S. S. V. S. S's

Dr. Bapuji Salunkhe Institute of Engineering & Technology, Kolhapur.

CONCRETE TIMES
VOLUME: 4

CIVIL ENGINEERING DEPERTMENT

2024-2025

Message From the Magazine Team

It gives us immense pleasure to present **Concrete Times – Volume 4** to all our readers. This magazine is not just a collection of articles, but a reflection of the creativity, knowledge, and dedication of our students and faculty members.

Civil Engineering is a field where imagination meets practicality. Every structure begins as an idea, grows through planning, and finally stands as a contribution to society. Through this edition, we have tried to capture that spirit — the learning, the experiences, the innovations, and the achievements of our department.

This magazine provides a platform for students to express their technical understanding, share innovative ideas, showcase talents beyond academics, and develop confidence in communication and presentation. We believe learning is not limited to classrooms; it grows through participation, curiosity, teamwork, and creativity — and this publication stands as proof of that journey.

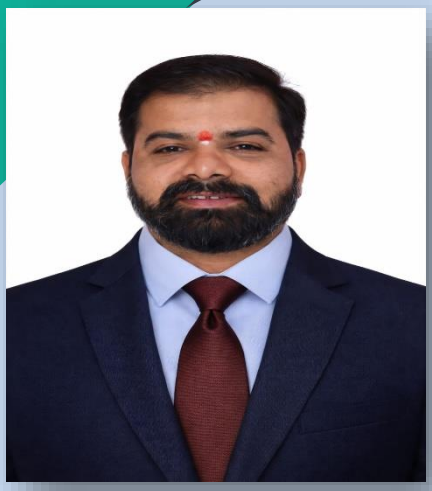
We sincerely thank our Honorable Management, Director, Principal, Head of Department, and all faculty members for their continuous encouragement and guidance. Their support motivated us to put our ideas into words and transform them into this magazine.

We also appreciate every student who contributed articles, technical papers, artwork, and photographs. Your enthusiasm and effort have made this edition meaningful and memorable.

We hope this volume inspires readers to think, create, and build a better future because every great structure begins with a strong foundation, and every strong foundation begins with knowledge.

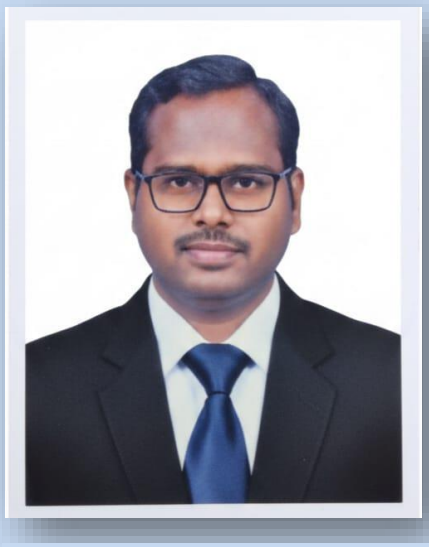
Happy Reading!

– Magazine Team



Mr. Hemant V. Kumbhar
Editing Team

Mr. Macchindranath N. Kumbhar
Editing Team



Mr. Yogesh N. Mane
Editing Team

Mr. Atharv S. Shingare
Editing & Designing Team

Mr. Prince S. Singh
Editing & Designing Team

CONTENTS

DISCLAIMER

The information, views, and opinions expressed in this magazine are solely those of the respective authors and contributors and do not necessarily reflect the official policy or position of the Institute, Department, or Editorial Team.

All efforts have been made to ensure the accuracy and reliability of the content published. However, the Editorial Team shall not be held responsible for any errors, omissions, or consequences arising from the use of the information contained in this magazine.

The magazine is intended for educational and informational purposes only. Any resemblance to real persons, organizations, or events is purely coincidental unless explicitly stated.

Editorial Team

Concrete Times – Volume 4

Our Contact Details
Address:- 2130, E, Tarabai Park, Kolhapur – 416003, MH, India
Phone:- 0231-2658613
E-Mail:- civil@bsiet.com

BSIET

Mr. R. K. Patil
Head of Civil Department

MESSAGE

I am delighted to share a few words for ***Concrete Times – Volume 4***, which represents the enthusiasm, innovation, and technical capabilities of our Civil Engineering students. The department always focuses on blending theoretical knowledge with practical application so that students become competent & responsible engineers ready to face real-world challenges.

We regularly organize industrial visits, expert lectures, technical workshops, surveying practices, material testing demonstrations, and project-based learning activities to enhance students' understanding beyond textbooks. Such exposure develops analytical thinking, teamwork, leadership qualities, and professional ethics among learners.

Our well-equipped laboratories, dedicated faculty members, and strong interaction with industry experts help students gain confidence and practical skills. We strongly encourage participation in seminars, paper presentations, model competitions, and social awareness activities related to sustainable construction and environmental protection.

This magazine serves as a platform for students to present their ideas, technical articles, achievements, and creative talents. I congratulate the Magazine Committee and all contributors for their sincere efforts in publishing this edition.

May this publication inspire students to continue learning, innovating, and contributing towards safe and sustainable infrastructure development.

Head of Civil Engineering Department
Mr. R. K. Patil

Department Faculty

Mr. Rhituraj K Patil
Qualification: BE Civil, MBA, MTech App
Designation: HOD
Research Interests: **Construction Management** involves planning, scheduling, and controlling construction projects to complete them within time, cost, and quality limits. It includes estimation, tendering, resource management, and coordination between engineers, contractors, and clients. Proper management ensures safety, reduces delays, and improves efficiency of infrastructure projects.

Mr. Appaso B Sonalkar
Qualification: B.E (Civil)
Designation: Lecturer
Research Interests: A **Surveyor** measures distances, angles, and elevations to determine exact land positions before and during construction. Using instruments like level, theodolite, and total station, surveyors prepare layouts and ensure proper alignment of structures. Accurate surveying helps in safe and correct execution of civil engineering projects.

Mrs. Supriya P Mengane
Qualification: M.Tech.(Structures) App, B.E (Civil)
Designation: Lecturer
Research Interests: **Structures & Estimation**
Structural Engineering deals with the analysis and design of buildings and other structures to ensure strength, stability, and safety against loads such as dead load, live load, wind, and earthquake forces. Estimation involves calculating quantities and cost of materials, labor, and equipment required for construction. Together, they help in safe design and economical execution of civil engineering projects.

