: Cybotic Student Association

About the Event:

The **Cybotic Student Association** of the Department of Computer Science and Engineering (IoT and Cyber Security with Blockchain Technology) successfully organized “**Code Crest**,” a two-day intra-college technical competition aimed at fostering problem-solving, coding efficiency, and collaborative learning among students.

The event saw enthusiastic participation from diverse teams, each bringing a unique approach to problem-solving, demonstrating the multidisciplinary spirit of the institution.

Structured into three rigorous and intellectually stimulating rounds, Code Crest challenged students to think critically, act strategically, and code efficiently.

The event format integrated elements of real-world software development and competitive programming, pushing participants beyond traditional academic boundaries.

Event Outcomes:

- The event successfully enhanced participants' **technical problem-solving, algorithmic thinking, teamwork, and strategic decision-making.**
- It offered an engaging platform for students to apply classroom knowledge in real-time coding scenarios.
- Peer interaction and healthy competition promoted a **culture of innovation and collaboration.**
- Participants gained valuable exposure to **hackathon culture, real-world problem solving, and competitive programming formats.**

Day 1: April 25th, 2025

Round 1 – Hackathon with Parallel Reverse Coding

The event commenced at **1:00 PM**, with registration and team assembly, followed by a formal inauguration and **rules briefing at 1:30 PM**. A total of **25 teams** from across departments participated in this challenge.

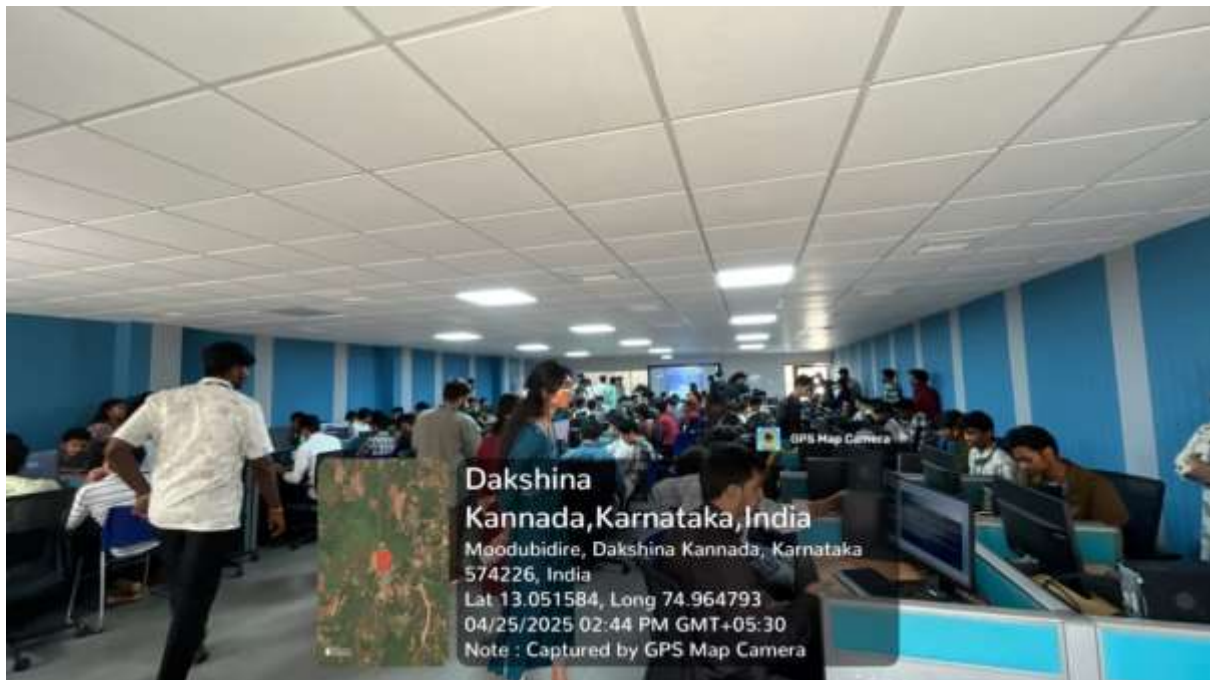
Participants were given **1.5 hours** to solve a **problem statement** under the Hackathon format. Parallely, those who opted for **Reverse Coding** challenges were provided additional time of **5 minutes per question**, allowing them to showcase analytical thinking and logical reconstruction skills.

At the end of the round, teams presented their solutions to a panel of judges. And the Judges were Dr.Jayaprakash, Senior Assistant professor Dept.of Civil Engineering, Ms.Prema Jain, Assistant professor Dept. of CSE(IoT & Cyber Security with Blockchain Technology) Mr.Aneesh Kumar, Assistant professor, Dept. of CSE(IoT & Cyber Security with Blockchain Technology) Mr.Ragesh Raju Assistant professor Dept. of MCA. Based on technical accuracy, innovation,

and presentation clarity, **15 teams were eliminated.** The **top 10 teams** qualified for the final rounds scheduled for Day 2.



“Highlights of day 1 :CODE CREST event”



“Highlights of day 1 :CODE CREST event”



Day 2: April 26th, 2025

Round 2 – Coding Auction

The second day began at **10:30 AM**, with an exciting and unconventional **Coding Auction**. In this round, teams strategically bid on coding problems based on their confidence and perceived difficulty. Successful problem-solving post-bidding awarded teams with proportional points, promoting not only technical skill but also strategic thinking and time management. There was a two sub rounds in the coding Auction Round .The Students were enthusiastically participated in the second rounds with a bidding of a coding question with a maximum amount of bidding points

Round 3 – Tech Rumble (1-on-1 Coding Battle)

The final round, titled “**Tech Rumble**,” was an intense 1-on-1 battle format. Competing teams were given a unique set of **three problems per battle**. The team to solve each question first earned **positive points**, while the opposing team received **deductions**. This round demanded speed, accuracy, and pressure handling.

