

## Innovations by the Faculty in Teaching and Learning

The Mechanical Engineering department has systematically transitioned from traditional teacher-centric methods to modern student-centric pedagogies. These innovations aim to bridge the gap between theoretical constructs and industrial application, fostering a generation of engineers capable of solving complex real-world problems.

### I. Core Innovative Methodologies

Beyond traditional lectures, the department has integrated several transformative techniques:

- **PEP Model (Participative, Experiential, Problem Solving):** An integrated approach where students actively engage in classroom discussions through Participative learning such as Role Play, Collaborative learning, Poster Presentation, Model based learning etc. Experiential Learning through hands-on laboratory work, Industrial Visit, case study, project based learning and critical thinking through flipped classroom session, Individual assignments and complex engineering scenarios.



Understanding motors through **practical dismantling and assembly** - This activity supported experiential learning by allowing students to connect theoretical concepts of motors with real physical components. Such practical exposure is highly relevant for subjects related to robotics, automation, and mechatronics.



**CAED – MODEL MAKING** - Model making is an activity used to apply theoretical knowledge, reinforce learning, and actively engage students through hands-on experience. It involves designing and developing conceptual or working models related to specific topics, enabling students to visualize concepts and gain practical understanding.



**3D Printer Software Training** - A training session on 3D printing technology was conducted for students in the Additive Manufacturing Lab with a focus on practical exposure to design and prototyping.



**Industrial visit to RITTAL INDIA PRIVATE LIMITED**, Doddaballapura Industrial Area as a part of the academic exercise on “Engineering Materials, Manufacturing process, Automation and its Application in Industry”.

- **Project-Based & Model-Based Learning:** Moving away from rote memorization, students develop tangible prototypes or mathematical models to validate kinematic and structural theories.



**Mini-Project Exhibition**



**Model Based Learning**

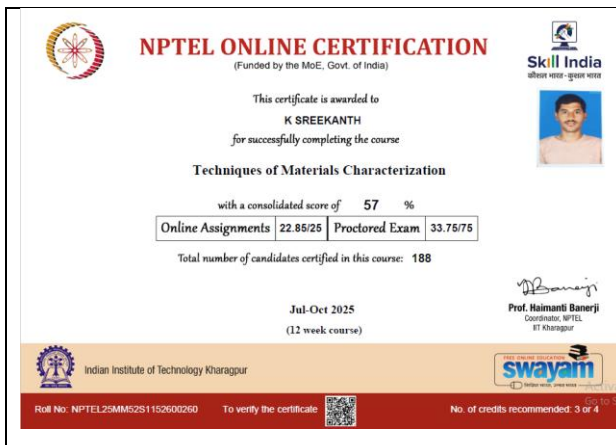
- **Flipped Classroom & Presentations:** Students review lecture materials via pre-recorded videos or digital content at home, utilizing classroom hours for intensive problem-solving and peer discussions.



Flipped classroom session - Students review provided study materials and assigned case studies in groups to analyze the case, identify infringements, and prepare a structured presentation. The approach enhanced critical thinking, analytical ability, teamwork, and communication skills while promoting self-directed learning and practical application of theoretical knowledge.

Poster Presentation Competition on Research Methodology and Intellectual Property Rights (IPR) - The competition provided a platform for students to visually present topics related to research design, data analysis methods, research ethics, patents, copyrights, trademarks, and various forms of IPR infringements.