Mr. Mahesh T Tirale
Qualification: B.E (Civil)
Designation: Lecturer
Research Interests: **Structures & Hydraulics**
Structural Engineering focuses on designing safe and stable structures capable of resisting loads like dead load, live load, wind, and earthquakes. Hydraulics deals with the behavior and movement of water in pipes, channels, and hydraulic structures such as dams and canals. Together, they ensure safe construction and efficient water management in civil engineering projects.

Department Faculty

Mr. Hemant V Kumbhar
Qualification: DCE, BE Civil, ME App
Designation: Lecturer
Research Interests: **Construction Management** is the coordination of planning, resources, manpower, and activities at a construction site to achieve timely and quality completion of work. It involves scheduling, site supervision, cost control, safety management, and proper communication among all stakeholders to ensure smooth project execution.

Mr. Yogesh N Mane
Qualification: DCE, BE Civil, ME App
Designation: Lecturer
Research Interests: **Geotechnical Engineering**
Geotechnical Engineering deals with the study of soil and its behavior to design safe and stable foundations for structures. It includes soil testing, bearing capacity analysis, settlement calculation, and slope stability to ensure buildings, roads, and dams are constructed on strong and suitable ground.

Mr. Macchindranath N Kumbhar
Qualification: DCE, BE Civil, ME App
Designation: Lecturer
Research Interests: **Structures & Hydraulics**
Structural Engineering ensures buildings and infrastructure remain strong and durable under various loads and environmental effects. Hydraulics studies the flow and pressure of water in pipelines and open channels, helping in the design of water supply systems, drainage networks, canals, and hydraulic structures for efficient water distribution and control.

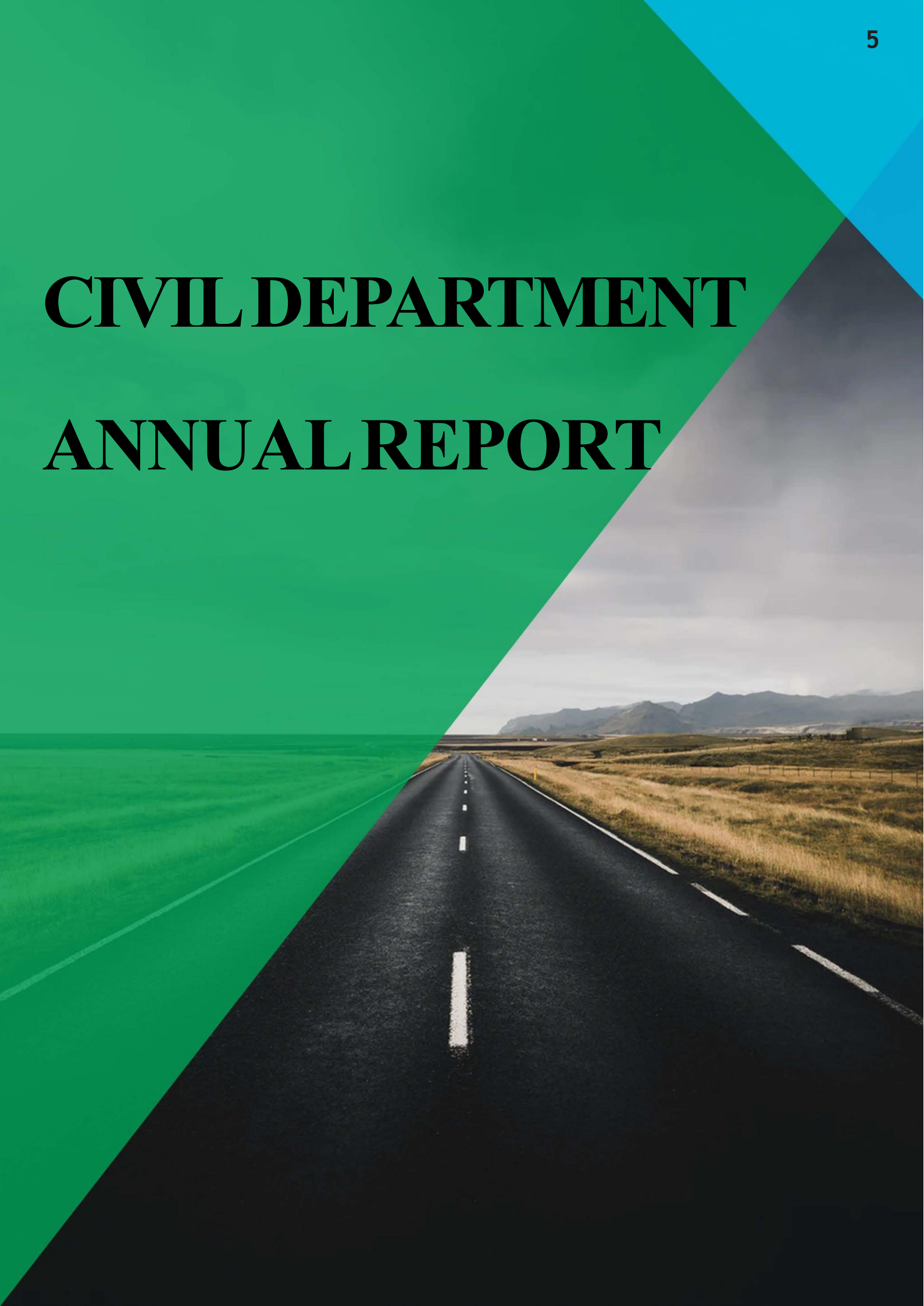
Department Non-Teaching Staff

Mrs. Manisha R Patil
Qualification: Diploma (Civil)
Designation: Lab Assistant

Mr. Sahil A Mulla
Qualification: B.E Civil
Designation: Lab Assistant

Mr. Dayanand D Taral
Qualification: HSC
Designation: Poen

CIVIL DEPARTMENT ANNUAL REPORT



Introduction

The Department of Civil Engineering of BSIET, Kolhapur, is one of the prominent and actively growing departments of the institute. Over the years, the department has developed a strong academic environment and is committed to providing quality technical education in the field of infrastructure development and sustainable engineering practices.

With a team of experienced and dedicated faculty members, the department maintains close interaction with construction industries, consultancy firms, and technical experts. Along with effective classroom teaching, emphasis is given to practical exposure through laboratories, site visits, expert lectures, workshops, and project-based learning.

The department is equipped with well-established laboratories and provides technical guidance, testing, and consultancy services in various areas of Civil Engineering. Students are encouraged to participate in research activities, seminars, technical competitions, and professional skill development programs.

Through continuous academic improvement and industry collaboration, the department strives to produce competent engineers with strong technical knowledge, professional ethics, and problem-solving abilities to serve society and the nation.