The complete event was hosted in the Hackerrank website creating the perfect coding environment. where we judged the Round2 and Round3 with the logic implemented and the testcases they passed.

Scores from **Round 2 and Round 3** were combined to determine the final standings. The atmosphere was energetic and competitive, with peers cheering for their teams and intense focus from participants.

using basic plotting techniques, providing a foundation for the more in-depth exploration planned for the following day.



“Highlights of day 2-ROUND 2 :CODE CREST (Coding Auction)”



“Highlights of day 2-ROUND 3 :CODE CREST (Tech Rumble)”

Winners:

- **1st Place:** Team **Numeronauts**
- **2nd Place:** Team **Mutex**
- **3rd Place:** Team **V R Cooked**

The winners were awarded from a **total prize pool of ₹6,000**. All participants received **certificates of participation** in recognition of their efforts and enthusiasm.

Conclusion:

The two-day “Code Crest” event, hosted by the **Cybotic Student Association**, proved to be a grand success, showcasing the technical capabilities and creative problem-solving skills of the students. The organizing team ensured seamless execution, and the positive response from participants reflected the impact and value of the initiative. The event served as a motivating platform for students to embrace innovation and technical excellence in a collaborative environment.



Glimpses of the CODE CREST event.

Coordinator

Head of Department



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**Department of CSE (IOT AND CYBER SECURITY WITH
BLOCKCHAIN TECHNOLOGY)**

TECHNICAL EVENT

“WEB DASH 2.0: IMAGINE PROTOTYPE DEPLOY”



10-05-25

**Sponsored by
CYBOTIC**





TECHNICAL EVENT REPORT: WEB DASH 2.0: Imagine Prototype Deploy

Date: May 10th, 2025

Time: 10:15 AM

Venue: IoT Lab, PG-Block, 2nd Floor.

Organized by: CYBOTIC Student Association

About the Event:

The **CYBOTIC Student Association** of the Department of Computer Science and Engineering (IoT and Cyber Security with Blockchain Technology) successfully organized “**Web Dash 2.0**,” a one-day intra-college technical competition aimed at fostering problem-solving, coding efficiency, and collaborative learning among students.

The event saw enthusiastic participation from diverse teams, each bringing a unique approach to problem-solving, demonstrating the multidisciplinary spirit of the institution.

Structured into two rigorous and intellectually stimulating rounds, Web Dash 2.0 is a dynamic technical event focused on frontend development.

It challenges students to create innovative and visually engaging web interfaces using modern web technologies. The event fosters creativity, collaboration, and practical coding experience.



Event Outcomes:

- Enhanced understanding of modern frontend technologies like **HTML, CSS, JavaScript, and frameworks.**
- Improved **problem-solving** and **UI/UX design skills through hands-on web development.**
- Practical experience in building **responsive and interactive web applications.**
- Strengthened **teamwork** and **collaboration** among participants.
- Encouragement of **creative thinking** and **innovation** in web interface design.

