

	Akhil Bharatiya Maratha Shikshan Parishad's Anantrao Pawar College of Engineering & Research		
	Record No.: ACA/D/021 Revision: 00	DoI: 01/02/2025	
EVENT REPORT			

Name of Event: One Week Online STTP under APCOER Civil ISTE Student Chapter on “AI and ML Approaches to Computational Modelling in Civil Engineering” in Association with ISTE and in collaboration with IGS Pune Chapter.

Date of Event: 6th October 2025 to 10th October 2025

Time of event: 35 Hrs (05 days)

Session 1: 9:15 AM TO 10:45 AM

Session 2: 11 AM TO 1 PM

Session 3: 2 PM TO 4 PM

Session 4: 4 PM TO 5:30 PM

Name of Event Coordinator: Dr. Raviraj Sorate, Prof. Amruta Chavan and Prof. Harsha Abhichandani

No. of beneficiaries: 54

Objective:

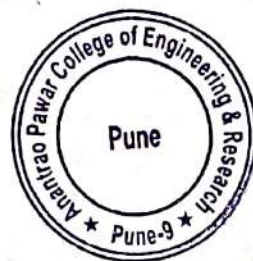
The objective of this STTP is to provide faculty members, research scholars, and industry professionals with insights into the applications of Artificial Intelligence (AI) and Machine Learning (ML) in computational modelling techniques relevant to Civil Engineering. The programme will include expert sessions, case studies, and hands-on demonstrations by eminent resource persons from reputed institutions and industries.

Outcome of the Program:

1. Participants learned the basic concepts of AI and ML and their importance in solving civil engineering problems.
2. Gained knowledge about computational modelling in structures, geotechnics, transportation, and water resources.
3. Understood how AI and ML help in predictive maintenance, smart monitoring, and better infrastructure management.
4. Explored real-life applications such as crack detection, concrete strength prediction, and design optimization.

Mapped PO/PSO: PO1, PO2, PO3, PO4, PO5, PO9, PO10, and PO12, PSO1, PSO2, and PSO3

Google Meet Link: <https://meet.google.com/bac-jswm-jnv>



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Brief About Event: (Detail Program Description)

Day 1 (6/10/2025) Description:

Session Coordinator: Prof. Neha Deshmukh

Table 1: Day 1 Schedule

Time	Module Name	Name of the Speaker and Designation
9:15 AM TO 10:45 AM	Inauguration & Optimization of concrete mix design using ML regression models	Dr. Abhay Shelar Associate Professor, Department of Civil Engineering, ABMSP's Anantrao Pawar College of Engineering and Research, Pune
11 AM TO 1 PM	Use of AI/ML in Geotechnical Engineering and Application	Dr. Raviraj R. Sorate Associate Professor & HOD, Department of Civil Engineering, ABMSP's Anantrao Pawar College of Engineering and Research, Pune
1 PM TO 2 PM	Lunch Break	
2 PM TO 4 PM	AI in Water resources and Structural Engineering	Dr. Pradnya Dixit Associate Professor Vishwakarma Institute of Information Technology, Pune
4 PM TO 5:30 PM	Mathematical Case Studies in Civil Engineering	Dr. R. M. Kenvat Assistant Professor ABMSP's Anantrao Pawar College of Engineering and Research, Pune



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The Department of Civil Engineering, ABMSP's Anantrao Pawar College of Engineering and Research, Pune, organized the Inauguration Ceremony of a *One Week Online Short Term Training Program (STTP)* on "AI and ML Approaches to Computational Modelling in Civil Engineering" under the APCOER Civil ISTE Student Chapter, in association with ISTE and in collaboration with the IGS Pune Chapter. Welcome speech was given by Prof. Harsha Abhichandani. After this description of the workshop was given by Coordinator, Dr. Raviraj Sorate. Sir explained in detail about the objectives of the workshop and outcomes.

Er. Deepali Kulkarni, Honorary Secretary, Indian Geotechnical Society, Pune Chapter, highlighted the importance of geotechnical research and emerging technologies in civil engineering. Mam emphasized the role of computational modeling, AI, and ML in improving design accuracy, project efficiency, and sustainable engineering practices.

Prof. Sayali Kokane, Institute ISTE Coordinator, encouraged students and faculty to actively participate in the STTP and leverage AI and ML tools for academic and research growth. Mam emphasized the significance of continuous learning and industry-academia collaboration for future-ready engineers.

Dr. S. M. Gawande elaborated on the objectives of the STTP, highlighting how computational modeling integrated with AI/ML can solve complex civil engineering problems. Sir encouraged participants to explore interdisciplinary approaches and innovative solutions.

Prof. Amruta Chavan delivered the vote of thanks, expressing gratitude to all dignitaries, resource persons, ISTE, IGS Pune Chapter, the Principal, Head of Department, faculty members, and participants for their support and active participation, making the inauguration a successful and motivating event.



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Day 1 (Session 1):

Session Overview:

The session began with a warm welcome to all participants, followed by an insightful presentation by Dr. Abhay Shelar sir, who spoke on the use of Machine Learning (ML) regression models in optimizing concrete mix designs. This talk marked the opening session of the workshop and set a strong foundation for the day's theme—integrating AI and ML in Civil Engineering.

Dr. Shelar sir discussed the traditional methods of concrete mix design and their limitations in achieving cost-effectiveness and precision. Sir introduced the concept of machine learning regression techniques—such as linear regression, decision tree regression, and support vector regression—as tools for improving the accuracy of mix proportion predictions.

Key Points Covered:

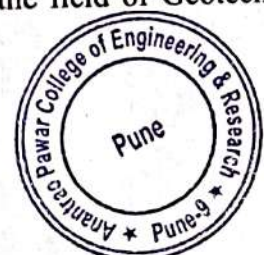
- Importance of concrete mix design in civil infrastructure projects.
- Overview of traditional vs. AI-based mix design methods.
- Introduction to ML regression models and their types.
- Data collection and preprocessing techniques for concrete mix datasets.
- Training ML models to predict compressive strength based on various mix proportions.
- Case studies and real-world applications showcasing improved performance and cost savings.
- Tools and software used in implementing ML models (e.g., Python, Scikit-learn).
- Challenges in data quality, overfitting, and model selection.