Academic Programs

The Department of Civil Engineering offers a Diploma Engineering program affiliated to MSBTE, Mumbai. The program is designed to develop strong fundamental knowledge and practical skills required for planning, design, construction, and maintenance of infrastructure projects.

The curriculum covers major areas such as Surveying, Building Construction, Structural Engineering, Geotechnical Engineering, Hydraulics, Environmental Engineering, Transportation Engineering, Estimation & Costing, and Construction Management. Emphasis is given to laboratory experiments, field work, and project-based learning to enhance practical understanding.

Students are also encouraged to participate in industrial training, site visits, expert lectures, and technical workshops to gain real-world exposure. The program prepares students for employment in construction industries, consultancy firms, government departments, as well as higher education and entrepreneurship opportunities.

Projects Undertaken by Department

During the academic year 2024–2025, the students of the Civil Engineering Department carried out various innovative and application-oriented projects addressing real world engineering and environmental challenges. The projects covered diverse areas such as flood control and management of the Panchaganga River in Kolhapur district, watershed management, green building concepts, zero energy building for the institute campus, and highway safety measures for NH-4. Several sustainable solutions were also explored including use of recycled plastic in road construction, recycling of construction waste, and application of solar grid systems in existing buildings.
Students also worked on advanced and modern engineering topics like application of graphene in water purification, use of AI in superstructure planning, landslide control using GI mesh and concrete spray, and learning-based manual design of G+1 RCC framed structures. These projects enhanced practical knowledge, research aptitude, and problem-solving skills among students while encouraging sustainable and technology-driven approaches in civil engineering practices.

Extension Activities

The Department shares practical and technical knowledge through expert lectures, training sessions, and workshops conducted for students and field practitioners. Regular interaction with industry professionals and engineers helps students understand modern construction practices and emerging technologies.

During the academic year, the department organized various awareness programs, technical guidance activities, and community-oriented initiatives for students and the local community. These activities helped in spreading engineering knowledge, improving practical skills, and strengthening the connection between institute and society.

Visitors to the Department

The Department regularly invites experienced academicians, industry experts, and professional engineers to interact with students and faculty members. Through expert lectures and technical sessions, the visitors share their valuable knowledge, practical experience, and recent developments in the field of Civil Engineering.
During the academic year, several professionals from construction industries, consultancy firms, and technical organizations visited the department and guided students on career opportunities, modern construction techniques, and industry expectations, thereby enriching the teaching–learning process.

Research Publications

The Department of Civil Engineering has demonstrated active research involvement by faculty and students through quality publications in reputed peer-reviewed international journals during the academic year. A total of **eight research papers** were published covering emerging and practical areas of civil engineering such as structural design, geotechnical engineering, environmental engineering, transportation, water resources and sustainable construction technologies.

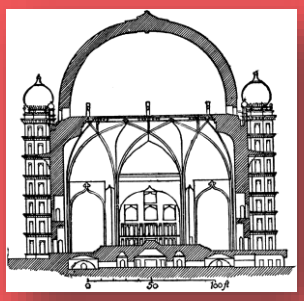
The published works include topics like **manual design of G+1 RCC framed structures**, **landslide control using GI mesh and shotcrete**, **application of Artificial Intelligence in civil engineering**, **recycling of construction waste**, **plastic roads technology**, **graphene-based water purification**, **flood control and management systems**, and **solar grid systems for existing buildings**. These studies focus on modern engineering challenges such as disaster mitigation, smart infrastructure, renewable energy, sustainability, and eco-friendly construction materials.

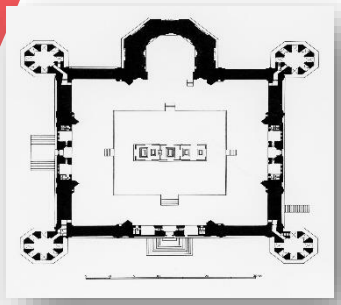
The publications highlight the department's commitment to bridging theoretical knowledge with real-world engineering applications while encouraging students to engage in research activities at an early stage. Such contributions enhance technical competence, innovation skills, and awareness of sustainable engineering practices among budding civil engineers.

TECHNICAL ARTICLES

Technical Information about the Gol ghumat

Mr. M. N. Kumbhar (Faculty)





Golghumat (popularly known as Gol Gumbaz) is one of the greatest examples of medieval Indo-Islamic architecture in India and is famous for having the second-largest unsupported dome in the world. It was constructed in 1656 AD as the mausoleum of Sultan Mohammed Adil Shah of the Adil Shahi dynasty at Vijayapura, Karnataka. The structure is built mainly using dark grey basalt stone and lime mortar plaster, which provides high compressive strength and durability. The building stands on a massive square base and is designed symmetrically in all directions, showing remarkable engineering knowledge of load distribution long before modern RCC technology.

Architecturally, the monument consists of a huge square hall covered by a gigantic hemispherical dome resting on pendentives without any internal pillars. Each corner of the structure contains a seven-storeyed octagonal tower connected by staircases leading to the famous Whispering Gallery, where even a small sound travels clearly across the diameter due to multiple sound reflections. The dome weight is transferred to thick load-bearing masonry walls nearly 3 m thick, which act as retaining and supporting structural members. The construction uses interlocking stone masonry and lime concrete that behaves similarly to modern mass concrete in compression.

Important Architectural Dimensions

- Plan shape: Perfect square
- Length × Breadth: ≈ 47.5 m × 47.5 m
- Total height of building: ≈ 60 m
- Diameter of dome: ≈ 44 m
- Height of internal hall: ≈ 51 m
- Thickness of walls: ≈ 3 m
- Height of corner towers: ≈ 68 m (approx.)
- Whispering gallery height from floor: ≈ 33 m
- Dome type: Unsupported double-shell hemispherical dome

Structural Significance

The dome rests on a system of pendentives and massive arches, transferring load uniformly to the four corners. The structure demonstrates early knowledge of:

- Load distribution in compression members
- Acoustic engineering (echo & whispering gallery effect)
- Thermal comfort through thick masonry
- Earthquake resistance due to heavy base and low slenderness ratio

Thus, Golghumat is not only a historical monument but also a remarkable example of ancient civil engineering design, acoustics, and structural stability achieved without modern reinforcement technology.

