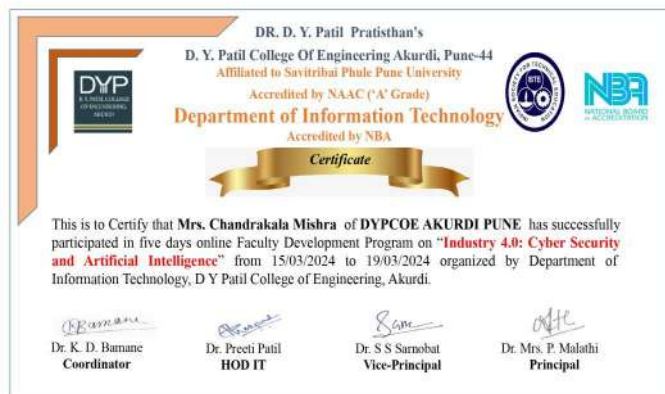


**NEWS LETTER – MARCH 2024**

**Faculty Achievements and Participation:**

- Mrs. Divyarani angaraj Patil, Mrs.Surbhi Kushwah, Mrs. Manasi Karajgar, Mrs. Trupti G. Lonkar, Mrs. Chandrakala Mishra, Mrs. Pranjali S. Bahalkar, Mrs. Snehal Rupesh Malpani, Assistant Professor AIDS department, has attended one-week online FDP on "Industry 4.0 : Cyber Security & AI", organized by Department of Information Technology, D Y Patil College of Engineering, Akurdi., held from 15th March 2024 to 19th March 2024.



**Faculty Achievements and Participation**

**Name of Faculty Coordinator :**

**Mrs. Trupti G. Lonkar**

**Dr Vinayak Kottawar**  
**Head of Department**

## NEWS LETTER – MARCH 2024

### Faculty Achievements and Participation:

- Mrs. Snehal Rupesh Malpani, Assistant Professor AIDS department, has attended one-week online FDP on "Industry 4.0 : Cyber Security & AI", organized by Department of Information Technology, D Y Patil College of Engineering, Akurdi., held from 15th March 2024 to 19th March 2024.
- Mrs. Anagha Jawalkar, Assistant Professor AIDS department, has attended one- day workshop on "Embedded System", organized by Department of Information Technology, DYPIEMR, Akurdi, held in 2nd March 2024. and Participated in One week Hybrid mode FDP on “ SecureChainCityCoin: A Convergence of Blockchain in Smart Cities", held from 18th March 2024 to 22nd March 2024.
- Mrs. Chandrakala Mishra, Assistant Professor AIDS department, has attended One-Week Faculty Development Program (online mode) on “EMERGING TRENDS IN ADVANCE MANUFACTURING TECHNOLOGY”, organized by the Mechanical Engineering Department, Sandeep University, Nashik held from 20th to 24th February 2024.



### Faculty Achievements and Participation

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Faculty Achievements and Participation:

- Mrs. Pranjali Bahalkar and Mrs. Trupti Lonkar, Assistant Professor AIDS department, has attended one-week FDP on "Cognitive computing for smart application", organized by VIIT, Pune, held from 18th March 2024 to 22th March 2024. and attended Five - days FDP on "Data science applications in real word using python" organized by, Department of Computer Engineering, Indira college of Engineering and Management, Pune. held from 18th March 2024 to 22th March 2024.
- Dr. Bhagyashree Ashok Tingare, Assistant Professor AIDS department, has published a paper "Anomaly Detection System in Surveillance Videos Using Unmanned Aerial Vehicle Systems" and "Fruit Detection and Classification application Based on Machine Learning Techniques Framework" in March 2024.



