



Shri Gajanan Shikshan Sanstha's
**SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDANA (MAHARASHTRA STATE), INDIA**

“Recognized by A.I.C.T.E., New Delhi” Affiliated to Sant Gadge Baba Amravati University, Amravati
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Innovative Practices for Teaching and Learning

Shri Sant Gajanan Maharaj College of Engineering, Shegaon integrates innovative teaching and learning methodologies, all meticulously designed to elevate the standard of education, enhance student engagement, and proficiently equip students for the challenges that lie ahead. The primary objectives for implementing innovative teaching and learning practices at SSGMCE include:

Enhancing Student Engagement: This goal seeks to captivate students' interest and motivation, transforming the learning experience into one that is engaging and interactive. The ultimate aim is to boost retention rates and foster a deeper understanding of the subject matter.

Improving Learning Outcomes: The foremost purpose of innovative practices is to enhance the overall effectiveness of the learning process. This encompasses improving comprehension, nurturing critical thinking, honing problem-solving skills, and ensuring students retain and apply their knowledge effectively.

Personalized Learning: The objective here is to cater to diverse learning styles and paces. Leveraging technology, these practices provide adaptive learning experiences meticulously tailored to the unique needs and capabilities of each student.

Fostering Critical Thinking: Encouraging students to engage in critical thinking, analyse information systematically, and evaluate evidence rigorously is a pivotal goal. These practices are intended to cultivate these essential skills.

Promoting Collaboration: Collaborative learning is deemed indispensable in today's world. The aim here is to actively promote teamwork, enhance communication skills, and foster seamless collaboration among students, mirroring the dynamics of real-world work environments.

Meeting Industry and Job Market Demands: An essential objective is to effectively prepare students for the competitive job market. To achieve this, innovative practices are meticulously aligned with industry prerequisites and the ever-evolving demands of the job market.

Fostering Creativity and Innovation: Stimulating creativity and nurturing problem-solving abilities in students is another key goal. These practices are designed to inspire innovative thinking and practical problem-solving skills.

Promoting Lifelong Learning: Apart from formal education, the ultimate goal is to foster a profound enthusiasm for learning that lasts a lifetime. Innovative practices play a pivotal role in nurturing an enduring desire for continuous self-improvement and lifelong learning.



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Innovative Approaches to Enhance Teaching and Learning

The faculties at SSGMCE employ various approaches to enhance the teaching and learning experience for every student, aiming to facilitate their understanding of concepts throughout the academic year. Below is a list of remarkable initiatives that the institute has embarked on as part of its on-going dedication to continuous enhancement.

Microsoft Teams

Throughout the pandemic, faculty and students adeptly harnessed platforms like Google Classroom and Microsoft Teams to facilitate the delivery of both theoretical and practical classes, exchange educational materials seamlessly, and submit assignments efficiently. Furthermore, online assessments were conducted through the MS Teams platform, demonstrating the adaptability and resourcefulness during challenging times.

Virtual Labs

Faculty effectively utilize virtual labs, which are online platforms or software applications simulating physical laboratory settings. These virtual labs enable students to conduct experiments and gain practical experience in a virtual environment. As part of an innovative initiative led by India's Ministry of Human Resource Development, online experiments are conducted with the assistance of simulators. These digital resources, known as virtual labs, proved instrumental during the pandemic, facilitating practical classes for both faculty and students with remarkable efficiency.

Animations

Faculty employs animations to simplify complex engineering concepts by visually illustrating processes, mechanisms, and dynamic systems. These engaging animations effectively capture students' attention, enhancing the appeal and enjoyment of the learning process.

PowerPoint presentations (PPTs)

Faculty widely employ PowerPoint presentations (PPTs) in teaching and learning due to their effectiveness in conveying information and engaging students. PPTs serve as valuable visual aids that complement verbal explanations and facilitate the illustration of complex concepts, thereby enhancing comprehension. Moreover, PPTs can be readily shared with students through digital platforms or learning management systems, ensuring accessibility to course materials at any time and from any location.

Working models

Faculty members utilize models as a strategy to not only pique students' interest but also to elevate the depth of their learning. The primary objective is to foster active engagement within the student community, creating an environment conducive to effective and



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participatory learning. Models provide a visual representation of abstract or intricate concepts, making them more accessible and comprehensible to students.