****

Technical Information about Soil Property Map

Mr. A. S. Shingare (SY Civil)

The development of a **Soil Property Map** is an essential activity in geotechnical and infrastructure planning, especially for urban development, highways, irrigation works, and building construction. Every civil engineering structure ultimately transfers its load to the ground; therefore, understanding the variation of soil characteristics over an area is necessary before any design is finalized. A soil property map provides a graphical representation of different engineering properties of soil at various locations and depths within a region. It helps engineers predict soil behavior, select suitable foundations, and reduce the chances of settlement, cracking, or structural failure.

The preparation of a soil property map begins with a detailed **site investigation program**. The study area is divided into grids (for example 50 m × 50 m or 100 m × 100 m depending on project size), and soil samples are collected from each grid point using boreholes, auger boring, or trial pits. The depth of sampling generally depends on the expected foundation depth and type of structure. During fieldwork, important observations such as groundwater table level, color of soil, consistency, and stratification are recorded carefully. Each sample location is marked using GPS coordinates so that the results can later be plotted accurately on a base map.

After collection, soil samples are tested in the laboratory to determine engineering properties. The important tests include **grain size analysis**, **Atterberg limits**, **natural moisture content**, **specific gravity**, **compaction test**, **shear strength test**, and **consolidation test**. From these tests, parameters such as plasticity index, cohesion, angle of internal friction, permeability, and compressibility are obtained. Using standard empirical relations and plate load test results, the **safe bearing capacity (SBC)** of soil at each location is calculated. These parameters are very important because they directly affect foundation design, settlement behavior, and slope stability.

Once laboratory results are obtained, the data is transferred to a computer-based mapping environment such as **GIS (Geographical Information System)** or CAD software. Each test location is plotted using its coordinates and the measured property values are assigned to that point. Interpolation techniques like **Inverse Distance Weighting (IDW)** or **Kriging method** are used to estimate values between sampled points. Using this process, engineers prepare different thematic maps such as:

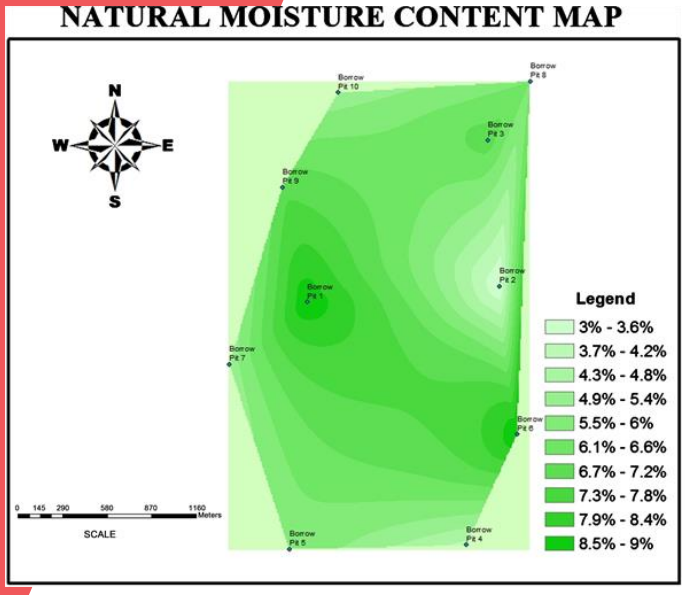
- Soil classification map (clay, silt, sand, gravel)
- Safe bearing capacity map
- Settlement potential map
- Permeability or drainage map
- Expansive soil distribution map
- Liquefaction susceptibility map

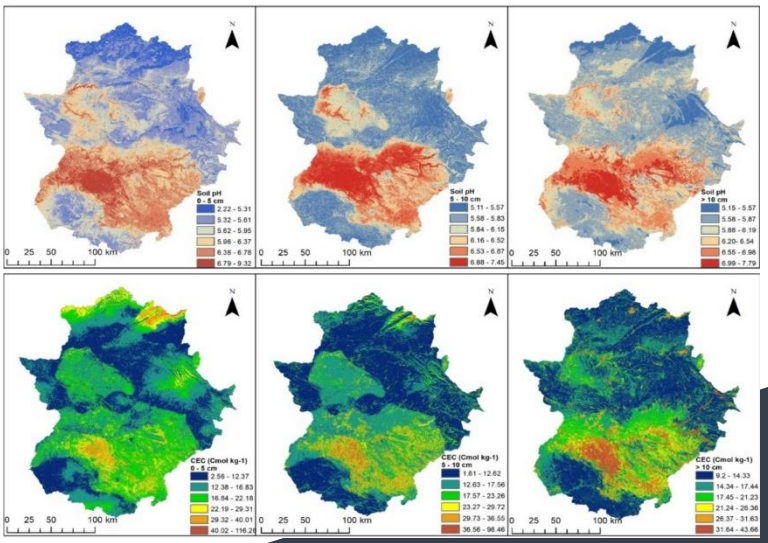
Contours or color zones are used to represent variations in soil behavior. For example, red zones may indicate low bearing capacity requiring pile foundation, while green zones may indicate good soil suitable for shallow footings. This visual representation makes it easy for planners and designers to understand ground conditions quickly without reading lengthy reports.

The soil property map plays a major role in **architectural and structural planning**. Before preparing building layouts, architects can identify suitable construction zones, parking areas, water tanks, and basements. Structural engineers use the map to decide foundation type such as isolated footing, raft foundation, or pile foundation. Highway engineers can determine pavement thickness based on subgrade strength, and irrigation engineers can plan canal alignment considering seepage characteristics. Thus, the map integrates geotechnical data with practical engineering decisions.

In addition, soil mapping helps in disaster mitigation and sustainable development. Areas with expansive soil or landslide-prone slopes can be identified in advance and avoided or treated using stabilization techniques. This reduces maintenance cost and increases the life of infrastructure. It also prevents over-design because engineers provide foundation dimensions based on actual soil strength rather than assumptions, leading to economical construction.

In conclusion, the development of a soil property map is a scientific and systematic process combining field investigation, laboratory testing, and digital mapping techniques. It serves as a decision-making tool for planners, architects, and engineers, ensuring safety, economy, and durability of civil engineering structures. Proper soil mapping not only improves construction quality but also supports sustainable and risk-free infrastructure development for future generations.





****

Technical Information about Estimation, Costing & Valuation

Mr. Y. N. Mane (Faculty)

In any construction project, proper financial planning is as important as structural safety. Estimation, costing and valuation form the backbone of project management in civil engineering. These processes help engineers decide whether a project is feasible, economical and sustainable before actual construction begins.

Estimation is the process of calculating the approximate quantities of materials and labour required for a structure using architectural drawings such as plan, elevation and section. From these drawings, quantities of earthwork, concrete, brick masonry, plastering, flooring and steel reinforcement are determined using standard methods like the *Centre Line Method* and *Long Wall – Short Wall Method*. A correct estimate avoids shortage or wastage of materials and ensures smooth execution of work.