### Faculty Achievements and Participation

**Name of Faculty Coordinator :**

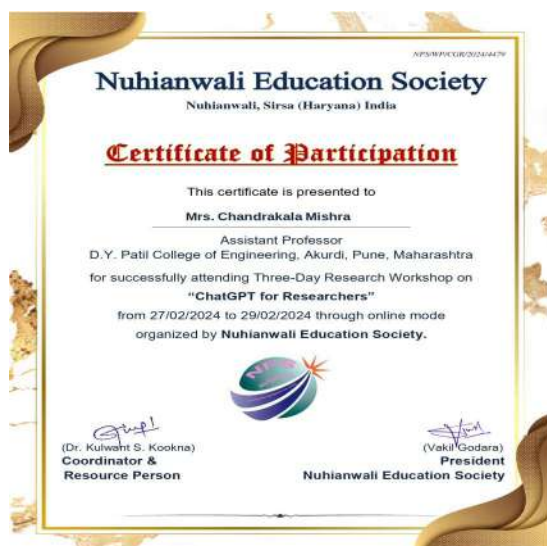
Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

## NEWS LETTER – MARCH 2024

### Faculty Achievements and Participation:

- Mrs. Chandrakala Mishra and Mrs. Snehal Rupesh Malpani, Assistant Professor AIDS department, has attended 3 - Day Workshop on “ChatGPT for Researchers” , organized by Nuhianwali Education Society, held from 27th March 2024 to 29th March 2024. .
- Mrs. Pranjali Bahalkar, Assistant Professor AIDS department, has attended one-week FDP on “Latest Train on computational Mathematics, Theory Methods, Application”, organized by Department of Mathematics, JIS University, held from 26th February 2024 to 1st March 2024.
- Mrs. Nita Mahale, Assistant Professor AIDS department, has published a paper “The Influence of classical raga on human Cognitive function: A Holistic Exploration ” in March 2024.



### Faculty Achievements and Participation

**Name of Faculty Coordinator :**

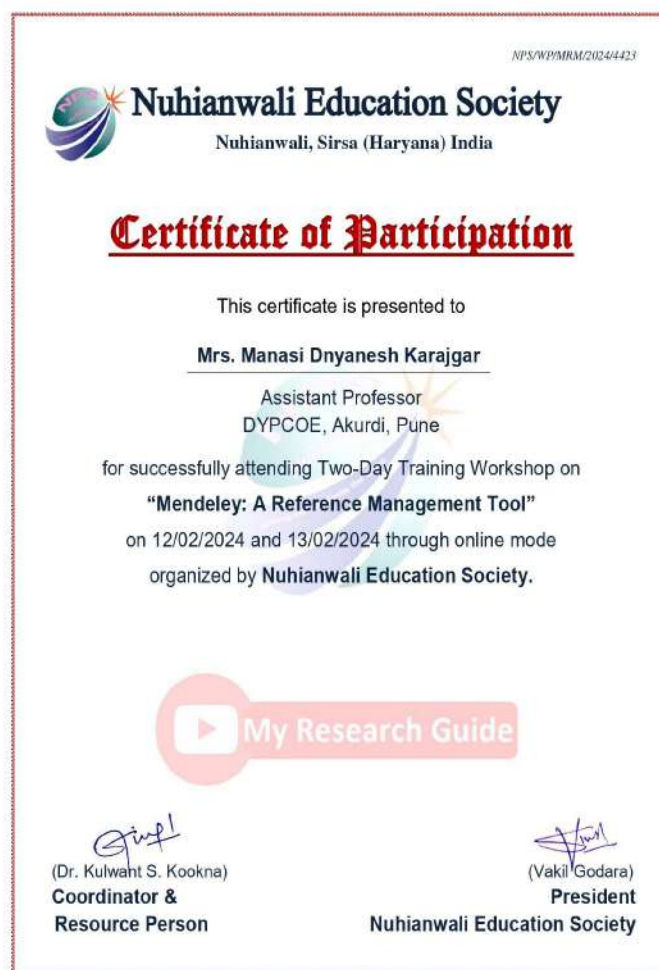
Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

## NEWS LETTER – MARCH 2024

### Faculty Achievements and Participation:

- Mrs. Manasi Karajgar, and Mrs, Nita J. Mahale, Assistant Professor AIDS department, has attended Five days FDP on “Amazon Web Services”, Conducted During 20th February 2024 to 24th February 2024 in association with Savitribai Phule Pune University (SPPU).
- Mrs. Chandrakala Mishra, Assistant Professor AIDS department, has attended one - Day Workshop on “Innovative Teaching method for the 21st Century”, on 6th March 2024, organized by FDP DIVISION, A.C.T. Academy, Kerala Unit.
- Mrs. Manasi Karajgar, and Mrs, Nita J. Mahale, Assistant Professor AIDS department, has attended Two - day workshop on “Mendeley: A Reference Management Tool”, organized by Nuhianwali Education Society, held from 12 February 2024 to 13th February 2024.