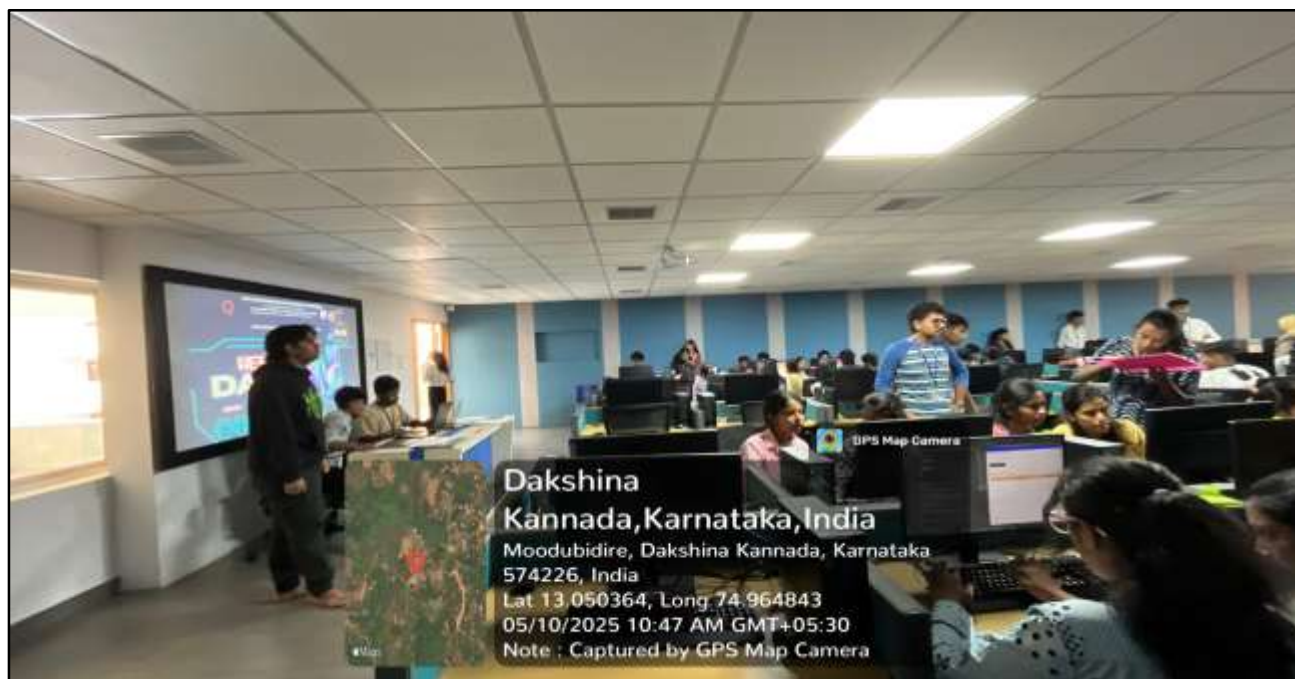
May 10th, 2025 :Session 1

Round 1 – BUG IN THE BEAUTY

The first round of the event began at **10:35 AM**, where all **35 participating teams** were given an opportunity to examine a **sample webpage output**. This output, crafted using **HTML and CSS**, served as the reference for their upcoming challenge. Each team was allotted **5 minutes to carefully observe the layout and design** through NDI (Network Device Interface) and printed papers. Once the observation time concluded at **10:40 AM**, teams received a “cracked” or incomplete version of the code. Their task was to **analyze, understand, and modify the code** so that the final result perfectly resembled the sample output they had studied. This round tested their **analytical thinking, attention to detail, and command over frontend technologies**. The round concluded at **11:05 AM**, and the **evaluation, overseen by the coordinators, was completed by 11:50 AM**. The top-performing teams demonstrated precision in layout replication and clean, functional coding.



“Highlights of morning session WEB DASH 2.0 event”



Session 2:

Round 2 – FRONTEND FUSION

Round 2 started at **12:40 PM** with **19 qualifying** teams from the first round. After briefing the participants on the guidelines and expectations, the actual competition commenced at **12:55 PM**. In this round, the participants had to design and develop a complete, fully **functional website based on a theme or requirements provided at the start of the round**. This was a comprehensive test of their ability to integrate structure, styling, and interactivity using technologies like **HTML, CSS, and JavaScript**. Teams had to demonstrate not only technical skill but also creativity, **user experience understanding, and time management**. The coding duration spanned **2 hours and 5 minutes**, with the session wrapping up at **3:00 PM**. The atmosphere was intense yet collaborative, with teams fully immersed in their work. The final submissions showcased a variety of designs, each reflecting unique problem-solving approaches and development strategies.



“Highlights of afternoon session ROUND 2 :WEB DASH 2.0”

The evaluation was conducted by **Mr. Aneesh Kumar, Assistant Professor**, **Mr. Ragesh Raju, Assistant professor**, who judged the final submissions based on design, functionality, and creativity. The winners were: **"Logs" (1st place)**, **"Sigmoid" (2nd place)**, and **"Code Designers" (3rd place)**. A vote of thanks was delivered at **3:40 PM**, and the event successfully wrapped up by **4:00 PM**. It was a well-organized and engaging competition that highlighted the talent and enthusiasm of all participants.



Winners:

- **1st Place:** Team Logs
- **2nd Place:** Team Sigmoid
- **3rd Place:** Team Code Designer

The winners were awarded from a **total prize pool of ₹6,000**. All participants received **certificates of participation** in recognition of their efforts and enthusiasm.

Conclusion:

The one-day “WEB DASH 2.0” event, hosted by the **CYBOTIC Student Association**, proved to be a grand success, showcasing the technical capabilities and creative problem-solving skills of the students. The organizing team ensured seamless execution, and the positive response from participants reflected the impact and value of the initiative. The event served as a motivating platform for students to embrace innovation and technical excellence in a collaborative



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environment.



Glimpses of WEB DASH 2.0 event.

Coordinator

Head of Department

**Department of CSE (IOT AND CYBER SECURITY WITH
BLOCKCHAIN TECHNOLOGY)**

WORKSHOP ON “IOT WITH ANALYTICS PROTOTYPING DESIGN”



19/05/2025 to 21/05/2025

In association with
Computer Society of India

Sponsored by
CYBOTIC



Title: “IOT with analytics Prototyping design”

Date: 19 May 2025 to 21 May 2025

Time: 9:30 AM to 04:30 PM

Venue: IOT LAB, 2nd floor, Post-Graduation Block.

About the Workshop:

The **IOT with analytics Prototyping Design Workshop** organized by the Department of CSE (IoT & Cyber Security with Blockchain Technology) was an intensive three-day hands-on training event. The aim of this workshop is to equip participants with practical knowledge and hands-on experience in building Internet of Things (IoT) systems by integrating hardware platforms with both wired and wireless sensor technologies, and applying data visualization and analytics tools to monitor, analyze, and interpret real-world data effectively.

Participants were introduced to the core concepts of the Internet of Things (IoT), including the architecture of IoT systems, key hardware components such as microcontrollers and development boards, and various types of sensors (both wired and wireless). They also explored different communication protocols (e.g., UART, I2C, SPI, Wi-Fi), and platform like Plotly Dash to visualise data and basic techniques for analysing sensor data to extract useful insights.

Workshop Outcome:

The workshop brought together various aspects of IoT, from sensor integration to data analysis, allowing us to see how each piece contributes to the overall system. By working through the entire process from acquiring real-time data to storing, visualizing, and analysing it students gained a comprehensive understanding of how interconnected technologies come together to create powerful IoT solutions. This combination of practical experience and theory

helped solidify our knowledge and enhanced our ability to design and implement IoT applications effectively.

By the end of the workshop, participants were able to:

1. **Understand IoT Architecture:** Grasp the fundamental components and flow of an IoT system, from data sensing to actionable insights.
2. **Perform Data Acquisition:** Interface wired and wireless sensors with microcontrollers to collect real-time environmental or system data.
3. **Implement Communication Protocols:** Use appropriate wired (I2C, SPI, UART) and wireless (Wi-Fi) protocols to transmit sensor data.
4. **Store Acquired Data:** Configure systems to store sensor data locally or on cloud platforms for further processing and access.
5. **Visualize Sensor Data:** Use tools such as Plotly Dash to display real-time and historical data.
6. **Analyze and Interpret Data:** Apply basic analytics to identify patterns, trends, or anomalies in the data, supporting better decision-making.
7. **Develop a Complete IoT Prototype:** Design and demonstrate a mini-project that integrates data acquisition, storage, visualization, and analysis.