After quantities are calculated, the next step is **Costing**. In costing, material quantities are multiplied by current market rates and labour charges to obtain the total project cost. It includes direct costs (cement, sand, steel, bricks, labour, equipment) and indirect costs (water charges, supervision, contractor profit and contingencies). Engineers also prepare **rate analysis**, which determines the cost per unit item such as per cubic meter of concrete or per square meter of plaster. Costing helps in selecting economical alternatives and maintaining the project within budget.

Once a building is constructed or when a property transaction is required, **Valuation** is performed to determine its present market value. Valuation is necessary for bank loans, taxation, insurance, rent fixation and property sale. It depends on several factors such as location, age of building, depreciation, type of construction, amenities and land value. Common valuation methods include the cost method, rental method, depreciation method and comparative market method.

Typical architectural dimensions considered in estimation for a residential building include foundation depth of about 1.0–1.5 m, plinth height around 0.45–0.60 m, wall thickness 230 mm for external walls, floor height about 3.0 m, slab thickness 120–150 mm and parapet height around 1.0 m. These standard dimensions help engineers calculate accurate quantities and prepare reliable estimates.

Thus, estimation, costing and valuation together ensure that a project is technically sound and financially practical. They help engineers control expenses, avoid disputes, and deliver safe and economical construction projects.

****

Value Engineering Framework for Residential Cost Optimization

Mr. Y. N. Mane (Faculty)

- **Introduction**

The construction industry plays a vital role in economic development, but it frequently faces problems such as cost overruns, time delays, inefficient use of resources, and quality-related issues. Residential construction projects, in particular, are highly sensitive to cost variations due to fluctuating material prices, labor shortages, and design changes during execution. Traditional construction methods often focus only on initial cost reduction, which may lead to compromised quality and increased maintenance costs in the long run.

Value Engineering (VE) is a systematic and function-oriented approach that aims to achieve the required functions of a project at the minimum life-cycle cost without sacrificing quality, safety, reliability, and performance. It is not merely a cost-cutting technique but a value-improvement process that balances cost, function, and quality. VE identifies unnecessary costs arising from inefficient designs, improper material selection, and outdated construction practices. Hence, the application of Value Engineering in residential buildings can significantly improve cost efficiency and overall project performance.

2. Concept and Importance of Value Engineering

Value Engineering focuses on analyzing the basic and secondary functions of a project component and finding alternative solutions that provide the same or better performance at a lower cost. The value of a project can be expressed as:

Value = Function / Cost

The importance of Value Engineering in construction includes reduction in production cost, optimization of resources, improvement in quality and reliability, reduction in project duration, and better decision-making. VE also enhances coordination among stakeholders and promotes innovative thinking. It helps in extending financial, material, and manpower resources and reduces life-cycle costs rather than only initial costs.

3. Literature Review Summary

Several studies have highlighted the effectiveness of Value Engineering in construction projects. Previous research shows that VE can be applied at any stage of a project, but maximum benefits are achieved when implemented during the early design and planning stages. Researchers have demonstrated that VE helps in eliminating unnecessary costs while maintaining functionality and quality. Case studies conducted on residential and high-rise buildings reveal that VE improves cost efficiency, construction time, and material utilization. However, many studies also report low adoption of VE in developing countries like India due to lack of awareness, resistance to change, and absence of standardized procedures.

4. Methodology of Value Engineering

This study adopts a five-phase Value Engineering methodology:

- **Information Phase:** Collection of project data, drawings, cost estimates, and identification of high-cost elements.
- **Function and Creative Phase:** Functional analysis of building components and generation of alternative ideas and materials.
- **Evaluation Phase:** Screening and ranking of alternatives based on cost, feasibility, and performance.
- **Development Phase:** Detailed analysis of selected alternatives including life-cycle cost and technical evaluation.
- **Recommendation Phase:** Final selection of value-engineered alternatives and preparation of recommendations for implementation.

A case study approach is used to apply VE techniques to a residential building project.

5. Application of Value Engineering (Case Study Summary)

In the case study, several value-engineered alternatives were proposed and analyzed. Conventional brick masonry was replaced with solid concrete blocks, ordinary cement plaster was replaced with gypsum plaster, acrylic wall putty was replaced with colour putty, ceramic tiles were replaced with marble flooring, and cement mortar adhesion was replaced with tile adhesive. These alternatives were selected based on cost savings, durability, ease of construction, and quality performance.

The application of these alternatives resulted in significant reduction in construction cost, improvement in construction speed, and better finishing quality.

6. Challenges in Implementing Value Engineering

Despite its advantages, the implementation of Value Engineering faces several challenges. Major barriers include lack of time for conducting VE studies, limited knowledge and awareness among professionals, resistance to change, poor communication among stakeholders, divided authority in decision-making, and fear of reduced profit margins. The complexity of construction projects and reliance on subjective decision-making further restrict effective VE implementation.

7. Research Gap

The study identifies several research gaps such as limited application of VE in Indian residential projects, lack of simplified VE methodologies, insufficient studies on alternative materials, and absence of quantitative assessment of future building performance. There is also a need for improved modeling techniques to reduce subjectivity in decision-making and for multidisciplinary education to enhance VE awareness.

8. Conclusion

The study concludes that Value Engineering is an effective and practical tool for cost optimization in residential construction projects. VE helps in reducing unnecessary costs while maintaining the required quality, functionality, and safety standards. The application of VE techniques in the case study resulted in significant cost savings along with improved project scheduling and construction quality. The findings clearly indicate that Value Engineering has tremendous potential in the construction industry from both developer and user perspectives.

9. Future Scope

Future scope includes wider adoption of Value Engineering in Indian construction practices, development of simplified VE frameworks, enhanced education and training for professionals, integration of performance-based value engineering, and increased government support. Special emphasis should be given to residential projects, where cost control is critical. With systematic implementation, Value Engineering can contribute significantly to sustainable, economical, and high-quality construction.

****

Technical Information about Water Resources Engineering

Mr. P. S. Singh (Student)

Water is one of the most essential natural resources for human life, agriculture, and industrial development. Water Resources Engineering is the branch of Civil Engineering that deals with the collection, storage, distribution, and management of water in a planned and efficient manner. As the population increases and rainfall becomes irregular due to climate change, proper water management has become very important for sustainable development.

