REPORT ON AICTE-ATAL SPONSORED ONE-WEEK FDP

"Integrating Technology in Engineering Pedagogy"

Organized by

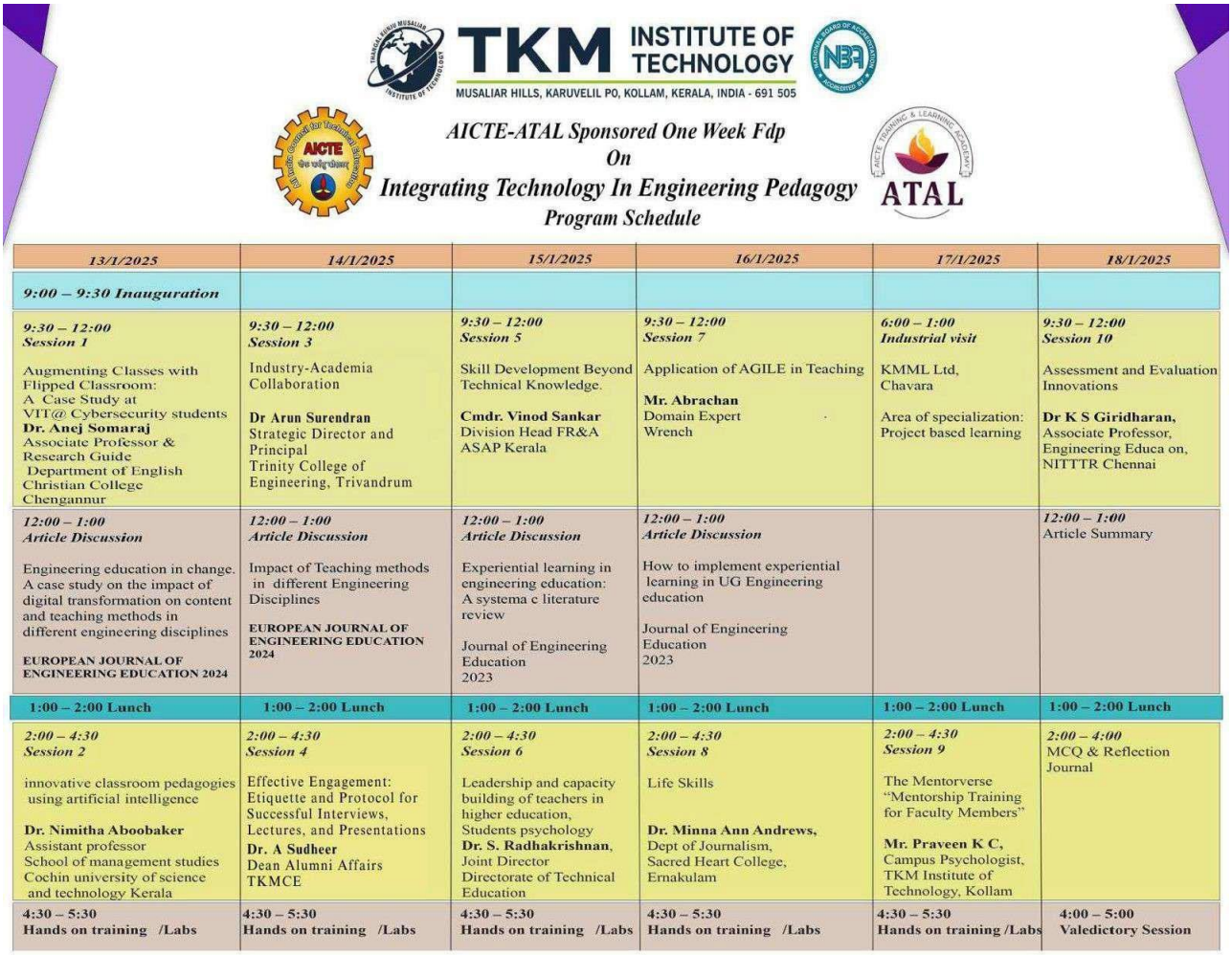
Department of Biomedical Engineering,

TKM Institute of Technology

13th – 18th January 2025

Introduction

The AICTE-ATAL-sponsored Faculty Development Program (FDP) on "Integrating Technology in Engineering Pedagogy" was successfully conducted at TKM Institute of Technology, Kollam, Kerala, from 13th to 18th January 2025. The program aimed to equip faculty members with modern teaching methodologies, emerging technologies, and best practices in engineering pedagogy. The sessions included expert talks, hands-on training, discussions, and industrial visits, fostering a comprehensive learning experience for the participants. The detailed schedule of the FDP is