### Faculty Achievements and Participation

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Faculty Achievements and Participation:

- Mrs. Manasi Karajgar, Assistant Professor AIDS department, has attended Two Week FDP on “Innovative Teaching and research Methodologies”, organized by Department of Information Technology, Smt kashibai Navale College of engineering, Pune, Maharashtra, India, conducted during 20th February to 4th March 2024.
- In March 2024, Mrs. Manasi Karajgar, Assistant Professor in the AIDS department, published a paper titled “NOVEL LOW-POWER CMOS VLSI DESIGN USING FEDERATED LEARNINGBASED ADIABATIC SWITCHING PRINCIPLE.”
- Dr. Bhagyashree Ashok Tingare, Assistant Professor AIDS department, has Awarded with trophy for Best Event Manager of the Year 2024 by NIEM Pune.



ISSN: 2395-1680 (ONLINE)  
DOI: 10.29171/jnc.2024.6293

ICTACT JOURNAL ON MICROELECTRONICS, JANUARY 2024, VOLUME-04, ISSUE-04

### NOVEL LOW-POWER CMOS VLSI DESIGN USING FEDERATED LEARNING BASED ADIABATIC SWITCHING PRINCIPLE

J. Muralidharan<sup>1</sup>, Manasi Dnyanesh Karajgar<sup>2</sup>, N. Kanagavalli<sup>3</sup> and S. Sudha<sup>4</sup>

<sup>1</sup>Department of Electronics and Communication Engineering, KPR Institute of Engineering and Technology, India

<sup>2</sup>Department of Artificial Intelligence and Data Science, D.Y. Patil College of Engineering, India

<sup>3</sup>Department of Computer Science and Engineering, Rajalakshmi Institute of Technology, India

<sup>4</sup>Department of Electronics and Communication Engineering, Sri Rangam Institute of Engineering and Technology, India

#### Abstract

This research introduces a groundbreaking approach to low-power CMOS VLSI design by leveraging the principles of federated learning and adiabatic switching. The escalating demand for energy-efficient integrated circuits necessitates innovative methodologies to mitigate power consumption while maintaining performance. Existing VLSI designs often face challenges in achieving optimal power efficiency, resulting in a research gap that this study aims to address. Our proposed method integrates federated learning, a decentralized machine learning paradigm, with the adiabatic switching principle, which involves gradual energy transitions. By employing federated learning for optimizing power consumption at distributed nodes and implementing adiabatic switching for energy-efficient transitions between logic states, the novel VLSI design promises to revolutionize

The core problem addressed in this research is the inefficiency of current VLSI designs in meeting the growing demand for low-power consumption. The inability to strike an ideal balance between power efficiency and performance hinders the progress of semiconductor technology, necessitating a reevaluation of design methodologies.

The primary objectives of this study include formulating a novel VLSI design method that integrates federated learning and adiabatic switching principles. The aim is to achieve substantial reductions in power consumption while maintaining or even enhancing overall performance. This research seeks to provide a viable solution to the persistent challenges associated with low-power CMOS VLSI design.



### Faculty Achievements and Participation

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

**NEWS LETTER – MARCH 2024**

**Students Achievements and Participation:**

- Mr .Aniket Bhor , Ms. Samiksha Borude from SE B div, and Mr.Zunzarrao pankaj deore from TE B Div, has Participated in the DevClash Hackathon held in the DYPIT pimpri by the DevKart club, in March 2024.
- Ms. Charvi Humane from SE B div, has got appreciation certificate for “NSS winter Camp” in March 2024.