In nature, water moves continuously through the hydrological cycle which includes evaporation, condensation, precipitation, infiltration, and runoff. Engineers study rainfall data and catchment characteristics to estimate how much water will be available in rivers and reservoirs. This helps in planning dams, canals, and water supply schemes. Rainfall is measured using rain gauges and analyzed to determine average rainfall and flood possibilities in a region.

Reservoirs and dams play a major role in water storage. They store excess water during rainy season and supply it during dry periods for irrigation, drinking water, and hydroelectric power generation. The stored water is distributed through canals and pipelines. Proper design of reservoirs prevents floods and also helps in groundwater recharge. Irrigation methods such as surface irrigation, sprinkler irrigation, and drip irrigation are used to supply water to crops efficiently. Among them, drip irrigation is the most water-saving technique because it provides water directly to plant roots.

Groundwater is another important source of water and is obtained through wells and bore wells. Engineers study soil layers and aquifers to determine water availability and safe yield of wells. Over-extraction of groundwater may lower the water table, therefore recharge methods like percolation tanks and rainwater harvesting structures are necessary.

Flood control is also an important part of water resources engineering. During heavy rainfall, rivers overflow and damage property and agriculture. To control floods, engineers construct dams, embankments, retaining walls, and drainage channels. Watershed management techniques such as contour bunding and check dams reduce runoff and soil erosion.

Thus, Water Resources Engineering helps in proper utilization, conservation, and protection of water. It ensures drinking water supply, supports agriculture, prevents floods, and maintains ecological balance. For civil engineers, understanding water behavior is essential for developing sustainable infrastructure and protecting the environment for future generations.

Technical Information about Survey Instruments Used in Civil Engineering

Mr. P. K. Yadav (Student)

Surveying is the first step in any civil engineering project. Before constructing buildings, roads, bridges, or canals, engineers must know the exact position, level, and distance of the land. Survey instruments help in measuring distances, angles, and elevations accurately. Proper surveying ensures correct layout and prevents construction errors.

One of the simplest instruments is the **Chain and Tape**. It is used to measure horizontal distances on ground. Chains are made of steel links and tapes are made of steel or fiber. They are commonly used in small projects and preliminary surveys because they are easy to handle and economical.

The **Compass** is used to measure horizontal angles and directions. It works on the principle of magnetic north. With the help of a compass, engineers can determine bearings of lines and prepare rough maps. However, compass readings may be affected by nearby metal objects and electrical lines.

The **Dumpy Level** is an important instrument used to measure elevations and difference in levels between points. It helps in preparing contour maps and leveling roads, canals, and building foundations. It works along with a leveling staff. Accurate leveling ensures proper drainage and prevents water stagnation.

A more advanced instrument is the **Theodolite**. It is used to measure both horizontal and vertical angles with high precision. Theodolite is widely used in triangulation, alignment of roads, bridges, and tall structures. Compared to simple instruments, it provides better accuracy.

Modern surveying uses the **Total Station**, which is a combination of electronic theodolite, electronic distance measurement (EDM), and microprocessor. It can measure angles and distances digitally and directly stores data. It saves time and reduces manual calculation errors. Survey data collected from total station can be directly transferred to computer for drawing maps.

The latest technology is **GPS (Global Positioning System)** surveying. It uses satellites to determine the exact location of a point on earth. GPS surveying is very fast and useful for large area mapping, highways, and city planning.

Thus, survey instruments have developed from simple chains to advanced digital equipment. Each instrument has its own importance depending on accuracy and project requirement. Knowledge of these instruments helps civil engineering students perform accurate surveying and ensures safe and proper construction.

Building Planning & Drawing in Civil Engineering

Mr. H. V. Kumbhar (Faculty)

1. Introduction

Building Planning and Drawing (BPDC) is one of the most important subjects in Civil Engineering because it connects imagination with actual construction. Before any structure such as a house, school, hospital, or commercial building is constructed, its complete layout must be carefully planned and represented in the form of technical drawings. These drawings act as a communication language between architect, engineer, contractor, and workers at site.

A properly planned building provides comfort, safety, good appearance, ventilation, lighting, and economical construction. Poor planning may lead to congestion, improper ventilation, higher cost, and inconvenience to occupants. Therefore, civil engineers must understand both functional and technical aspects while planning a building.

2. Objectives of Building Planning

The main objective of building planning is to provide a structure that satisfies the needs of users while maintaining safety and economy.

Goals of good building planning:

- Maximum comfort and convenience
- Proper circulation of air and light
- Efficient utilization of space
- Safety and structural stability
- Future expansion possibility
- Economy in construction and maintenance
- Aesthetic appearance

3. Principles of Building Planning

3.1 Aspect

Aspect means arrangement of rooms in relation to sunlight and wind direction. Bedrooms should receive morning sunlight while kitchens and toilets should have proper ventilation. Proper aspect improves health and reduces dampness.

3.2 Prospect

Prospect deals with outside view and appearance of building. The building should face garden, road, or open area instead of waste land or drainage. It improves aesthetics and property value.

3.3 Privacy

Privacy is very important in residential buildings. Bedrooms and bathrooms should be separated from living room and entrance area. This avoids disturbance and maintains comfort.

3.4 Grouping

Related rooms should be placed near each other:

- Kitchen near dining room
- Bedroom near bathroom
- Drawing room near entrance

Grouping reduces unnecessary movement and increases convenience.

3.5 Circulation

Circulation refers to movement inside building through doors, corridors, and staircases. It should be short, direct, and obstruction-free.

3.6 Sanitation

Proper arrangement of water supply and drainage system is essential. Toilets and bathrooms should be located on outer walls for ventilation and plumbing connections.

3.7 Flexibility

Buildings should allow modification in future. Example: provision for extra floor or additional room.

3.8 Elegance

The building should look simple but attractive. Good proportion, symmetry, and color combination improve appearance.

4. Orientation of Building

Orientation means positioning the building with respect to sun and wind direction.

Advantages of correct orientation:

- Natural lighting
- Better ventilation
- Reduced electricity consumption
- Thermal comfort

In India, longer walls are generally placed in North-South direction to reduce heat gain from sun.

5. Building Bye-Laws and Regulations

Before preparing drawing, engineers must follow local municipal rules known as building bye-laws.

Common regulations:

- Minimum room size
- Minimum ceiling height (generally 3 m)
- Ventilation area (10% to 15% of floor area)
- Setback distance from road and boundary
- Maximum building height
- Fire safety requirements

These rules ensure public safety, hygiene, and proper city planning.

6. Types of Building Drawings

6.1 Plan (Top View)

A plan shows arrangement of rooms, walls, doors, windows, and furniture as seen from top at about 1 m above floor level. It is the most important drawing used at site.