YouTube: A Multimodal Approach to E-Content

Faculty members have embraced YouTube as a powerful tool for education by creating their own channels and sharing recorded subject-specific videos. YouTube's user-friendly platform ensures accessibility to a broad audience, enabling students to conveniently access content from virtually anywhere with an internet connection. Moreover, YouTube accommodates a range of content formats, encompassing videos, animations, presentations, and more. This diverse array of media options caters to varied learning styles and preferences, facilitating a more comprehensive understanding of intricate concepts among students.

MOOCS

MOOCs, or Massive Open Online Courses, represent a recent advancement in the academic domain. They are rapidly gaining acknowledgment within academic circles as an innovative means of enriching students' existing knowledge. The institute acknowledges the value of MOOCs as a supplementary resource to enhance the effectiveness of educational initiatives. We actively encourage both students and faculty to participate on platforms like NPTEL and SWAYAM to access these valuable learning opportunities. Furthermore, our institute collaborates with platforms such as EDX and Coursera to offer additional learning experiences to our students.

Project based Learning

PBL actively engages students in the learning process, encouraging them to address real-world problems, thus nurturing curiosity, exploration, and critical thinking. Through PBL, students cultivate robust problem-solving skills by analysing intricate engineering challenges, formulating solutions, and refining their approaches based on feedback. Our institute has implemented Problem-Based Learning (PBL) to inspire active learning through collaborative problem-solving among our students.

Flipped Class

The flipped classroom model is implemented by educators. In this approach, rather than teachers delivering lectures during class time, students are tasked with independently learning the course material before attending the class. This pre-class learning can be facilitated through readings, videos, online tutorials, or other educational resources. During the scheduled class time, the focus shifts to interactive activities, discussions, problem-solving, and various engaging exercises



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WhatsApp platform

WhatsApp is a modern interactive tool that is effectively utilized in certain courses. Both teachers and students can upload various educational resources such as eBooks, course materials, video lectures, question banks, and real-time issues. This approach helps students better prepare for their classes.

Blogs

Faculty members create blogs as platforms for sharing academic materials and resources. They share supplementary reading materials, links to online resources, and multimedia content to enhance students' understanding of the subject matter. Blogs are also utilized for posing discussion or thought-provoking prompts related to the course material, thereby encouraging students to actively participate in online discussions.

Simulated Software-Based Learning

Simulation is a valuable instructional technique that replicates real-world activities and processes within a controlled and safe environment. It aims to provide learners with an experience closely resembling real-life situations while offering the flexibility to reset scenarios and experiment with different strategies and approaches. Simulated learning enables students to apply their knowledge and gain practical experience in specific situations. In the context of engineering education, commercially available software packages like MATLAB, SPICE, Multisim, XILINX, AUTOCAD, ANSYS, and LABVIEW are commonly utilized to simulate and solve engineering problems. This practice exposes students to authentic engineering instruments and devices, allowing them to gain hands-on experience in a virtual setting.

Content based question making

Questioning plays a crucial role in facilitating meaningful learning experiences. The art of formulating well-crafted questions not only stimulates critical and creative thinking but also deepens students' understanding of the subject matter. In this educational practice, students are actively involved in developing question banks related to the topics covered in their curriculum. Subsequently, faculty members assist students in addressing these questions. This practice serves as a catalyst for enhancing creative thinking, critical thinking, and problem-solving skills among students.

Industrial visit/field work and report writing

Industry visit/ field work means sending the students to certain workplaces sites, garages, Industries for doing some Practical work. Industrial visit is considered as one of the tactical methods of teaching. Students get the practical experience in the organization. They get aware about the recent technologies used by industries. This enhances communication and



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writing skills in students and this enables students to understand professional duties and responsibilities of the personnel in the field.

Think Pair and share

Think-Pair-Share (TPS) is an instructional strategy that promotes collaborative learning, challenging students to collectively tackle problems and address questions within a given subject area. This approach involves a structured sequence of activities. Initially, students contemplate the topic or question individually, encouraging independent thought. Following this, students form pairs or small groups, facilitating discussion and idea exchange. Finally, students share their reflections and insights with their peers. By engaging in TPS, students enhance their critical thinking abilities and refine their communication skills, fostering a more interactive and participatory learning environment.

Student Chapter Activities

Institute hosts a range of professional chapters, each offering an excellent platform for students to actively participate in a variety of competitions, seminars, and lectures organized by their respective societies. These activities are instrumental in nurturing students' talents, enhancing skills such as teamwork, communication, target achievement, and overall professional development.