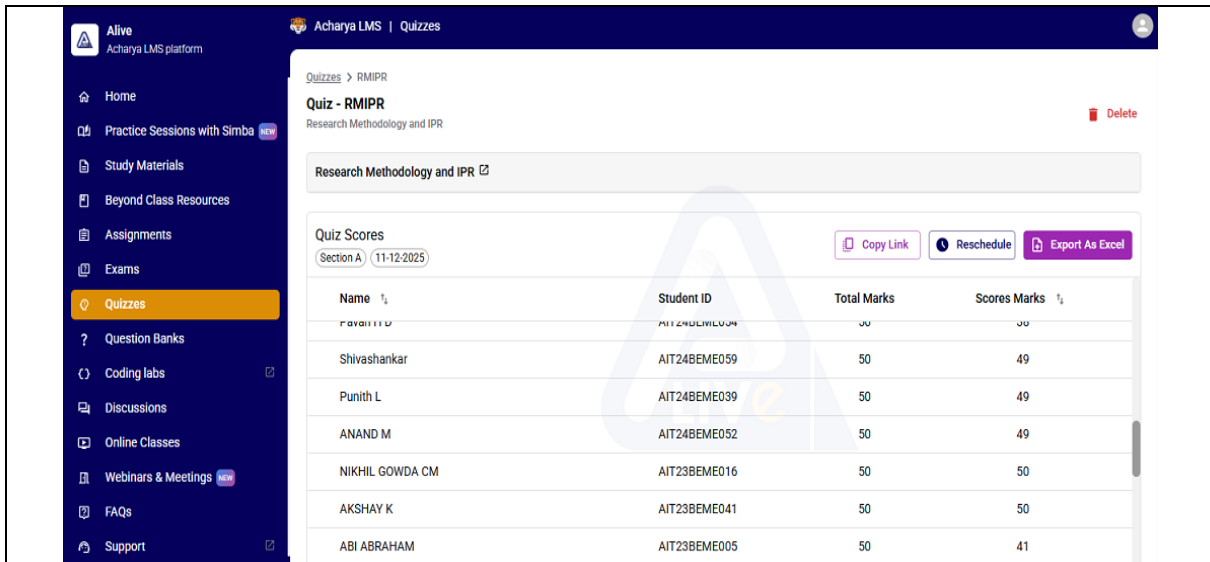
- **Blended Learning & MOOCs:** Integration of NPTEL-SWAYAM, Coursera, and edX modules allows students to learn emerging technologies directly from global experts.



## II. Technical Tools and ICT Integration

The department leverages advanced Information and Communication Technology (ICT) to enhance visualization:

- **Interactive Digital Tools:** Use of **ALIVE Platform**, for assessment online classes and self-learning. Implementing quiz-based competitions and leader board systems to make fundamental concepts more engaging.



Name	Student ID	Total Marks	Scores Marks
Shivashankar	AIT24BEME059	50	49
Punith L	AIT24BEME039	50	49
ANAND M	AIT24BEME052	50	49
NIKHIL GOWDA CM	AIT23BEME016	50	50
AKSHAY K	AIT23BEME041	50	50
ABI ABRAHAM	AIT23BEME005	50	41

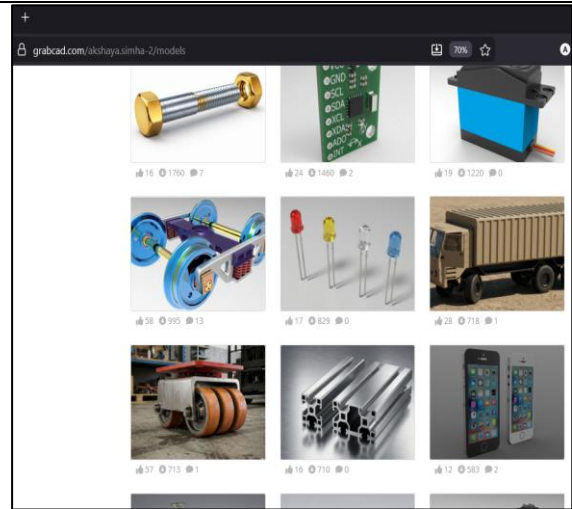


**ALIVE platform for self-learning and assessment** - The quiz included multiple-choice questions, short-answer questions, and scenario-based problems focusing on legal provisions, consequences of violations, and preventive measures. This activity promoted active participation, quick thinking, knowledge retention, and healthy academic competition while reinforcing theoretical and practical understanding of the subject.

- **Simulations & CAD/CAM:** Advanced training in FUSION 360, CATIA V19, 3D Printing Real World Applications Using Python and PLC Programming and GD&T as Value-Added Programs to ensure industry-readiness.



Hands on training on **FUSION 360** for 6th semester students for knowledge enhancement.



As part of ICT-enabled teaching and CAD-based concept delivery, the **GrabCAD platform** was actively used for teaching mechanical engineering concepts through self-created 3D CAD models.



**Simulation on Fluid Mechanics** - through structured HTML topic files and organised digital content. The usage is focused on improving conceptual clarity, especially for fundamental and slightly extended topics beyond syllabus where students require additional explanation.



**'Hands-on Workshop on Real-World Applications Using Python and PLC Programming'** in association with Aqmenz Automation Private Limited, Bengaluru - To master Python & PLC programming skills, including ladder logic and structured text, for effective control of automation systems.

### III. Additional Innovative Techniques

To further enrich the curriculum, the following methods have been successfully adapted:

- **Peer-to-Peer Teaching:** Students consolidate their learning by teaching complex topics to classmates, boosting communication skills and confidence.