TKM INSTITUTE OF TECHNOLOGY
MUSALIAR HILLS, KARUVELIL PO, KOLLAM, KERALA, INDIA - 691 505

AICTE-ATAL Sponsored One Week Fdp
On
Integrating Technology In Engineering Pedagogy
Program Schedule

ATAL

13/1/2025	14/1/2025	15/1/2025	16/1/2025	17/1/2025	18/1/2025
9:00 – 9:30 Inauguration					
9:30 – 12:00 **Session 1** Augmenting Classes with Flipped Classroom: A Case Study at VIT@ Cybersecurity students **Dr. Anej Somaraj** Associate Professor & Research Guide Department of English Christian College Chengannur	**9:30 – 12:00** **Session 3** Industry-Academia Collaboration **Dr Arun Surendran** Strategic Director and Principal Trinity College of Engineering, Trivandrum	**9:30 – 12:00** **Session 5** Skill Development Beyond Technical Knowledge. **Cmdr. Vinod Sankar** Division Head FR&A ASAP Kerala	**9:30 – 12:00** **Session 7** Application of AGILE in Teaching **Mr. Abrachan** Domain Expert Wrench	**6:00 – 1:00** **Industrial visit** KMML Ltd, Chavara Area of specialization: Project based learning	**9:30 – 12:00** **Session 10** Assessment and Evaluation Innovations **Dr K S Giridharan,** Associate Professor, Engineering Educa on, NITTTR Chennai
12:00 – 1:00 **Article Discussion** Engineering education in change. A case study on the impact of digital transformation on content and teaching methods in different engineering disciplines **EUROPEAN JOURNAL OF ENGINEERING EDUCATION 2024**	**12:00 – 1:00** **Article Discussion** Impact of Teaching methods in different Engineering Disciplines **EUROPEAN JOURNAL OF ENGINEERING EDUCATION 2024**	**12:00 – 1:00** **Article Discussion** Experiential learning in engineering education: A systema c literature review Journal of Engineering Education 2023	**12:00 – 1:00** **Article Discussion** How to implement experiential learning in UG Engineering education Journal of Engineering Education 2023		**12:00 – 1:00** Article Summary
1:00 – 2:00 Lunch	**1:00 – 2:00 Lunch**	**1:00 – 2:00 Lunch**	**1:00 – 2:00 Lunch**	**1:00 – 2:00 Lunch**	**1:00 – 2:00 Lunch**
2:00 – 4:30 **Session 2** innovative classroom pedagogies using artificial intelligence **Dr. Nimitha Aboobaker** Assistant professor School of management studies Cochin university of science and technology Kerala	**2:00 – 4:30** **Session 4** Effective Engagement: Etiquette and Protocol for Successful Interviews, Lectures, and Presentations **Dr. A Sudheer** Dean Alumni Affairs TKMCE	**2:00 – 4:30** **Session 6** Leadership and capacity building of teachers in higher education, Students psychology **Dr. S. Radhakrishnan,** Joint Director Directorate of Technical Education	**2:00 – 4:30** **Session 8** Life Skills **Dr. Minna Ann Andrews,** Dept of Journalism, Sacred Heart College, Ernakulam	**2:00 – 4:30** **Session 9** The Mentorverse "Mentorship Training for Faculty Members" **Mr. Praveen K C,** Campus Psychologist, TKM Institute of Technology, Kollam	**2:00 – 4:00** MCQ & Reflection Journal
4:30 – 5:30 **Hands on training /Labs**	**4:30 – 5:30** **Hands on training /Labs**	**4:30 – 5:30** **Hands on training /Labs**	**4:30 – 5:30** **Hands on training /Labs**	**4:30 – 5:30** **Hands on training /Labs**	**4:00 – 5:00** **Valedictory Session**

Inauguration

The FDP commenced on 13th January 2025 with an inaugural ceremony. The chief guest was Dr. Rijo Jacob Thomas, Dean - Strategic Planning at TKM College of Engineering, Kollam. The dignitaries emphasized the need for integrating modern technology into teaching to enhance student learning outcomes. The event set the stage for an insightful week of discussions and training.