Key Highlights

Competitions and Challenges: Students have the opportunity to participate in competitive events, fostering teamwork and encouraging them to strive for excellence.

Seminars and Lectures: Regular seminars and lectures organized by these chapters provide students with insights from industry experts, helping them stay updated on current trends and best practices.

Communication Skills: Participation in chapter activities hones students' communication skills, preparing them for effective interactions in the professional world.

Teamwork: Many of these activities require students to collaborate effectively, promoting the development of essential teamwork skills.

Mentorship and Guidance: Each student chapter is assigned a dedicated faculty advisor who serves as a mentor, offering guidance and overseeing the chapter's activities.

List of Student Chapters at our Institute:

- IEEE
- ISTE (Indian Society for Technical Education)
- E-Cell (Entrepreneurship Cell)
- SAE (Society of Automotive Engineers)



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- ACM (Association for Computing Machinery)
- IEI (Institution of Engineers India)
- MESA (Mechanical Engineering Students Association)
- ESSA (Electronics Students and Staff Association)
- ITSA (Information Technology Students Association)
- Team X-Treme Club

These student chapters provide valuable platforms for students to engage in a wide range of academic, technical, entrepreneurial, and extracurricular activities, fostering their personal and professional growth during their time at the institute.

Cutting-Edge Educational Initiatives

In response to the ever-evolving landscape of education and the imperative of embracing diverse teaching approaches, today's educational systems are increasingly incorporating innovative teaching techniques and strategies. These initiatives are designed to foster a culture of diversity and inclusion while nurturing students' passion for learning. Within our institute, several cutting-edge initiatives utilize modern technology to achieve these goals.

Avishkar: Avishkar is an initiative that encourages students to explore and showcase their creativity and innovation. It provides a platform for students to engage in research, develop projects, and present their findings using modern technology.

Hackathon: The Hackathon is an exciting challenge that harnesses the power of technology to solve real-world problems. It fosters collaboration, creativity, and problem-solving skills among students as they work in teams to develop innovative solutions.

Startup & Innovation Cell: The Startup & Innovation Cell promotes an entrepreneurial spirit among students. It supports and nurtures innovative ideas and provides resources and guidance for students interested in launching their startups.

The Entrepreneurship Cell fosters entrepreneurship among students and create a comprehensive resource pool to support aspiring students in their journey towards becoming successful entrepreneurs.

Industry Institute Interaction:

The primary objective of fostering interactions between the industry and the institute is to enhance the quality of technical education, aligning it with the evolving demands of the industry. These interactions serve as a continuous source of valuable input for the refinement of teaching and learning processes. They also aim to raise students' awareness of the industrial environment, impart practical knowledge, and instil the self-confidence needed to pursue entrepreneurial endeavours. The preparation of engineering students for positions in multinational corporations necessitates exposure to cutting-edge technologies and engineering methodologies, which can be facilitated by establishing a robust bridge between the industry and academic institutions.



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SSGMCE maintains close affiliations with various renowned companies and organizations, including Adani Power, Tata Power, ABB, Siemens, Mitsubishi, Cotmac Pune, Zensar Technology, M.I.T. Skills, Mahindra and Mahindra, and many more. These affiliations ensure that our faculty members are deeply engaged with industry practices. Experts from these industries actively participate in several facets of our educational initiatives. They contribute to the development of laboratories, deliver expert talks, share insights about corporate careers, discuss emerging technologies, the current market landscape, and shed light on the corporate environment. They provide real-world applications, facilitate industry visits, and collaborate on industry problem-solving projects.

Additionally, the institute organizes annual industrial visits for students, offering them a first-hand look into real-world operations. Domain experts from various industries are regularly invited to share their knowledge and experiences with our students. Final-year BE project work conducted in association with industry partners is given significant weightage in our curriculum.

The institute regularly organizes Industry Institute meets, providing students and faculty with first-hand insights into the latest industry trends, technologies, and practices. This exposure ensures that the curriculum remains relevant and up-to-date. Thus, this initiative is a mutually beneficial endeavour that enriches the learning experience for students, enhances faculty expertise, and strengthens the ties between academia and industry.

Furthermore, students are motivated and supported in pursuing industrial training and internships, which enrich their understanding of business processes and prepare them for successful corporate careers. These industry interactions play a pivotal role in equipping our students with the skills and insights necessary for their professional journeys ahead.

Prof. D.L. Bhombe
Dean Academics



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