**Students Achievements and Participation Certificates**

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

## NEWS LETTER – MARCH 2024

### Students Achievements and Participation:

- Mr. Soham Nimbalkar from TE A div, Won the hackathon organized by MIT college , received 1st prize among 60+ teams for our accident detection and Alarm system project.
- Ms. Shweta Yadav From BE A div, has successfully completed Certification course “Data Analytics and Visualization Job simulation” on 14th March 2024.
- Mr. JADHAV UMESH RAJENDRA from SE A div, has successfully completed Certification course with Google education partner “JAVA PROGRAMMING ” on 3rd March 2024.
- Mr. Jayesh Aher From TE A div, has successfully completed Certification course on Tata NEUSkill “AI fundamentals ” on 21st March 2024.



### Students Achievements and Participation Certificates

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

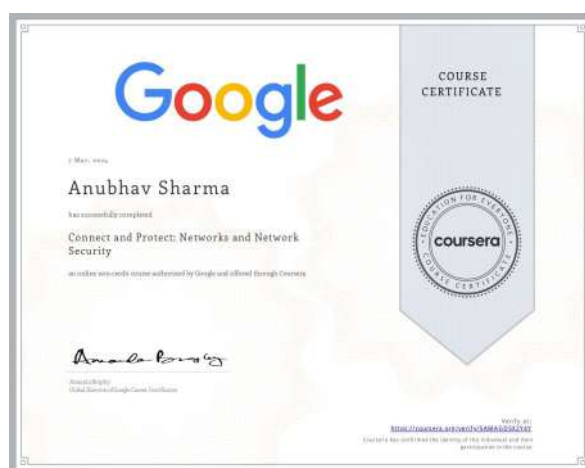
Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Students Achievements and Participation:

- Mr. Rahul Abhishek From SE A div, has successfully completed Certification course “Canva For Beginners ” on 8th March 2024.
- Ms. Vidya Kundlik Gaikwad From SE A div, has successfully completed Certification course on Infosys Springboard “IOT and Electronics Course” on 21st March 2024.
- Mr. PARTH MAGAR from SE A Div, Participated in Vishwa CTF (Cyber Security Hackathon) organized by CyberCell VIIT, Pune, on 1st to 3rd March 2024.
- Mr. Anubhav Sharma From SE B div, has successfully completed Certification course “Connect and Protect: Networks and Network Security ” on 7th March 2024.



### Students Achievements and Participation Certificates

**Name of Faculty Coordinator :**

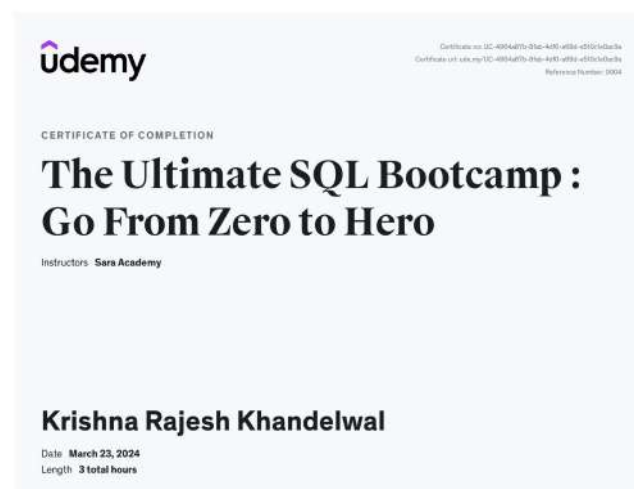
Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

## NEWS LETTER – MARCH 2024

### Students Achievements and Participation:

- Mr. Piyush Choudhari, and Mr. Aaryan Palve from SE A Div, Participated in Visionary Hackathon 2024 at Vishwakarma University along with two teammates. Achieved 4th rank in AIML category. Received certificate in March 2024. VU Techfest, Visionary Hackathon.
- Mr. Parth Dange from TE A div, achieve victory as a winner in event 'NACHANA' Dance group of dyp Dynamite, won the first prize in dance competition at bharti Vidyapeeth, organized on 14th to 16th March 2024.
- Mr. Krishna Rajesh Khandelwal From TE A div, has successfully completed Certification course "The ultimate SQL BOOTCamp" on 23rd March 2024.