The session successfully highlighted the transformative potential of AI/ML in concrete mix optimization. It provided participants with a modern perspective on solving traditional engineering problems through data-driven methods. Dr. Shelar's expertise and clear explanation helped demystify machine learning concepts for a civil engineering audience, making the session informative and inspiring.

Day 1 (Session 2):

Session Overview:

The second technical session of the workshop was delivered by Dr. Raviraj R. Sorate sir, focusing on the emerging role of Artificial Intelligence (AI) and Machine Learning (ML) in the field of Geotechnical



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Engineering. Dr. Sorate sir began the session by explaining the traditional approaches in geotechnical investigations and their limitations due to uncertainties in soil behavior and variability in site conditions. Sir then introduced AI and ML as powerful tools for improving the accuracy, speed, and reliability of geotechnical assessments. The session emphasized how data-driven models can support decision-making in design, analysis, and construction.

Key Points Covered:

- Introduction to geotechnical engineering and common challenges in soil analysis.
- Role of AI/ML in handling complex and nonlinear geotechnical data.
- Applications of ML models in:
 - Soil classification
 - Bearing capacity prediction
 - Settlement analysis
 - Slope stability evaluation
 - Liquefaction potential assessment

The session was highly informative and well-structured, offering a comprehensive overview of AI/ML applications in geotechnical engineering. Dr. Raviraj Sorate effectively bridged the gap between theory and practice, providing participants with both conceptual understanding and practical insights. The session reinforced the importance of embracing modern computational tools to enhance geotechnical investigation and analysis in civil engineering.

Day 1 (Session 3):

Session Overview:

The session was conducted by Dr. Pradnya Dixit mam, who shared valuable insights into how AI is transforming various sectors of civil engineering. Mam discussed:

- The use of AI in predicting water demand, flood forecasting, and reservoir operation optimization.
- Applications of Machine Learning in groundwater modeling and water quality assessment.
- Structural engineering applications such as damage detection, structural health monitoring, and optimization of design parameters.



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- Real-life case studies where AI has improved efficiency, accuracy, and sustainability in engineering projects.

The session was highly interactive, with participants asking queries about software tools, datasets, and implementation challenges. The expert talk by Dr. Pradnya Dixit mam was informative and insightful. It successfully highlighted the importance of interdisciplinary learning and the role of Artificial Intelligence in shaping the future of civil engineering. The Department expressed gratitude to the resource person and all participants for making the session successful.

Day 1 (Session 4):

Session Overview:

The session was conducted by Dr. R. M. Kenvat mam, who presented several real-life case studies showing how mathematical techniques are applied in civil engineering. Topics discussed included:

- Use of differential equations and numerical methods in structural analysis.
- Application of statistical and regression models in traffic and transportation studies.
- Mathematical modeling for groundwater flow and slope stability.
- Optimization techniques in construction management and design.

Dr. Kenvat mam also highlighted the use of software tools and mathematical simulations that support civil engineers in achieving precision and sustainability in their work.

The expert talk by Dr. R. M. Kenvat mam was highly informative and engaging. It successfully demonstrated the connection between mathematics and practical civil engineering applications. The Department expressed gratitude to Dr. Kenvat for sharing his expertise and enriching the participants' technical knowledge.

At the beginning of each session, the session coordinator introduced the speaker, and at the conclusion, proposed a vote of thanks. Participant feedback was collected through Google Forms.



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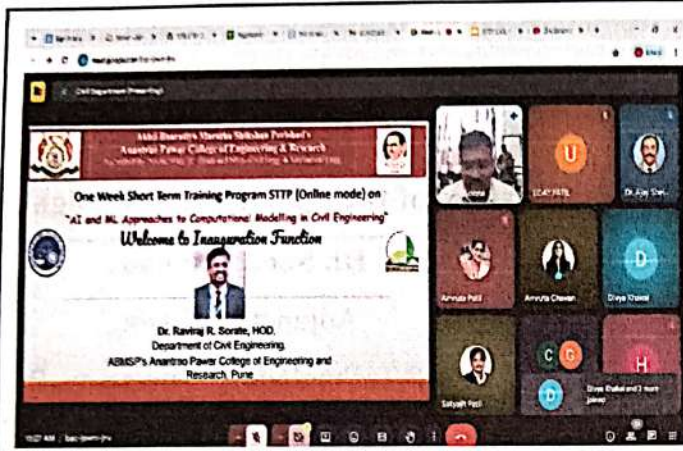
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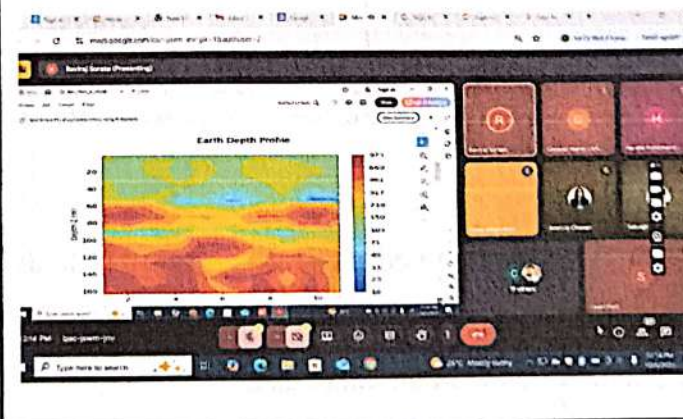
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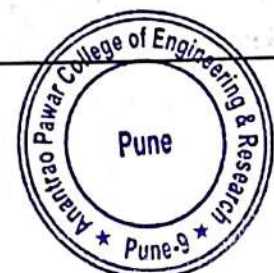


Inauguration Screenshots



Day 1 Screenshots

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Day 2 (07/10/2025) Description:

Session Coordinator: Prof.Ranjit Gaikwad

Table 2: Day 2 Schedule

Time	Module Name	Name of the Speaker and Designation
9:15 AM TO 10:45 AM	Pavement Performance & Maintenance Prediction using ML	Dr. Snehal Bobade Adjunct Professor, COEP Technological University, Pune
11 AM TO 1 PM	Smart Land and Water Management	Dr. Ajay V. Deshmukh Director, Centre for Industrial Mathematics, Bhaskaracharya Pratishthan, Pune
1 PM TO 2 PM	Lunch Break	
2 PM TO 4 PM	AI and ML approach for Predictive Maintenance of Civil Infrastructure	Dr. Mandar Mokashi Assistant Professor, Vishwakarma Institute of Information Technology, Pune
4 PM TO 5:30 PM	Mathematical Modelling of Concrete Compressive Strength using Regression and Neural Networks	Dr. R. M. Kenvat Assistant Professor, ABMSP's Anantrao Pawar College of Engineering and Research, Pune

Day 2 (Session 1):

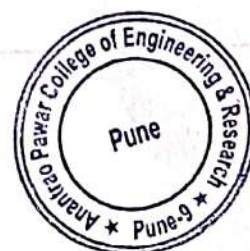
Session Overview:

The session highlighted how AI-driven predictive models can enhance the efficiency, safety, and cost-effectiveness of road infrastructure management.

Dr. Snehal Bobade mam discussed:

- Overview of pavement performance indicators such as roughness, cracking, rutting, and structural deterioration.

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- Application of ML models for predicting pavement deterioration and maintenance needs.
- Data collection, preprocessing, and model training techniques for accurate predictions.
- Case studies showing successful use of ML in transportation engineering for cost and time optimization.
- Integration of predictive models with infrastructure management systems for long-term planning.

The session included interactive discussions where participants asked questions about software tools, model selection, and implementation challenges.

Day 2 (Session 2):

Session Overview:

Dr. Ajay V. Deshmukh sir elaborated on:

- Efficient water resource management using predictive modeling and optimization techniques.
- Land use planning and monitoring with computational and GIS-based tools.
- Application of smart technologies and IoT in irrigation, watershed management, and sustainable agriculture.
- Case studies demonstrating the benefits of integrating mathematics and technology for resource conservation.

The session also included interactive discussions where participants asked questions regarding modeling techniques, data collection, and implementation challenges. The session by Dr. Ajay V. Deshmukh sir successfully highlighted the importance of combining analytical tools, technology, and innovative thinking for sustainable land and water management. It motivated participants to explore modern, data-driven approaches in civil and environmental engineering.

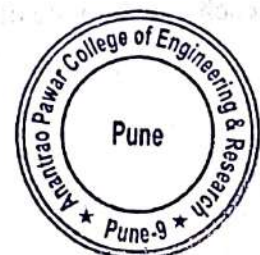
Day 2 (Session 3):

Session Overview:

Dr. Mandar Mokashi sir discussed:

- The importance of predictive maintenance in prolonging infrastructure life and ensuring safety.
- Data collection methods, including sensor data, structural health monitoring systems, and inspection reports.

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- Machine Learning models for predicting structural deterioration, failure, and maintenance schedules.
- Integration of AI/ML models with building information modeling (BIM) and infrastructure management systems.
- Case studies showing successful applications in bridges, pavements, and other civil structures.

Participants actively engaged in discussions about model selection, data challenges, and software tools used for predictive maintenance. The expert session by Dr. Mandar Mokashi sir provided valuable insights into the application of AI and ML for predictive maintenance of civil infrastructure. It motivated participants to adopt data-driven, proactive approaches to ensure structural safety, efficiency, and sustainability.

Day 2 (Session 4):

Session Overview:

Dr. R. M. Kenvat mam discussed:

- Fundamental concepts of regression models and neural networks in predictive analysis.
- Input parameters affecting concrete compressive strength, such as cement content, water-cement ratio, aggregates, and curing conditions.
- Step-by-step methodology to develop predictive models using regression and neural networks.
- Case studies showing the accuracy and reliability of AI-based prediction compared to experimental results.
- Tools and software used for computational modeling and analysis.

Participants interacted with the speaker to understand model selection, data preprocessing, and validation techniques for predictive accuracy. The expert session by Dr. R. M. Kenvat mam successfully demonstrated the application of regression and neural networks in predicting concrete compressive strength. It emphasized the importance of integrating AI/ML techniques into structural engineering for efficient, accurate, and sustainable design solutions.

At the start of each session introduction of speakers was done by the session coordinator and at the end of each session vote of thanks was proposed and feedback was collected by the session coordinator.



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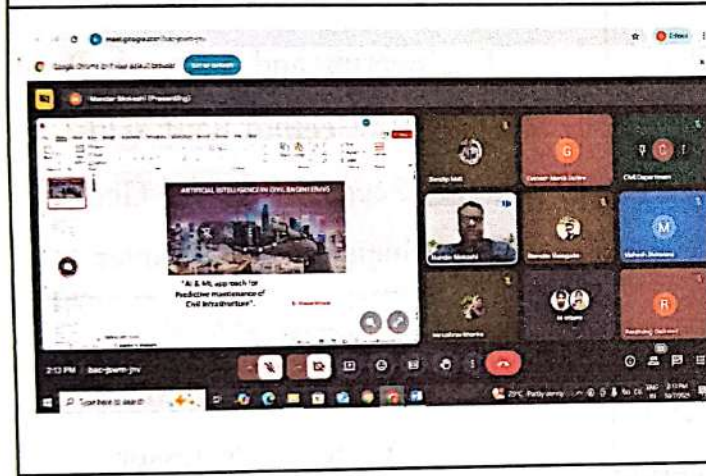
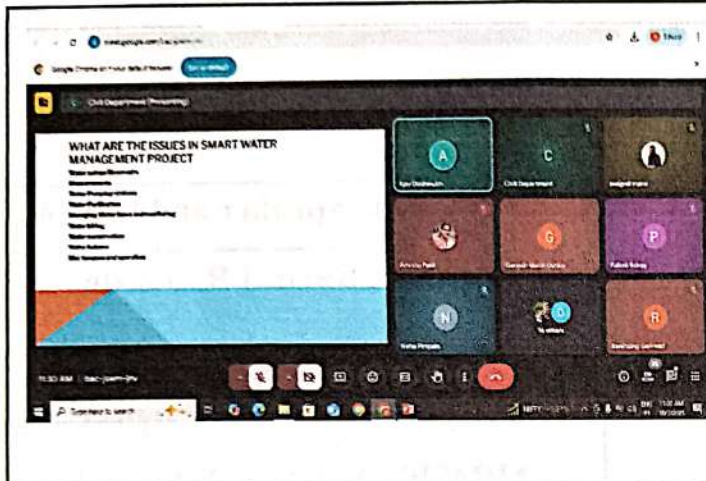
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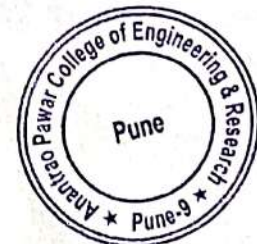
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Day 3 (08/10/2025) Description:

Session Coordinator: Dr. Krantikumar Mhetre

Table 3: Day 3 Schedule

Time	Module Name	Name of the Speaker and Designation
9:15 AM TO 10:45 AM	Prediction of Soil Bearing Capacity using ML Regression Models	Dr. Raviraj R. Sorate Associate Professor & HOD, Department of Civil Engineering, ABMSP's Anantrao Pawar College of Engineering and Research, Pune
11 AM TO 1 PM	Application of AI in Field Data Investigations	Er Deepali Kulkarni Honorary Secretary, Indian Geotechnical Society, Pune Chapter
1 PM TO 2 PM	Lunch Break	
2 PM TO 4 PM	Application of AI in Concrete and Environmental Engineering	Dr. Preeti Kulkarni Associate Professor Vishwakarma Institute of Information Technology, Pune
4 PM TO 5:30 PM	AI-Driven Risk Analysis and Delay Prediction in Construction Projects.	Dr. Sagar Gawande Assistant Professor ABMSP's Anantrao Pawar College of Engineering and Research, Pune



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Day 3 (Session 1):

Session Overview:

Dr. Sorate sir discussed the importance of accurately estimating the soil bearing capacity for safe and economical foundation design. He explained how conventional empirical and theoretical methods are often limited by variability in soil properties and testing challenges.

The session introduced participants to various machine learning regression models such as:

- Linear Regression
- Polynomial Regression
- Support Vector Regression (SVR)
- Random Forest Regression

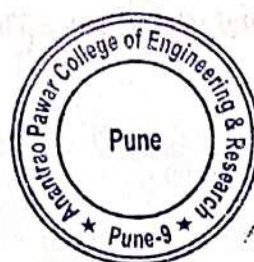
Sir emphasized the role of data preprocessing, feature selection, and model training for accurate predictions. Through examples and case studies, Dr. Sorate sir demonstrated how ML-based models outperform traditional approaches by learning complex relationships among soil parameters like density, cohesion, angle of internal friction, and moisture content. The session provided valuable insights into the integration of machine learning techniques in geotechnical engineering. Dr. Sorate sir highlighted that adopting AI-based prediction models can enhance accuracy, save time, and improve decision-making in foundation design. The session encouraged participants to explore the use of computational tools for solving real-world geotechnical problems. Faculty members gained practical understanding of how machine learning regression models can be applied to predict soil bearing capacity efficiently. The talk inspired participants to combine civil engineering principles with AI tools for innovative research and field applications.

Day 3 (Session 2):

Session Overview:

The main objective of the session was to highlight the growing role of Artificial Intelligence (AI) in analyzing and interpreting field investigation data in civil and environmental engineering. The event aimed to expose students and researchers to advanced data-driven techniques that improve the accuracy, speed, and reliability of field data interpretation.

The session focused on the following key areas:



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- Introduction to Artificial Intelligence, Machine Learning, and Deep Learning.
- AI-based tools and algorithms for geotechnical, hydrological, and environmental field data analysis.
- Use of AI in predicting soil properties, groundwater levels, and structural responses.
- Case studies demonstrating the successful application of AI in site investigation and hydrology projects.
- Challenges and ethical considerations in applying AI to engineering data.

Participants gained awareness about the importance of AI in modern field investigations.

- Participants were motivated to explore AI-based research projects and applications in civil engineering.
- The event emphasized the necessity of integrating AI and data analytics courses into the engineering curriculum.
- It fostered an understanding of how digital technologies are transforming traditional engineering practices.

Day 3 (Session 3):

Session Overview:

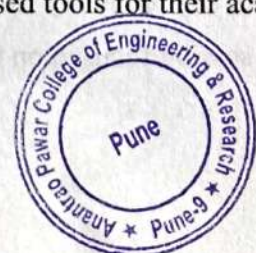
The objective of this session was to explore the emerging role of Artificial Intelligence (AI) in improving the design, analysis, and performance assessment of concrete materials and environmental systems. The event aimed to educate students and researchers about how AI-based models are transforming traditional experimental and monitoring methods in these domains.

The session included discussions on the following key topics:

- Fundamentals of Artificial Intelligence and Machine Learning.
- Use of AI for predicting concrete strength, durability, and mix design optimization.
- AI-based approaches for air water quality prediction, and pollution control.
- Application of ANN and Genetic Algorithms in modeling concrete and environmental behavior.

Participants gained a clear understanding of the applications of AI in predicting concrete behavior and environmental performance. The event encouraged participants to adopt AI-based tools for their academic

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projects and research. Participants expressed keen interest in attending future workshops with hands-on AI training.

Day 3 (Session 4):

Session Overview:

Dr. Gawande sir discussed how construction projects are inherently prone to uncertainties such as cost overruns, material shortages, labor inefficiencies, and design changes. He explained how traditional project management methods are often reactive, whereas AI and ML enable predictive and preventive decision-making.

The session covered:

- Identification of key risk factors in construction projects.
- Data collection and feature selection for delay prediction models.
- Use of AI techniques like regression, decision trees, random forest, and neural networks for analyzing project risks.
- Case studies where ML models were successfully implemented for delay prediction and schedule optimization.