6.2 Elevation (Front View)

Elevation shows the external appearance of building from front or side. It includes:

- Door and window positions
- Floor levels
- Architectural features

6.3 Section (Cut View)

Section shows internal details after cutting building vertically. It provides:

- Foundation depth
- Floor thickness
- Roof height
- Staircase details

6.4 Working Drawings

These include detailed drawings used during construction:

- Foundation plan

- Column layout
- Plumbing drawing
- Electrical layout

7. Symbols and Conventions in Drawing

Standard symbols are used so that drawings can be understood everywhere.

Examples:

- Door – shown by arc opening
- Window – thin lines in wall
- Staircase – arrow showing upward direction
- Sanitary fittings – standard plumbing symbols

Using standard conventions avoids confusion at site.

8. Functional Requirements of Residential Building

Living Room

Located near entrance, well ventilated, properly lighted.

Bedrooms

Should be private, quiet, and receive morning sunlight.

Kitchen

Should be near dining area and provided with exhaust ventilation.

Bathroom & Toilet

Located on outer wall for drainage and ventilation.

Staircase

Placed in convenient and safe location with proper width and headroom.

9. Importance of BPDC in Civil Engineering

Building Planning & Drawing plays a vital role in successful construction.

Benefits:

- Reduces construction mistakes
- Saves time and cost
- Improves coordination at site
- Ensures proper material estimation
- Enhances building comfort and safety

It is also necessary for obtaining municipal approval before starting construction.

10. Modern Trends in Building Planning

Today building planning also considers environmental sustainability.

Modern concepts:

- Green building design
- Rainwater harvesting provision
- Solar panel placement
- Natural ventilation planning
- Energy efficient orientation

Thus BPDC is no longer limited to drawing but includes environmental responsibility

11. Conclusion

Building Planning & Drawing is the foundation of every construction project. A well-planned building provides comfort, safety, economy, and beauty. Proper drawings help engineers and workers understand exact construction requirements and avoid errors. For civil engineers, BPDC acts as a bridge between design and execution, ensuring that the final structure meets functional needs and technical standards. Knowledge of planning principles, bye-laws, and drawing methods is therefore essential for every aspiring civil engineer.

CIVIL ENGINEERING STUDENTS ASSOCIATION EVENTS AND UPDATES

CESA 2024-25
COMMITTEE MEMBERS

Sr No.	Positions	Names
1.	President	Rohit Mandal
2.	Vice-President	Viraj Hudale
3.	Treasurer	Aljarin Bangi
4.	Printing And Notice Board	Parth Yadav, Sairaj Shinde
5.	Stage Decoration	Mayuri More, Samruddhi Sakat, Sridevi Nair
6.	Event Management	Prachi Matawade, Riya Randive, Pratiksha Bakare
7.	Social	Prince Singh, Rehan Mulla, Sourabh Warang
8.	Food And Refreshment	Vaibhav Nanavare, Sairaj Yadav, Samarth Killedar
9.	Sports	Sairaj Shinde, Shubham Patil, Atharv Shingare
10.	Photography	Rohan Dhamane, Shravan Patil

Civil Engineering Association

The Civil Engineering Students Association (CESA) of our institute functions with the aim of improving technical knowledge, practical exposure, and leadership qualities among students. It serves as a common platform where students and faculty members work together to conduct academic, technical, and co-curricular activities. The association encourages students to participate in seminars, workshops, technical competitions, and awareness programs to enhance their professional competence.

CESA regularly organizes expert lectures, industrial visits, surveying practices, model exhibitions, and technical discussions so that students can relate theoretical concepts with real-life engineering practices. These activities help students interact with industry professionals and understand modern construction methods, safety practices, and professional ethics.

Apart from technical activities, the association also conducts social, cultural, and sports events which develop teamwork, communication skills, creativity, and confidence among students. Through continuous efforts, CESA plays an important role in shaping students into responsible, skilled, and industry-ready civil engineers.

Traditional Day Celebration

The Civil Engineering Department celebrated Traditional Day with great enthusiasm and cultural spirit. Students and faculty members participated by wearing traditional attire representing diverse cultures and heritage. The event aimed to promote unity, cultural awareness, and respect for traditions among students.

Various activities such as cultural presentations, ramp walk, and group photography were organized, creating a joyful and memorable atmosphere in the department. The celebration encouraged interaction between juniors and seniors and strengthened bonding among students and staff.

Traditional Day provided a refreshing break from academics while nurturing teamwork, confidence, and cultural values, making it one of the most enjoyable events of the academic year.

JALLOSH 2K25

The institute celebrated its Annual Gathering **“Jallosh 2K25”** with great enthusiasm and excitement. The event provided a wonderful platform for students to showcase their cultural talents, creativity, and confidence beyond academics.

The program included dance performances, singing, drama, fun activities, and prize distribution for academic and extracurricular achievements. Students from various departments actively participated, making the celebration vibrant and memorable.

The event strengthened unity, teamwork, and bonding among students and faculty members. Jallosh 2K25 not only entertained everyone but also motivated students to maintain a balance between technical education and co-curricular development.

Students Trip – Vasota Fort & ESR Satara

The Civil Engineering Department organized an educational trip to Vasota Fort and the Elevated Service Reservoir (ESR) at Satara to provide practical exposure beyond classroom learning. The visit helped students understand both historical construction techniques and modern water supply infrastructure.

At Vasota Fort, students observed ancient masonry construction, stone bonding, foundation systems, drainage arrangements, and durability of traditional materials used in fort architecture. The structure demonstrated how engineering knowledge was effectively applied in earlier times without modern machinery, highlighting sustainability and strength of traditional construction methods.

The visit to ESR Satara provided practical knowledge about components of a water supply system such as staging, tank capacity, column arrangement, bracing, and distribution pipeline network. Students also learned about load transfer, water pressure, maintenance practices, and safety considerations in overhead tanks.

The trip enhanced students' practical understanding, observation skills, and appreciation of civil engineering applications in both historical and modern structures.

IMPULSE 2K25

IMPULSE 2K25

Bridge Model Making Competition

The Civil Engineering Department organized a Model Making Competition based on bridge construction using ice-cream sticks. The main objective of this activity was to develop practical understanding of structural analysis, load transfer mechanism, joint behavior, and stability concepts taught in subjects like Strength of Materials and Structural Engineering.

Students prepared design sketches, selected suitable bridge type (truss, arch, beam, or suspension concept), and calculated approximate member arrangement before fabrication. They used ice sticks, glue, thread, and lightweight connectors to construct scaled bridge models while maintaining proper alignment and symmetry.