### Students Achievements and Participation Certificates

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

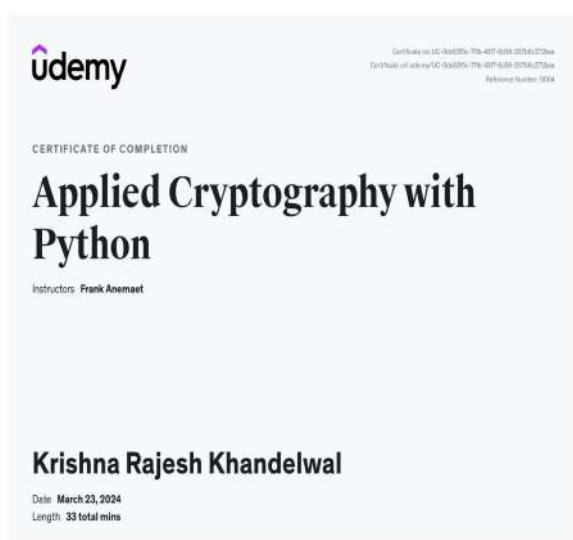
Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Students Achievements and Participation:

- Mr. Krishna Rajesh Khandelwal From TE A div, has successfully completed Certification course “The complete C & C++ programming course ” on 23rd March 2024. and “The applied cryptography with python” on 23 March 2024 and “The Digital Marketing Certified ” on 25th March 2024.
- Mr. Dhananjay Sanjay Kumbhar From SE A div, has successfully completed Certification course “Azure Fundamentals Cloud Skill Challenge ” on 23rd March 2024.



## Students Achievements Glimpses

Name of Faculty Coordinator :

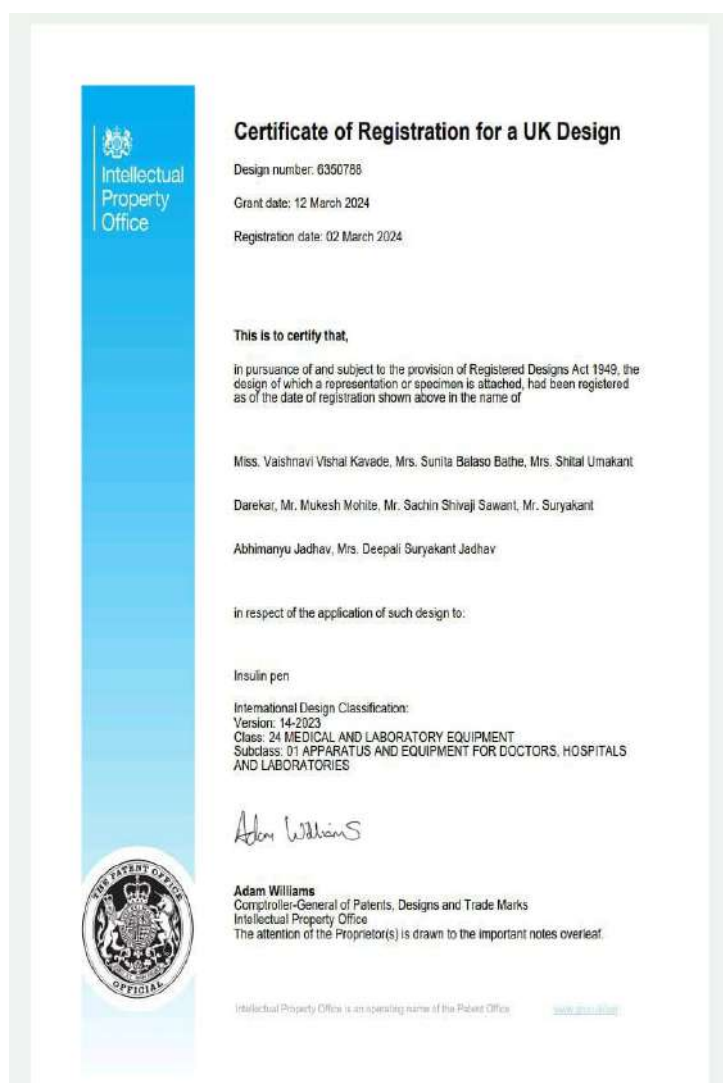
Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