Dr. Gawande sir also highlighted tools and platforms that support AI-based project management and demonstrated how predictive models help prioritize critical activities to minimize project delays. The session effectively demonstrated how AI and ML can transform traditional construction management practices by introducing intelligent forecasting and decision-support systems. Dr. Gawande sir emphasized that engineers and managers must adopt digital tools and analytics to handle complex, large-scale construction projects efficiently. The session was highly informative and encouraged participants to adopt AI-based solutions for risk and delay management in future projects.

At the start of each session introduction of speakers was done by the session coordinator and at the end of each session vote of thanks was proposed and feedback was collected by the session coordinator.



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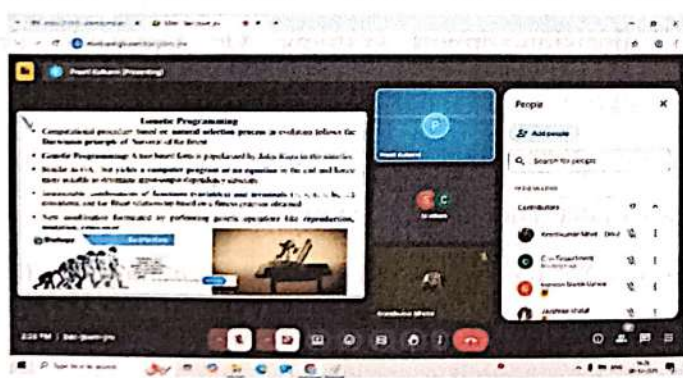
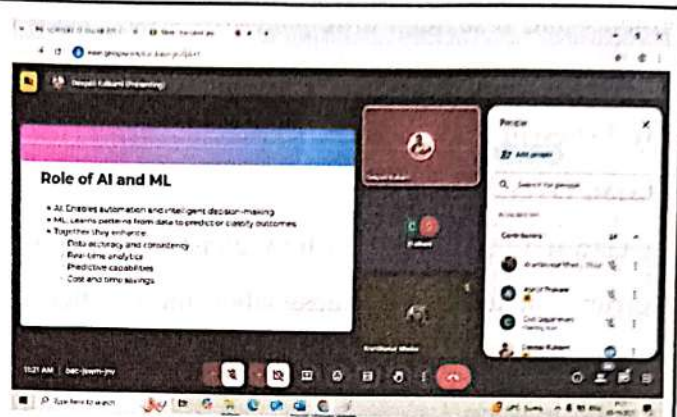
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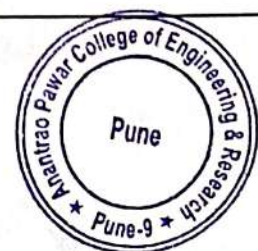
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Day 3 Screenshots

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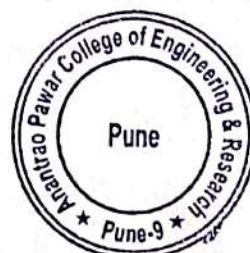
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Day 4 (09/10/2025) Description:

Session Coordinator: Prof. Rakesh Kumar

Table 4: Day 4 Schedule

Time	Module Name	Name of the Speaker and Designation
9:15 AM TO 10:45 AM	Remote Sensing & AI in Civil Engineering (Virtual visit to platforms like Google Earth Engine)	Prof. Sachin Yadav Assistant Professor ABMSP's Anantrao Pawar College of Engineering and Research, Pune
11 AM TO 1 PM	Finite Element Method	Dr. L. Shangerganesh Assistant Professor of Mathematics National Institute of Technology Goa
1 PM TO 2 PM	Lunch Break	
2 PM TO 4 PM	Eigenvalue Computation by Physics Informed Neural Networks	Dr. Kirankumar Hiremath Associate Professor, Indian Institute of Technology (IIT), Jodhpur
4 PM TO 5:30 PM	Virtual tour/online demo of how bridges, dams, or tall buildings use sensors + AI to detect cracks, vibrations, or stress.	Dr. Abhay Shelar Associate Professor, Department of Civil Engineering, ABMSP's Anantrao Pawar College of Engineering and Research, Pune



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Day 4 (Session 1):

Session Overview:

Prof. Yadav sir introduced the concepts of remote sensing, satellite imagery, and GIS-based platforms, explaining their significance in modern civil engineering. He demonstrated how AI models can process large datasets obtained from satellite imagery to predict and analyze patterns related to:

- Land use and land cover changes
- Urban growth and infrastructure planning
- Environmental monitoring and flood risk assessment
- Soil erosion and slope stability

The session included a virtual hands-on visit to Google Earth Engine, where participants observed real-world datasets and AI-based analysis techniques. Prof. Yadav emphasized how AI accelerates data interpretation, reduces manual errors, and supports decision-making in planning and monitoring infrastructure projects. The session highlighted the growing importance of combining remote sensing and AI for smarter, data-driven decision-making in civil engineering projects.

Prof. Yadav sir encouraged participants to explore geospatial tools and AI platforms to improve the efficiency, safety, and sustainability of infrastructure projects. The virtual visit provided practical exposure to real-world tools and datasets, enhancing participants' analytical skills. Fundamentals of the Finite Element Method and its mathematical foundation.

Sir Explained about:

- Step-by-step process of discretization, assembly, and solution.
- Applications of FEM in structural analysis and engineering simulations.
- Importance of boundary conditions, element selection, and model accuracy.
- Overview of software tools commonly used for FEM analysis in civil engineering.



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Day 4 (Session 2):

Session Overview:

Dr. Shangerganesh sir explained the core principles of Finite Element Method, including:

- Discretization of complex structures into smaller, simpler elements.
- Formulation of element equations and assembly into a global system.
- Application of boundary conditions and solution of the resulting system of equations.
- Use of FEM for analyzing stress, deformation, and stability in engineering structures.

The session also highlighted practical examples in civil engineering, such as beams, frames, and slabs, demonstrating how FEM provides accurate numerical solutions where analytical solutions are difficult or impossible. Participants were introduced to the workflow of FEM analysis, including preprocessing, solving, and post-processing results. The session provided a clear understanding of how the Finite Element Method is a powerful tool for solving complex civil engineering problems. Dr. Shangerganesh Sir emphasized its role in improving accuracy, efficiency, and reliability in structural analysis and design. Participants gained valuable insights into both the theory and practical implementation of FEM.