About resource person for the Three day's workshop on "IOT with analytics Prototyping design"



VIJAY G. H.

Vijay G. H. is an experienced technology leader with over 8 years in C, C++, Python development, and IoT solutions. He specializes in embedded systems, microcontrollers, sensors, and Industry 4.0 applications. Currently, Vijay serves as the Head of Technology at DLithe Consultancy Services Pvt Ltd, His role involves ensuring seamless integration between software and hardware, mentoring a team of developers, and overseeing the successful delivery of IoT solutions for Industry 4.0 applications. Vijay G. H. is skilled in various programming languages including C, Python, Embedded C, and JavaScript. He has strong expertise in IoT technologies like RTOS, MQTT, AWS IoT, and IBM Bluemix, and is proficient with microcontrollers such as ESP8266, ESP32, STM32, and Arduino. Vijay has hands-on experience with wireless protocols like Zigbee, Bluetooth, Wi-Fi, and LoRaWAN, as well as networking protocols (TCP/IP, UDP). His hardware proficiency extends to PCB prototyping, SMT assembly, and working with communication protocols like UART, I2C, and PWM. He is skilled in using EasyEDA for designing PCBs and Postman, Shodan, and Pytest for testing IoT solutions. Additionally, he is proficient in system administration, database management, and development tools like GitLab and Jira. Previously he has worked as a Research Engineer at ESDS Software Solutions Pvt Ltd, As an IoT Consultant at Tings Alive Solutions Pvt Ltd , As an IoT Developer at BlickX Technologies Pvt Ltd, as a Software Engineer at Impelsys India Pvt Ltd. Also Vijay G. H. co-authored the publication titled "Non-Invasive Smart Glucose Monitoring System," which was featured in the International Journal of Innovative Research in Computer and Communication Engineering .

Day-1: Session-1 Introduction to IOT with analytics Process Design (9:00 AM – 11:00 AM)

The workshop commenced on May 19, 2025 (Monday) in the IOT lab. The session began with a formal welcome by Mr. Nikhil K, followed by a prayer. Dr. Shivanandha V Seeri, the HOD of the CSE-IoT department, delivered a keynote speech emphasizing the growing significance of IOT-Internet of Things. A brief introduction to Mr. Vijay G.H, the workshop's key resource person, was provided by Ms. Lamiah Shabbir Saheb.



1st day Inauguration Session.

The first session (9:45 AM-11:00AM) Introduction to Internet of Things (IoT) of the workshop began with an insightful introduction to *IOT with*

analytics Process Design. Mr. Vijay commenced the workshop with an energetic overview of the interconnected worlds of IoT, Robotics, and Generative AI. He clarified that IoT (Internet of Things) is a system where *no human-to-human or human-to-computer interaction is needed*, highlighting its role in enabling devices to communicate independently. He discussed the need for IoT in industries today: efficiency, real-time monitoring, automation, and data-driven decision-making. A major emphasis was placed on how enabling microcontrollers and sensors has become easier due to their low cost and wide availability, making IoT adoption more accessible than ever. Delving into the architecture of IoT systems, he covered components like gateways, sensors, microcontrollers. He broke down the standard IoT application stack into a clear roadmap: Data Acquisition → Data Storage → Data Visualization → Data Analysis, which became the guiding structure for the rest of the workshop.

The Second session **(11:15 AM – 12:45 PM) IOT Case Studies Project Requirements (hardware & software)** In this session, led by Mr. Vijay, focused on bridging theoretical knowledge with real-world implementation through detailed IoT case studies. He began by outlining the essential hardware and software components required for building IoT systems. Participants explored how to define project requirements by analyzing application goals, environment constraints, and user needs. Emphasis was placed on selecting the right sensors, microcontrollers, connectivity modules, and programming platforms. Mr. Vijay explained how this integration requires careful selection of tools and technologies—addressing common project questions such as:

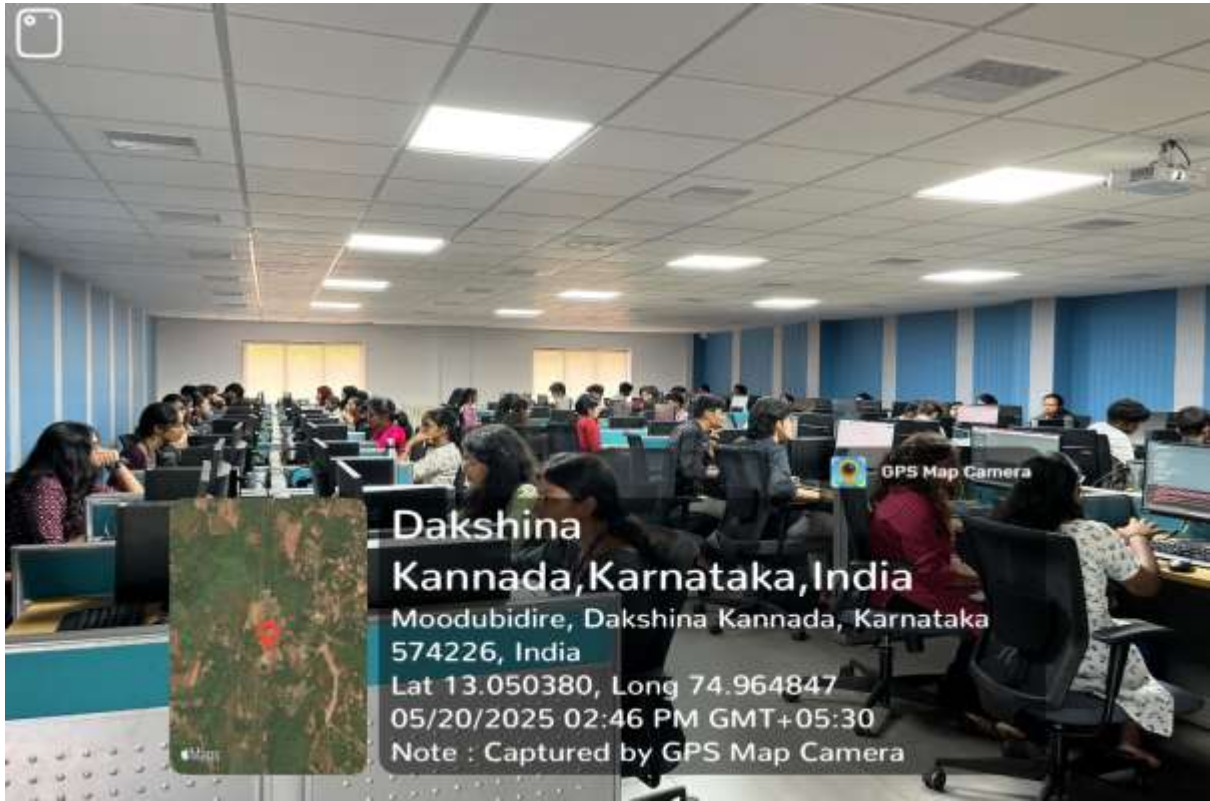
- *Which microcontroller should I use?*
- *What type of sensor fits my application?*
- *Which programming language suits my hardware?*

- *Which cloud service is scalable and secure?*

He stressed the importance of data security, especially in hardware-sensitive environments, warning that hardware data can be breached just like digital systems if not designed thoughtfully. In an applied context, Mr. Vijay walked through case studies demonstrating how to design IoT applications for web, mobile, and embedded platform.

In the Third session **Overview of Sensors & Interfacing (1:45 PM-3:15 PM)**

Mr. Vijay opened this session by explaining how sensors function as the “sense organs” of an IoT system, capturing environmental data to inform system behavior. He provided a breakdown of digital and analog sensors, including temperature, humidity, pressure, gas, motion, and light sensors. The session emphasized the importance of understanding signal types and how to interpret sensor output accurately. Real-world scenarios were shared, including smart parking systems using PIR motion sensors and Google's talking tulip, which reacts to human interaction. Mr. Vijay demonstrated hands-on interfacing using the Arduino IDE, where participants wrote simple programs to control and monitor LEDs. The LED on/off status was printed on the Serial Monitor, showing real-time data interaction. He further explained how sensors work in tandem with actuators like relays and servo motors to automate physical tasks. Modern microcontrollers such as the ESP32-S3 Dev Module and Adafruit Metro ESP32-S2 were introduced, highlighting their enhanced connectivity and memory features. Participants learned the differences between using Arduino Uno and newer modules in terms of speed, flexibility, and support for cloud communication.



“Highlights from day 1 Session 3 : IOT with analytics Process Design”

The fourth session **IoT Data Acquisition & Platforms (3:30 PM – 4:30 PM)**

This session introduced participants to the vital role of data acquisition in IoT systems, serving as the bridge between the physical world and digital analytics. Mr. Vijay explained how microcontrollers like ESP32-S3, ESP32-S2 are used to collect sensor data and transmit it for further processing. Attendees were shown how to configure hardware drivers and install libraries that enable sensor-to-controller communication. Mr. Vijay guided them through building basic data acquisition pipelines from sensor readouts to digital signals readable by the board.

Day 2: 20th May 2025

The second day **IoT Data Communication (9:00 AM – 11:00 AM)** Mr. Vijay began the session by explaining how IoT devices communicate, focusing on both wired and wireless methods. He detailed the difference between serial and parallel communication. The concept of master-slave communication was introduced, with ESP32 as the master and sensors as slaves. Key protocols like SPI, UART, and I2C were discussed, along with their specific use cases. He also explained the differences between wired and wireless setups in terms of speed, flexibility, and reliability. Wi-Fi modes—Access Point and Station—were demonstrated with live device configurations. A major highlight was the coverage of nine types of Wi-Fi security measures and three cellular security standards. Real-time data transmission from ESP32 to cloud platforms was shown through hands-on experiments.

Following this, the Second Session **Networking with IoT (11:15 AM – 12:45PM)** In this session, Mr. Vijay focused on enabling IoT devices to connect and communicate over networks. He introduced the ESP32S3 and ESP32S2 modules, explaining how they establish Wi-Fi connectivity in IoT systems. Participants learned to configure devices in both Station and Access Point modes to build flexible network topologies. A hands-on activity guided attendees through creating a local web server on ESP boards to display live sensor data.

In the Third session **Introduction to IoT Data Analytics (1:45 PM – 3:15 PM)** Mr. Vijay introduced IoT data analytics by explaining how sensor data drives automation and intelligent decisions. The session covered the end-to-end analytics workflow: collecting, storing, exploring, and visualizing data. Participants worked hands-on with JSON dataset and demonstrated a Wi-Fi

scanning experiment using the ESP32 board, where available networks were listed and a message was displayed on the phone browser via the IP address from the serial monitor. This was done using the Arduino IDE, where we wrote code in ARM-compatible syntax. The activity showcased real-time connectivity, browser-based output, and IP-level communication.