**Additive Manufacturing** - Students were able to design and visualize small mechanical components before fabrication, which improved dimensional accuracy and reduced trial-and-error during development.



**Mechanical Engineering and Robotics Workshop** - The objective of this initiative was to create interdisciplinary awareness and demonstrate that robotics is a combination of mechanical design, electronics, and programming, rather than programming alone.

- **Entrepreneurship, Idea Generation, Hackathons:** Encourages creative thinking by simulating industrial hierarchy.

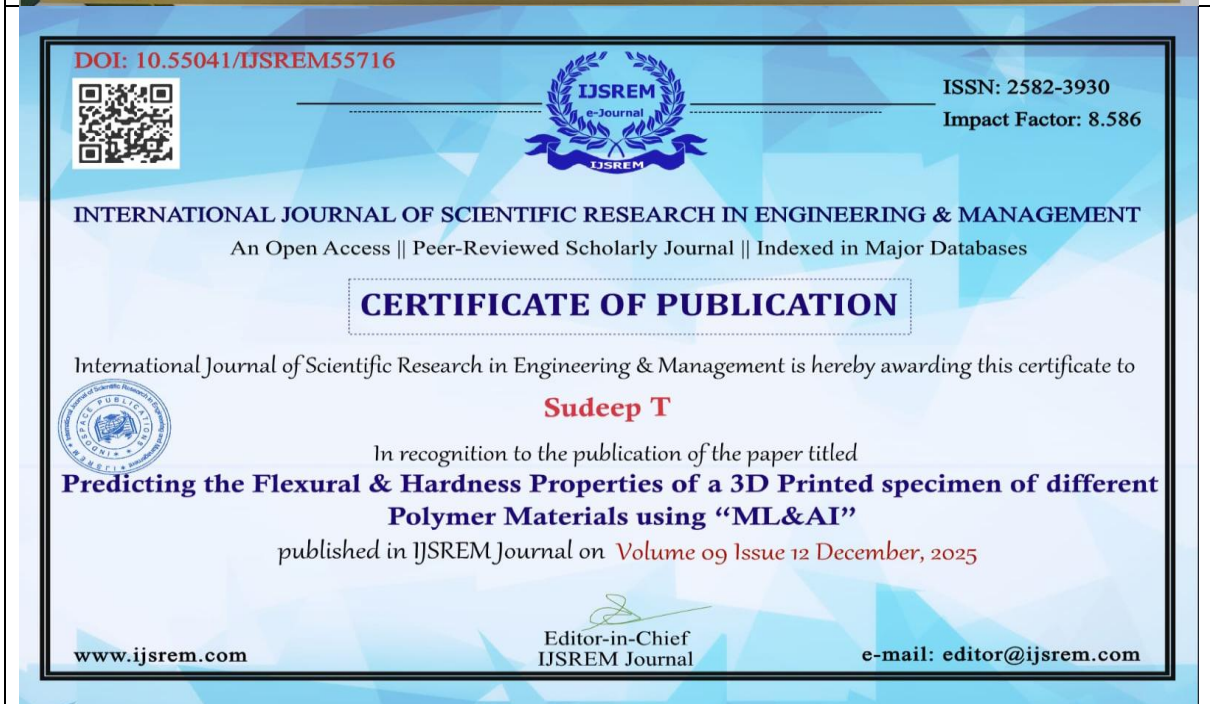


**MSME IDEA HACKATHON 4.0** - The aim of the workshop was to help the students to understand the importance of self-sustenance and employability.



**Standard Writing Competition** - In association with Bureau of Indian Standard (BIS), Bengaluru - To create the awareness to the students on how to write the standards and the contents needed to write the standards for a new product.

- **Technical Seminars & Paper Publications:** Fast learners are mentored to publish research in reputed journals, fostering a culture of innovation and research aptitude.