Day 4 (Session 3):

Dr. Hiremath Sir introduced the concept of Physics-Informed Neural Networks (PINNs) and demonstrated their application in computing eigenvalues, which are critical in structural dynamics, vibration analysis, and stability studies. Key points covered in the session included:

- Fundamentals of eigenvalue problems in engineering.
- Limitations of conventional numerical methods such as finite element analysis.
- How PINNs embed governing physical equations (e.g., differential equations) into the neural network's loss function.
- Training neural networks to predict eigenvalues and eigenfunctions with higher efficiency and accuracy.
- Case studies showing PINN applications in structural vibration and mechanical systems.

The session combined theory, methodology, and practical implementation examples, highlighting the advantage of AI-driven approaches in computational engineering.



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Key Learnings

- Understanding eigenvalue problems and their significance in engineering.
- Fundamentals of Physics-Informed Neural Networks and their training process.
- Application of PINNs for solving problems in structural dynamics and vibrations.
- Advantages of integrating physics knowledge with machine learning for more accurate predictions.
- Insight into future research directions combining AI and computational mechanics.

Day 4 (Session 4):

Session Overview:

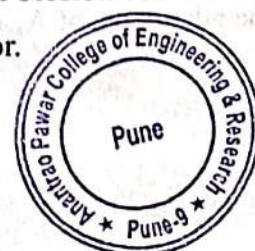
Dr. Shelar sir explained the concept of Structural Health Monitoring (SHM) and demonstrated:

- Types of sensors used: strain gauges, accelerometers, vibration sensors, fiber optic sensors, etc.
- How these sensors collect real-time data on structural performance.
- AI and machine learning algorithms that analyze sensor data to detect cracks, stress, vibrations, or potential failure points.
- Case studies showing how sensor-based AI models are implemented in bridges, dams, and tall buildings for predictive maintenance.

The session also included a virtual demonstration, showing participants how monitoring dashboards work and how AI predicts structural anomalies before visible damage occurs. The session provided valuable insights into the use of sensor technology and AI for modern infrastructure monitoring. Dr. Shelar emphasized that integrating SHM systems can significantly improve safety, longevity, and operational efficiency of civil structures. Participants were encouraged to explore AI-based monitoring tools for future research and practical implementation. Participants gained a clear understanding of how advanced sensors and AI can be applied for structural health monitoring. The session motivated students and faculty to consider smart technologies and predictive analytics for research and practical applications in civil engineering projects.

At the start of each session introduction of speakers was done by the session coordinator and at the end of each session vote of thanks was proposed by the session coordinator.

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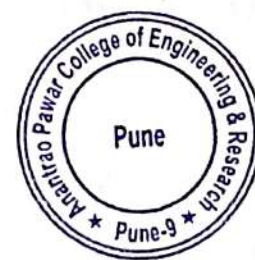
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Day 5 (09/10/2025) Description:

Session Coordinator: Prof. Harsha Abhichandani

Table 5: Day 5 Schedule

Time	Module Name	Name of the Speaker and Designation
9:15 AM TO 10:45 AM	Computational Methods in Civil Engineering	Prof. S. B. Shinde Assistant Professor ABMSP's Anantrao Pawar College of Engineering and Research, Pune
11 AM TO 1 PM	Techniques in Civil Engineering: ML-Driven Mathematical Modeling	Dr. R. M. Kenvat Assistant Professor ABMSP's Anantrao Pawar College of Engineering and Research, Pune
1 PM TO 2 PM	Lunch Break	
2 PM TO 4 PM	Use of AI/ML in Transportation Engineering and Application	Dr. Snehal Bobade Adjunct Professor, COEP Technological University, Pune
4 PM TO 5:30 PM	Valedictory Function & Assessment	



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Day 5 (Session 1):

Session Overview:

Prof. S. B. Shinde mam discussed various computational techniques and numerical methods applied in solving complex civil engineering problems. Mam elaborated on the importance of finite difference, finite element, and boundary element methods in analyzing structural and geotechnical systems. The session also highlighted how these computational tools enhance the accuracy, efficiency, and reliability of engineering analysis and design. Mam further elaborated on the use of software tools and programming approaches for implementing these methods efficiently. The integration of Artificial Intelligence (AI) and Machine Learning (ML) with computational methods was discussed in detail, showcasing how modern civil engineering analysis and design are evolving toward data-driven decision-making and predictive modelling.

Participants gained valuable insights into modern trends in computational modelling, its integration with AI and ML approaches, and its role in predictive analysis and optimization in civil engineering projects. The session was highly informative and interactive, providing a strong foundation for understanding the role of computational methods in today's data-driven engineering environment.

Day 5 (Session 2):

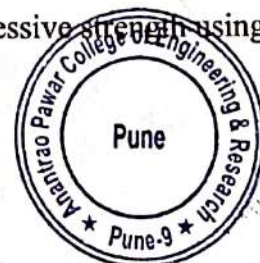
Session Overview:

Dr. Kenvat began the session by explaining the fundamental role of mathematical modelling in solving civil engineering problems and how Machine Learning (ML) techniques are revolutionizing traditional approaches to data analysis and prediction. He highlighted the importance of developing mathematical models that can capture complex relationships among parameters influencing material properties, structural behaviour, and environmental conditions.

The session focused on how ML algorithms such as Linear Regression, Decision Trees, Random Forests, and Artificial Neural Networks (ANNs) can be effectively used for predicting the performance of civil engineering materials and systems. Dr. Kenvat demonstrated how ML-based models enhance accuracy and reduce human bias compared to empirical or purely theoretical methods.

One of the key examples discussed was the prediction of concrete compressive strength using regression

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analysis and neural networks. He showed how input variables like water-cement ratio, aggregate content, and curing time can be used to train ML models that yield highly reliable predictions. The participants were introduced to Python-based tools and data preprocessing techniques, emphasizing the need for proper dataset selection and normalization for model efficiency.