The final session of Day 2 **Data Pre-processing & Cleaning (3:30 PM – 4:30 PM)** In this session, while data pre-processing and cleaning techniques were briefly introduced, the highlight was the hands-on IoT workshop conducted by Mr. Vijay. Participants explored how ESP32-S3 and ESP32-S2 microcontrollers can be used for real-world automation. Key experiments included turning an LED and buzzer on and off through Wi-Fi, simulating basic smart home functionality. The Arduino IDE and Arm-based programming were used for coding and uploading to the boards. Additional experiments involved reading data from temperature-humidity sensors and using ultrasonic and IR sensors for distance and motion detection. These activities demonstrated how raw IoT data can later be cleaned and analysed in data pipelines. Participants gained practical exposure to wireless control and sensor data acquisition.



“Highlights from day 2 Session 1: IOT with analytics Process Design”

Day 3: 21st May 2025

Day three began with **Exploratory Data Analysis (EDA) (9:00 AM – 11:00 AM)** the focus of the first session on Day 3, was equipping participants with techniques to understand data distributions, relationships, and patterns. Summary statistics, data visualization, and correlation analysis were thoroughly covered. Mr. Vijay supported this session by offering IoT-collected data, showcasing how EDA helps in identifying trends from sensor-based inputs. The hands-on nature of the session made it highly engaging.

The second session **Advanced Visualization & Dashboards (11:15 AM – 12:45 PM)** In this session, participants explored advanced data visualization techniques and dashboard creation using tool like Plotly. Mr. Vijay's IoT workshop added a practical real-time dimension, where ESP32 devices were made available on the local network using BasicOTA via the Arduino IDE. This allowed wireless firmware updates and device accessibility over Wi-Fi. A key experiment involved collecting live sensor data—such as temperature, humidity, or motion—and automatically sending it to Google Sheets for real-time logging. Participants then used this data to build their own interactive dashboards, simulating smart monitoring systems. The session emphasized how IoT and cloud tools can be combined for dynamic data reporting.

In the afternoon, the **third session Predictive Analytics & Machine Learning (1:45 PM – 3:15 PM)** This session introduced participants to the fundamentals of predictive analytics and machine learning. Core concepts like supervised and unsupervised learning, training/testing data splits, and model evaluation were explained. Mr. Vijay's IoT workshop contributed by showing how IoT data can be used in predictive maintenance models. Use cases in healthcare, retail, and smart devices helped participants understand real-world applications.



“Highlights from day 3 Session 1: IOT with analytics Process Design”

The final session **End-to-End Project, Question and Answers (3:30 PM – 4:30 PM)** of the workshop, participants were guided through an end-to-end data science project. Starting from data collection and cleaning to model building and visualization, all steps were reviewed. A collaborative project using IoT data—provided as part of Mr. Vijay’s workshop—served as the primary case study. The project showcased how data flows from sensors to dashboards. A Q&A segment allowed attendees to clarify doubts from all previous sessions. Common challenges in real-world implementations were discussed. Best practices for deploying models and dashboards were outlined. The session concluded with feedback collection. It was an engaging wrap-up, reinforcing the workshop’s key learning objectives.

Workshop Conclusion

The three-day workshop on IOT with analytics Process Design concluded on a positive note. Ms. Fiona Lavisha Lobo delivered a heartfelt vote of thanks, expressing gratitude on behalf of the students for the valuable insights and knowledge shared by the resource persons. The Head of the Department, Dr. Shivanandha Seeri, and the workshop coordinator, Mr. Sandeep Naik, presented letters of appreciation to the resource persons, formally acknowledging their contributions to the event's success. The closing ceremony marked the end of a productive and informative workshop.



Glimpses of the Workshop.

Coordinator

Head of Department



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Department of CSE (IoT & Cyber Security with Blockchain Technology)

AICTE Activity Report

Title of the Event: Tourism Promotion Innovative Approaches.

Date: 23/02/2025 to 23/03/2025

Timings: 09:00 AM to 1:00 PM

About the Event: As part of our local tourism visit, students explored several beautiful and culturally significant places in our region. The aim of this visit was to better understand and appreciate the natural beauty, history, and heritage of our local area. Students had the opportunity to explore several beautiful, historically significant, and naturally rich places in and around our region. The main purpose of this excursion was to enhance our understanding of local geography, culture, heritage, and the importance of environmental preservation.

Students journey included visits to **Thodar Falls, Konaje Kallu, Malpe Beach, Saavira Kambada Basadi, and Kadalkere Nisarga Dhama**. Each destination offered a unique and enriching experience that left a lasting impression on us. Students visit to Thodar Falls, located near Moodbidri in the Dakshina Kannada district, was both adventurous and enriching. The falls are beautifully nestled within the dense greenery of the Western Ghats, known for their rich biodiversity and ecological importance. As Students made our way through the forested path, Students observed a wide variety of native plant species, showcasing the area's healthy and thriving ecosystem. The trail to the falls was steep and rocky, adding an element of challenge and excitement to our journey. This sense of adventure made reaching the falls even more rewarding. The falls are located in Thodar village, a place of cultural and spiritual importance, home to Shri Kshetra Thodar, known for its deep-rooted traditions of spirit worship. The serene atmosphere, combined with the natural beauty of cascading water and chirping birds, offered a peaceful retreat. The experience helped us appreciate the importance of conserving such natural spaces that blend ecological richness with local heritage. Though the path was challenging, it added adventure to the trip. The peaceful surroundings and natural beauty made it a memorable stop.