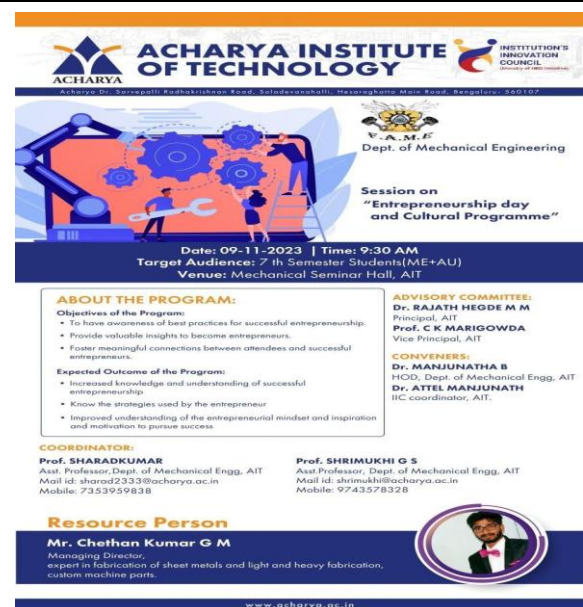


Conference publications completed by our students – sample certificates

- Collaborative Learning (Think-Pair-Share):** Workshops, Alumni Interactions, Small group activities that encourage diverse perspectives and teamwork in solving real world challenges and best Practices can be adopted for Successful Entrepreneurship.



**Skills and career Opportunities within the Industry** - Alumni Explaining his experience at work with students and career guidance



**ACHARYA INSTITUTE OF TECHNOLOGY**  
INSTITUTION'S INNOVATION COUNCIL

V.A.N.E.E  
Dept. of Mechanical Engineering

Session on  
"Entrepreneurship day and Cultural Programme"

Dates: 09-11-2023 | Time: 9:30 AM  
Target Audience: 7th Semester Students (ME+AU)  
Venue: Mechanical Seminar Hall, AIT

**ABOUT THE PROGRAM:**  
Objectives of the Program:  

- To have awareness of best practices for successful entrepreneurship.
- Provide valuable insights to become entrepreneurs.
- Foster meaningful connections between attendees and successful entrepreneurs.

Expected Outcome of the Program:  

- Increased knowledge and understanding of successful entrepreneurship.
- Know the strategies used by the entrepreneur.
- Improved understanding of the entrepreneurial mindset and inspiration and motivation to pursue success.

**ADVISORY COMMITTEE:**  
**Dr. RAJATH HEGDE M M**  
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**Prof. C K MARIGOWDA**  
Vice Principal, AIT  
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 Managing Director,  
 expert in fabrication of sheet metals and light and heavy fabrication,  
 custom machine parts.

[www.acharya.ac.in](http://www.acharya.ac.in)

**Entrepreneurship Day – To foster meaningful connections between attendees and successful entrepreneur**



**A workshop on "MSME Idea Hackathon 3.0 for Women"** - The workshop is to enlighten about the idea submission for all categories of women such as girl students, female faculty (teaching and non-teaching) members.



**Entrepreneurship skill, Attitude and Behavior Development** - Mr. Mukul Manohar, explaining the students about Entrepreneurship, Attitude and Behaviour development

- **Social Connect & Responsibilities:** A role to play in making the community a better place.



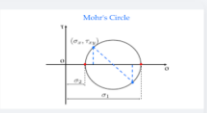
**Heritage Walk** - To develop empathy and a greater understanding of diverse culture and traditions.



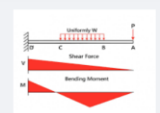
**BIS MANAK MITRA** – The students were part of BIS Door to Door campaign to create awareness on BIS standards to the public.

**Engineering Analysis Tools**

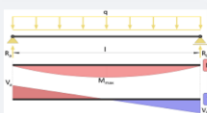
Strength of Materials
Structural Analysis
Drawing
FEM



**Mohr's Circle**  
Stress transformation



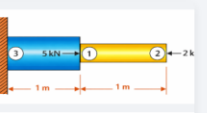
**Cantilever Analysis**  
SFD and BMD



**SS Beam Analysis**  
SFD and BMD



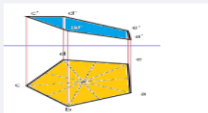
**overhanging Analysis**  
SFD and BMD



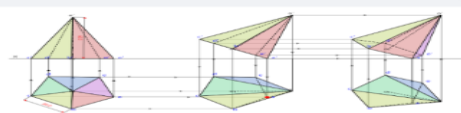
**Stepped Analysis**  
Stress and Strain

**Engineering Analysis Tools**

Strength of Materials
Structural Analysis
Drawing
FEM



**Drawing**  
Lamina Projections



**Drawing**  
Pyramid Projections

Webpage Developed for Ready Solutions in Strength of Materials and Engineering Drawing  
by Dr. Manjunatha B, Professor and HOD.

### Conclusion

These faculty-led innovations have significantly improved student engagement and outcome-based education (OBE). By combining traditional rigour with modern digital and experiential tools, the department ensures that graduates possess both the technical depth and the soft skills required for the global engineering landscape.