Dr. Kenvat also discussed how ML-driven modelling can support optimization in structural design, pavement performance analysis, and geotechnical investigations. He underlined that the integration of AI and ML with mathematical modelling not only improves predictive performance but also provides valuable insights for decision-making, sustainability, and cost efficiency in civil engineering projects.

The session concluded with a question-answer segment, where Dr. Kenvat addressed participants' queries regarding data quality, overfitting issues, and interpretability of ML models. The interactive discussion helped attendees connect theoretical concepts with real-world engineering applications.

Day 5 (Session 3):

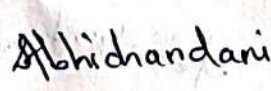
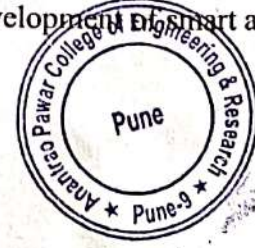
Session Overview:

Dr. Bobade mam began the session by emphasizing the vital role of Artificial Intelligence (AI) and Machine Learning (ML) in addressing challenges faced in the field of Transportation Engineering. She explained how the application of intelligent computational methods has transformed transportation planning, traffic management, and infrastructure maintenance.

The session covered the fundamentals of AI and ML techniques such as supervised learning, unsupervised learning, regression analysis, classification models, and neural networks, and their relevance to solving real-world transportation problems. Dr. Bobade discussed various applications of AI/ML, including:

- Traffic flow prediction and optimization
- Accident detection and risk assessment
- Travel time estimation and route optimization
- Pavement condition monitoring
- Intelligent Transportation Systems (ITS)

She illustrated these concepts with real-time examples and research case studies demonstrating how AI-based algorithms improve decision-making, enhance safety, and support the development of smart and

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sustainable transportation systems.

Participants were introduced to modern tools and data-driven approaches used for analyzing large datasets collected from GPS, sensors, and IoT-based systems. Dr. Bobade also discussed the challenges related to data quality, model interpretability, and implementation in urban transport networks.

The interactive session concluded with a lively discussion where participants clarified their doubts regarding model development, validation techniques, and future opportunities in AI-integrated transport systems.

Overall, the session was highly engaging, technically rich, and future-oriented, providing valuable insights into the use of AI and ML technologies in transportation engineering applications. The participants gained a deeper understanding of how emerging computational techniques contribute to building efficient, safe, and sustainable transportation networks.

Day 5 (Session 4):

Session Overview:

The Valedictory Function and Assessment Session of the One Week Online Short Term Training Program (STTP) on “AI and ML Approaches to Computational Modelling in Civil Engineering” was successfully conducted by the Department of Civil Engineering, ABMSP’s Anantrao Pawar College of Engineering and Research (APCOER), Pune, in association with ISTE and IGS Pune Chapter.

The session marked the successful completion of a week-long series of expert lectures, technical discussions, and interactive sessions aimed at exploring the integration of Artificial Intelligence (AI) and Machine Learning (ML) in various domains of Civil Engineering such as structural analysis, transportation, geotechnical, and water resources engineering.

The Valedictory Function commenced with a warm welcome address by the event coordinator Prof. H. J. Abhichandani, who summarized the objectives and outcomes of the STTP. A comprehensive overview of the sessions conducted throughout the week was presented, highlighting the valuable contributions of all expert speakers from reputed institutions.

The function was graced by the presence of Dr. R. R. Sorate, Head, Department of Civil Engineering, and other faculty members who appreciated the enthusiastic participation of faculty, researchers, and students from various engineering institutions across India.

H. J. Abhichandani





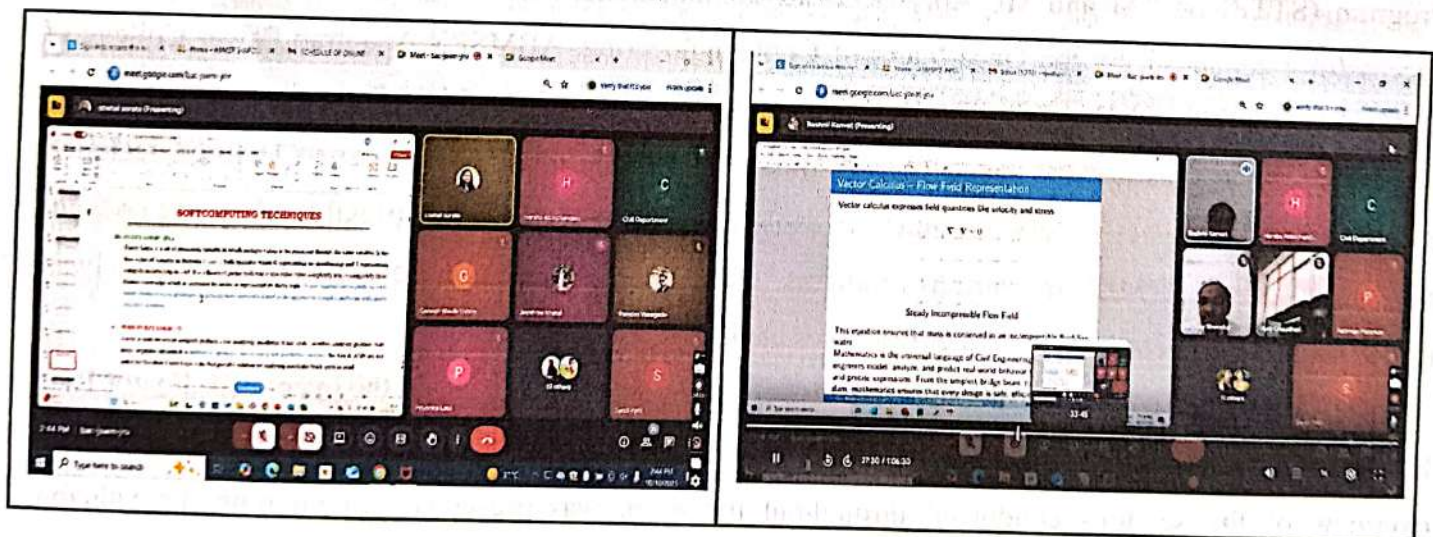
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During the Assessment Session, participants were evaluated based on their attendance, engagement, and performance in the final assessment test (Quiz) designed to measure their understanding of key concepts related to AI and ML applications in civil engineering. Certificates of participation were awarded to all participants who successfully completed the program requirements.