After fabrication, load testing was conducted by gradually applying weights at the center and at different points to observe deflection, failure pattern, and maximum load capacity. Students analyzed which members failed first and learned the importance of triangulation, bracing, and joint strength in real structures.

The competition improved creativity, analytical thinking, teamwork, and time management skills among students. It also helped them understand real construction challenges such as material limitations, economic design, and safety considerations.

Overall, the event successfully connected theoretical knowledge with practical application and inspired students to explore structural design concepts in an innovative and enjoyable way.

Engineering Day 2K24

Engineering Day 2K24

The Civil Engineering Department celebrated Engineers Day 2024 with great enthusiasm and active student participation. The event was organized to honor the contribution of engineers to society and to promote technical as well as team-building activities among students.

Various competitions such as Treasure Hunt, Free Fire gaming event, and Poster Presentation were conducted. The Treasure Hunt improved logical thinking and teamwork skills, while the gaming event encouraged coordination and quick decision-making. In the Poster Presentation competition, students presented innovative ideas on modern engineering topics like smart cities, sustainable infrastructure, electric vehicles, robotics, and climate change solutions.

Students actively participated and showcased creativity, communication skills, and technical knowledge. Winners were awarded certificates and cash prizes. The celebration created a lively and motivating atmosphere in the department and made Engineers Day a memorable learning experience for all.

Academic Toppers

BSiET

"ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार"- शिक्षणमहर्षी डॉ.बापूजी साळुंखे

SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S

DR. BAPUJI SALUNKHE INSTITUTE OF ENGINEERING AND TECHNOLOGY

Congratulations

MSBTE TOPPER 2024-25

S.Y. CIVIL ENGINEERING

2nd

SHUBHAM D. PATIL
79.56

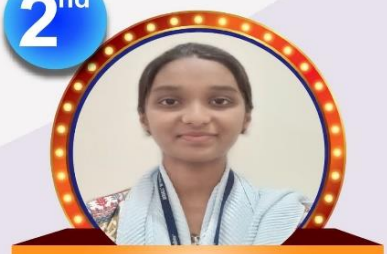
1st

PRASAD S. PATIL
79.78%

3rd

PARTH K. YADAV
79.44%

T.Y. CIVIL ENGINEERING



2nd

ALAJARIN A. BANGI
91.74%

1st

SRIDEVI J. NAIR
92.16%

3rd

NEHA A. MALI
88.32%

2130, E Ward, Tarabai Park, Kolhapur - 416003
960 760 4242 | 960 760 9292

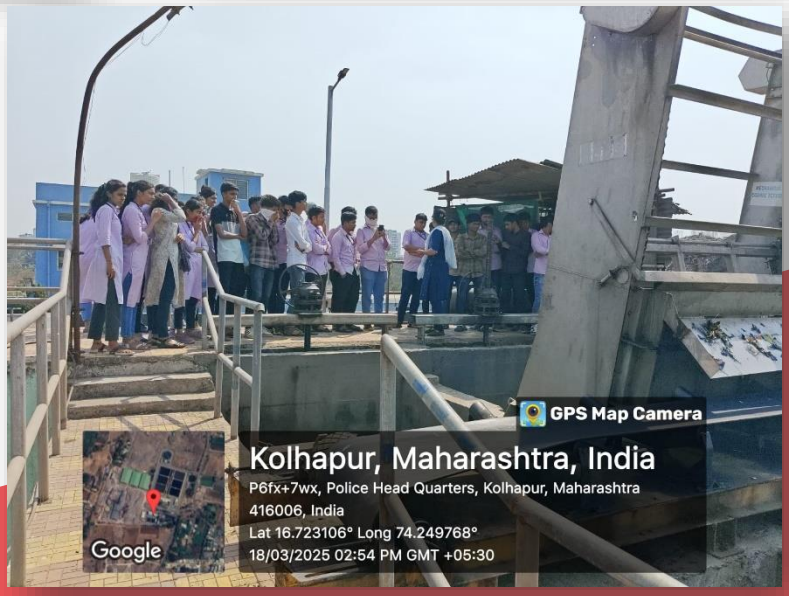
GALLERY


DR. BAPUJI SALUNKHE INSTITUTE OF ENGINEERING AND TECHNOLOGY
BSIET
WELCOME


GPS Map Camera
Kolhapur, Maharashtra, India
P7f2+35r, Police Head Quarters, Kolhapur, Maharashtra
416006, India
Lat 16.723134° Long 74.250381°
18/03/2025 03:21 PM GMT +05:30
Google


GPS Map Camera
Kolhapur, Maharashtra, India
P6cr+g6r, Police Head Quarters, Kolhapur,
Maharashtra 416006, India
Lat 16.722013° Long 74.24011°
01/03/2025 01:25 PM GMT +05:30
Google


BSIET


GPS Map Camera
Kolhapur, Maharashtra, India
P6fx+7wx, Police Head Quarters, Kolhapur, Maharashtra
416006, India
Lat 16.723106° Long 74.249768°
18/03/2025 02:54 PM GMT +05:30
Google


GPS Map Camera
Kolhapur, Maharashtra, India
P67Q+G8R, Warna Colony, Kolhapur, Maharashtra 416003, India
Lat 16.713627°
Long 74.238139°
03/09/24 11:07 AM GMT +05:30
Google


GPS Map Camera
Kolhapur, Maharashtra, India
1062, Shivaji Peth A Ward, C Ward, Kolhapur,
Maharashtra 416012, India
Lat 16.689356° Long 74.220687°
07/02/25 03:30 PM GMT +05:30
Google


GPS Map Camera
Dudhaganganagar, Maharashtra, India
9257+rc6, Dudhaganganagar, Farale,
Maharashtra 416231, India
Lat 16.358489° Long 74.015468°
06/11/24 12:30 PM GMT +05:30
Google


Guest Lecture


GPS Map Camera
Farale, Maharashtra, India
9246+cvp, Farale, Maharashtra 416231, India
Lat 16.355397° Long 74.012473°
06/11/24 12:02 PM GMT +05:30
Google

BSIET

S. S. V. S. S's

Dr. Bapuji Salunkhe Institute of Engineering & Technology.

A.I.C.T.E, D.T.E, Approved M.S.B.T.E. Affiliated

DEPARTMENT OF CIVIL ENGINEERING

2130, E, Tarabai Park, Kolhapur 416003, Maharashtra.

Telephone : 0231-2658613 Email : civil@bsiet.org