Students next destination was the striking and historically noted Konaje Kallu, a twin-peaked granite hill situated approximately 7 kilometers from Moodbidri. This impressive natural formation is also known by the nickname "Ass's Ears", a name given by British sailors due to the

distinct shape of its twin peaks that resemble the ears of a donkey from a distance. Rising to a height of about 344 meters above sea level, Konaje Kallu is a favored destination among trekking enthusiasts, nature lovers, and geology students alike. The trek to the top was both challenging and exhilarating, involving narrow rocky paths and steep inclines. However, the trail also offered us the opportunity to observe the diverse vegetation, rock layers, and peaceful surroundings of the Western Ghats. Along the way, Students paused frequently to take in the sounds of birds, the rustling of trees, and the refreshing breeze elements that added to the overall immersive nature experience. Students also noticed how untouched and raw the landscape was, providing a stark contrast to the bustling towns Students are used to. Reaching the summit of Konaje Kallu was a rewarding moment for all of us. From the top, Students were greeted with breathtaking panoramic views of the surrounding valleys, forests, paddy fields, and distant hills. The sight was not only visually stunning but also gave us a new appreciation for the natural topography of our region. It was a perfect spot for photography, quiet reflection, and environmental observation. Some of us even took the time to sketch the landscape or take notes for future school projects related to geography or environmental science. Apart from its natural beauty, Konaje Kallu also carries geological significance, being a part of the ancient rock formations in the Western Ghats. Learning about its formation sparked our curiosity about regional geology and the forces of nature that shape the land over time. Moreover, the peaceful environment and relatively untouched surroundings made us reflect on the importance of preserving such landscapes, especially in times of rapid urban development and deforestation. Overall, our visit to Konaje Kallu was much more than a trekking trip it was an experience filled with learning, physical endurance, and spiritual calmness.





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As part of our local tourism journey, one of the most memorable and scenic destinations we visited was Malpe Beach, situated near Udupi along the stunning coastline of Karnataka. Known for its pristine sands, scenic sunsets, and vibrant local life, the visit to Malpe Beach was not only enjoyable but also deeply educational and thought-provoking, offering us a wonderful blend of fun, learning, exploration, and environmental awareness. Upon our arrival, Students were immediately captivated by the breathtaking beauty of the beach. The endless stretch of golden sand, the gentle roar of waves, and the sight of swaying coconut palms against the backdrop of an open blue sky created a refreshing and tranquil atmosphere that instantly lifted our spirits. Many of us took a moment just to stand by the shore, letting the cool breeze and rhythmic waves connect us with the serenity of nature. As Students walked along the shoreline, we engaged in a variety of activities that allowed us to interact more closely with the coastal environment. Some of us collected seashells, observed crab trails, and watched fishermen preparing their boats, gaining insight into the traditional coastal livelihoods that are still practiced here. Students also had meaningful discussions with our teachers about coastal ecosystems, the importance of mangroves, and the delicate balance that must be maintained to protect marine life. This helped us understand the crucial role beaches like Malpe play in supporting both biodiversity and local economies. Students also learned about the impact of tourism on coastal environments. Littering, overdevelopment, and pollution are serious concerns, and Students discussed how responsible tourism practices such as avoiding plastic, respecting local wildlife, and supporting eco-friendly initiatives can help preserve the beach for future generations. This sparked conversations among us about what Students, as students and future citizens, can do to promote sustainable tourism and protect the natural treasures of our region. The beach also offered recreational opportunities such as camel rides, local snacks, and a glimpse of St. Mary's Island ferries, which added to the liveliness of the area. While Students didn't have time to explore the island on this trip, learning about its geological rock formations and historical significance made many of us eager to return one day with family or friends. The visit to Malpe Beach was not just a fun outing it was a truly meaningful experience that taught us to admire and respect the natural world around us. It deepened our connection to the coastal charm of Karnataka and gave us valuable insights into the ecological and cultural significance of coastal regions. The memories Students created at Malpe will stay with us for years to come, reminding us of the importance of protecting such serene and beautiful landscapes.

One of the most impressive and culturally rich sites Students visited was the Saavira Kambada Basadi, also called the Thousand Pillars Temple, located in the heart of Moodbidri. This ancient Jain temple was built in 1430 AD during the rule of Devaraya Wodeyar and stands as a monumental representation of Jain architectural excellence. The temple is renowned for its 1000 intricately carved stone pillars, each one unique in design and craftsmanship. These pillars are adorned with carvings of various motifs, including animals, flowers, and religious symbols, showcasing the artistic mastery of the artisans of that era. Students walked through the temple in awe, taking in the peaceful atmosphere and the spiritual aura of the place. Students also appreciated the ongoing preservation efforts, as the temple premises were clean, well-organized, and maintained in a way that protects its cultural and historical value. Visiting Saavira Kambada Basadi gave us a deeper appreciation of the region's religious diversity, traditional architecture, and artistic legacy.

Finally, Students concluded our trip with a visit to Kadalkere Nisarga Dhama, a tranquil eco-park near Moodbidri. This beautiful nature retreat is surrounded by lush greenery and offers a wide range of recreational activities such as boating, nature walks, and picnic areas. It was a peaceful way to end our journey, allowing us to reflect on what Students had seen and learned. Kadalkere is an ideal spot for families, students, and nature lovers, and its well-maintained environment promotes eco-tourism and nature appreciation. Students spent time boating, walking through shaded trails, and simply relaxing in the serene environment. The park also reminded us of the role green spaces play in urban life, offering both environmental and mental health benefits.