Feedback collected from the participants reflected a highly positive response, with many appreciating the relevance of the topics, the quality of expert lectures, and the overall organization of the STTP. They expressed gratitude towards the institute and coordinators for providing a valuable learning platform that bridged the gap between computational technologies and civil engineering practices.

The Valedictory Function concluded with a vote of thanks delivered by the coordinator Prof. H. J. Abhichandani, acknowledging the support of the management, principal, head of department, expert speakers, technical team, and participants for their cooperation and contribution to making the program a grand success.

At the beginning of each session, the session coordinator introduced the speaker, and at the conclusion, proposed a vote of thanks. Participant feedback was collected through Google Forms.



Abhichandani



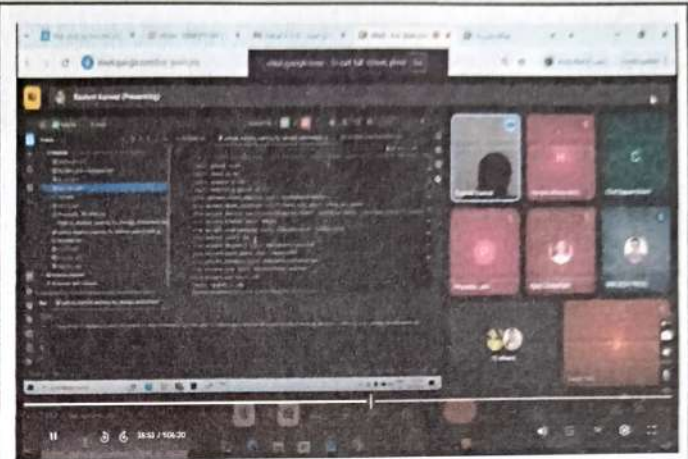
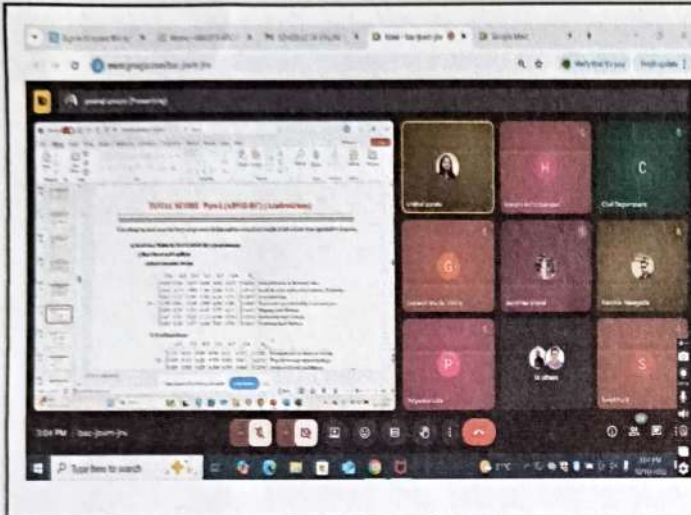
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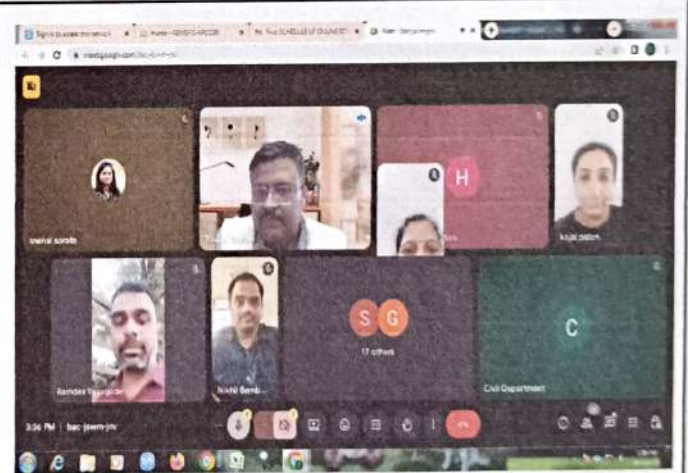
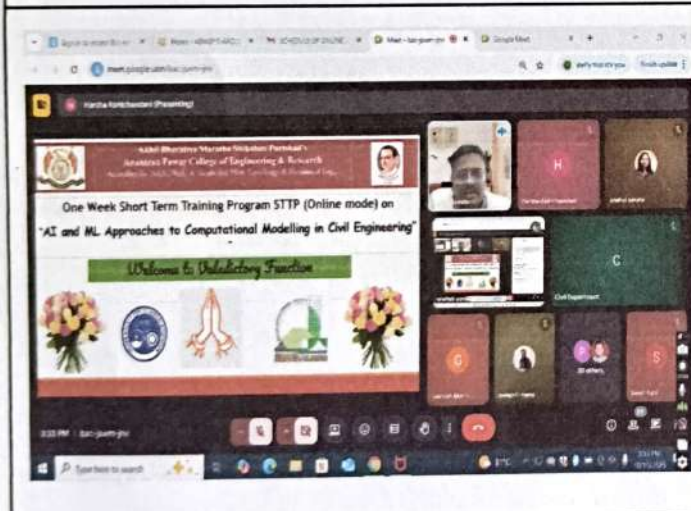
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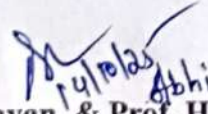


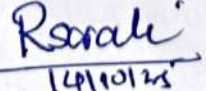
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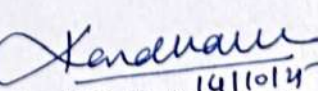


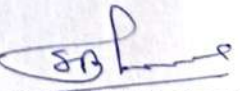
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Date: 14/10/2025


Prof. A. A. Chavan & Prof. H. J. Abhichandani
Co-coordinator


Dr. R. R. Sorate
Coordinator &
HOD, Civil


Prof. G. E. Kondhalkar
IQAC Head


Dr. S. B. Thakare
Principal
14-10-25