**NEWS LETTER – MARCH 2024**

**Students Achievements and Participation:**

- Ms. Vaishnavi Kavade, from TE A Div, got a patent grant certificate for registration for a UK Design on 12th March 2024.
- Ms. Sonam Sanjay Patole from SE A div, has got a Certificate of appreciation “AICTE Oasis Infobyte Internship” on 20th March 2024.
- Mr. Harshwardhan Patil From T E A div, has successfully completed Certification course “Get Started with Figma” on 14th March 2024.



**Students Achievements and Participation Certificates**

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

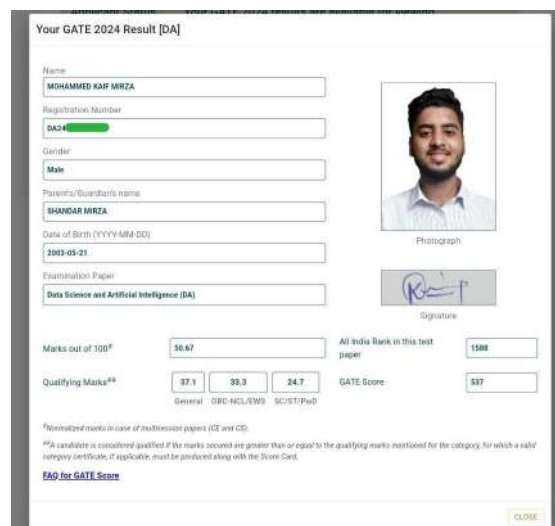
Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Students Achievements and Participation:

- Ms. Shreya Durde from BE A Div, has won the second prize at the Datathon at MITAOE among 156+ participating teams. The project focused on license plate number detection and took place on March, 2024.
- Mr. Mohammed Kaif Mirza from BE A div, has Secured All India Rank 1588 in the gate exam this year.
- Mr. Yash Bedagkar From TE A div, has successfully completed Certification course “ Hands-On Data Visualization with Microsoft Power BIs” on 20th March 2024.



## Students Achievements and Participation Certificates

Name of Faculty Coordinator :

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

**NEWS LETTER – MARCH 2024**

**Students Achievements and Participation:**

- Ms. Aditi Desai From TE A div, has successfully completed Certification course “Foundations of Cybersecurity” on 14th March 2024. “Introduction to Generative Adversarial Networks” on March 2024 and “Python\_basic” on 16th March 2024.
- Mr. Anurag Milind Kolte From TE A div, has successfully completed Certification course “Data Visualization With Power BI ” on March 2024.



Students Achievements and Participation Certificates

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

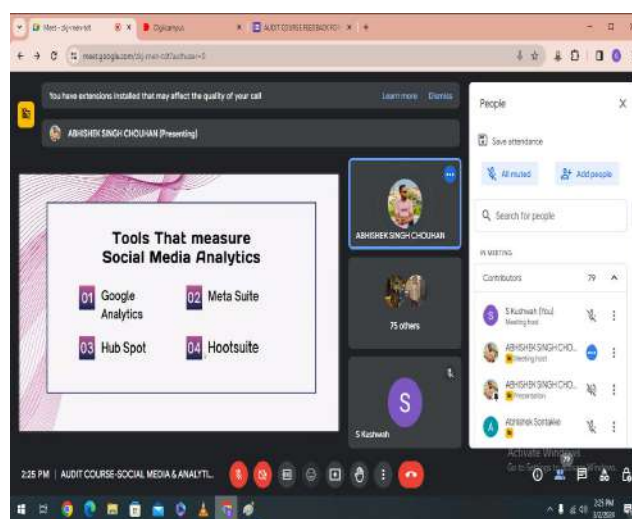
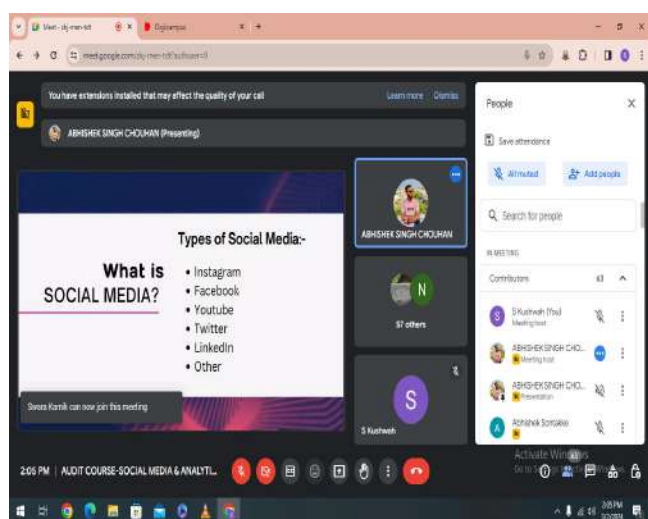
Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Department activities:

- Department of Artificial Intelligence and Data Science Engineering Organized Expert lecture on “Recent trends in AI, Job Opportunities In AI” for Third Year students on 7th March 2024. , Dr. Manish Godase , (IIT Bombay), CTO, izDOX AI Platform by BizAmica , was the speaker for the session. Mrs. Prajnali Bahalkar coordinated the session. Around 100 students attended the session.
- Department of Artificial Intelligence and Data Science Engineering Organized Expert lecture on “Audit Course - Social Media and Analytics ” for Final Year students on 2nd March 2024. Mr. Abhishek Singh Chouhan , Digital Marketing Head , was the speaker for the session. Mrs. Surabhi Kushwah coordinated the session. Around 80 students attended the session.



Some Glimpses of the session

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department

## NEWS LETTER – MARCH 2024

### Department activities:

- Department of Artificial Intelligence and Data Science Engineering Organized Expert lecture on “Streamlining Software Development Life cycle” for Second Year students on 5th March 2024. , Mr. Swapnil Khandare Business Analyst – Investment Bankin Infosys India Private Ltd., was the speaker for the session. Mr. Suhas Deokate and Mrs. Trupti G. Lonkar coordinated the session. Around 62 students attended the session.
- On occasion of Women's Day, Department of Artificial Intelligence and Data Science Engineering Organized Expert Talk for female students and staff on “Women's Health” on 7th March 2024. DR. Himanee Chaudhary was the speaker for the session. Mrs. Snehal Malpani, Mrs. Nita mahale, Mrs. Anagha Jawalkar and Mrs. Chandrakala Mishra coordinated the session. Around 52 students attend- ed the session.



Some Glimpses of the session

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department



## NEWS LETTER – MARCH 2024

### Department activities:

- Department of Artificial Intelligence and Data Science Engineering Organized Expert lecture on "Importance of Vedas and Purana in Indian culture under IKS activities" for students on 1st March 2024. Dr. Narendra Tripathi, was the speaker for the session. Mrs. Nita Mahale and Mrs. Chandrakala Mishra coordinated the session. Around 150 students attended the session.
- Department of Artificial Intelligence and Data Science Engineering Organized Historic visit at Bhandarkar museum, Shivaji Nagar Pune, for third year students, on 15th March 2024. Mrs. Nita Mahale coordinated the session. Around 80 students attended the session.



Some Glimpses of the session

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department



**NEWS LETTER – MARCH 2024**

**Department activities:**

- The Department of Artificial Intelligence and Data Science Engineering organized a Industrial Visit to CDAC PASHAN, Pune , for third year on 3rd March 2024. Mrs. Pranjali Bahalkar and Mrs. Manasi Karajgar, Mrs. Nita Mahal, Mrs. Suhas Deokate and Dr. Bhagyashree Tingare coordinated the visit. Around 80 students participated in Industrial Visit.



Some Glimpses of the Visit

**Name of Faculty Coordinator :**

Mrs. Trupti G. Lonkar

Dr Vinayak Kottawar  
Head of Department