In conclusion, our local tourism trip was not just a sightseeing experience but a deeply enriching educational journey that left a lasting impact on all of us. It gave us the valuable opportunity to explore and appreciate the natural beauty, cultural landmarks, and historical treasures present in our own local surroundings many of which Students had previously overlooked or taken for granted. Each destination Students visited offered unique learning experiences from the biodiversity of Thodar Falls and the geological marvel of Konaje Kallu, to the architectural brilliance of Saavira Kambada Basadi, the coastal charm of Malpe Beach, and the recreational serenity of Kadalkere Nature Park. Students returned from the trip with greater awareness, a deeper respect for our environment, and a new sense of pride in the rich heritage of our region. The memories Students created be it trekking up rocky hills, walking on sandy shores, or observing intricate temple carvings will be cherished for a lifetime. Students came to understand how deeply interconnected natural and cultural heritage is, and how preserving one helps sustain the other. The trip also encouraged teamwork, responsibility, and a sense of curiosity among all of us, as Students explored these sites together. More importantly, this experience has inspired us to take an active role in promoting and preserving local tourism, ensuring that these remarkable places continue to thrive and inspire future generations to explore, learn, and protect the heritage that surrounds them. Tourism promotion is an investment in our culture, economy, and environment. Highlighting our rich history, vibrant festivals, and scenic landscapes can attract global attention and boost local livelihoods. By combining modern marketing with sustainable practices, Students can ensure tourism grows responsibly. Let us work together to make our region a must visit destination for travelers everywhere.





Glimpses of the Activity



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Department of CSE (IoT & Cyber Security with Blockchain Technology)

AICTE Activity Report

Title of the Event: Facilitating 100% Digitized money transactions.

Date: 28/05/2025

Timings: 09:00 AM to 1:00 PM

About the Event: Under the AICTE activity point program, Students organized an awareness activity with the goal of facilitating 100% digital transactions. Digital payments refer to transactions conducted using electronic methods, where no physical exchange of cash takes place. Both the payer and the payee engage in the transaction through online platforms such as banking applications, UPI systems, or internet banking services. The Indian government has taken several steps to promote digital payments and financial literacy across the country, aiming to create a digitally empowered economy that is fearless, paperless, and cashless. These efforts are designed not only to improve convenience and efficiency but also to reduce corruption, increase transparency, and bring more people into the formal financial ecosystem.

During our activity 3 year total 63 students of were participated, students visited a nearby shop and introduced ourselves to the people there. Students explained the purpose of our visit, which was to spread awareness regarding digital payments, educate the public about various online transaction methods, and highlight the importance of secure digital practices. Students began by discussing the basic concept of digital banking and familiarized the participants with different types of digital payment methods widely used in India today. Among the most commonly used were banking cards such as debit and credit cards, Unified Payments Interface (UPI) systems, mobile wallets like Paytm and PhonePe, mobile banking, internet banking, and Micro ATMs. Each method has its own benefits and is designed to provide secure and convenient access to financial transactions. Students also emphasized that UPI, developed by the National Payments Corporation of India (NPCI), has become one of the fastest and most widely used digital payment systems in the country due to its simplicity, speed, and real-time transfer capabilities.

An important part of our session focused on educating people about the safety measures that must be followed while using digital payment methods. We discussed the importance of never sharing personal banking information such as OTPs, PINs, or passwords with anyone. People were

informed about common scams and phishing attempts that can occur through fake websites or suspicious messages. Students strongly advised everyone to use only verified and official applications from trusted developers. Additionally, users were encouraged to regularly update their banking apps, use strong passwords, and enable two-factor authentication wherever possible to enhance their account security. Students made sure to explain that just as it is important to lock one's house or wallet, securing digital payment methods is equally crucial.

Students also demonstrated how digital payments can be made easily through mobile phones using UPI apps and mobile wallets. The demonstration included step-by-step guidance on how to scan QR codes, send money to contacts, check transaction history, and ensure successful payments. By doing this, Students helped people realize that digital transactions are not only time-saving but also reduce the need to handle physical cash, which is particularly beneficial in reducing the risk of theft, loss, or unhygienic exchanges. Students further discussed how digital payments contribute to better financial tracking, improved record-keeping, and transparency for both consumers and small business owners. These advantages make digital payments a reliable and modern solution, especially for shopkeepers, vendors, students, and working professionals who engage in frequent transactions. Another important aspect Students covered was the role of digital transactions in improving access to government schemes and subsidies. Through Direct Benefit Transfers (DBT), many welfare



programs now credit money directly into the beneficiaries' bank accounts, which is only possible due to digital banking. Students explained that by adopting digital payments, citizens can take full advantage of these services without delays or middlemen.



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Students also introduced the audience to digital literacy resources and customer support helplines available through banks and government portals in case they face issues or have doubts about using digital payment tools. The people Students interacted with showed great interest in learning and asked questions about security, usage, and benefits. Students clarified their doubts and encouraged them to start with simple transactions and gradually become comfortable with more advanced features. Overall, this activity was a meaningful step in spreading awareness about the benefits, tools, and precautions related to digital payments. By promoting digital financial habits, Students hope to empower more citizens to confidently embrace technology in their daily lives and actively contribute to India's journey toward a truly digital and inclusive economy.

Digital payments refer to cashless transactions conducted through electronic platforms like mobile apps, internet banking, and payment cards. To promote financial inclusion and reduce dependency on cash, the Government of India has been actively encouraging digital payment adoption under the "Digital India" initiative. As part of our awareness activity, Students visited a local shop to educate people about different digital payment methods such as debit/credit cards, UPI, mobile wallets, internet and mobile banking, and Micro ATMs. Students provided hands-on demonstrations, explained the benefits of each method, and discussed how to use them safely. A major focus was on cybersecurity highlighting the need to protect personal information, use verified apps, and remain alert to phishing threats. Students also introduced user-friendly platforms like UPI apps to make the shift to digital payments easier for daily use. Overall, the session aimed to empower people with knowledge and confidence to adopt secure and efficient digital payment practices.





Glimpses of the Activity