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Inaugural Ceremony
of

AICTE-ATAL
SPONSORED ONE WEEK FDP

INTEGRATING TECHNOLOGY IN ENGINEERING PEDAGOGY

Programme Schedule

Silent prayer

Welcome Address : Dr. Muhammed Shafeeque Rahman P P
HOD , Department of Biomedical Engineering , TKMIT

Presidential Address : Dr. M. Haroon
Trust Member , TKM College Trust

Principal's Address : Dr. Gouri Mohan L
Principal , TKMIT

Inaugural Address : Dr. Rijo Jacob Thomas
Dean-Strategic Planning , TKM College of Engineering , Kollam

Felicitations : Dr. Sooraj T R
Vice Principal , TKMIT

Dr. Nijil Raj N
Dean Academics , TKMIT

Vote of Thanks : Mr. Praveen K C
Head of Industry Connect & Asst Prof, Department of Biomedical Engineering , TKMIT

Mr. K Shahir
Administrator , TKMIT

Date : 13th January 2025
Venue : Seminar Hall (Admin Block)

Session Highlights

Day 1: 13th January 2025

Session 1: Augmenting Classes with Flipped Classroom – A Case Study

Speaker: Dr. Ajeh Somaraj, Associate Professor & Research Guide, Department of English, Christian College, Chengannur.

This session introduced participants to the Flipped Classroom model, where students learn content before class through digital resources, allowing classroom time for interactive discussions and problem-solving. A case study in cybersecurity education demonstrated the effectiveness of this method in improving student engagement and knowledge retention.

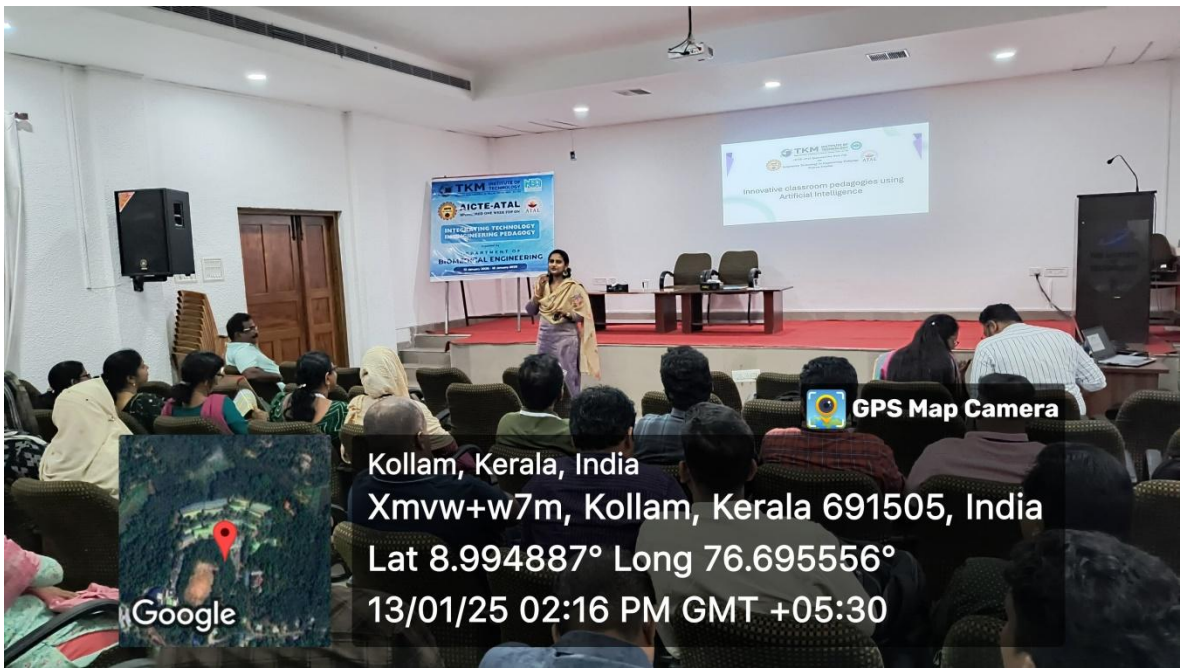
Article Discussion: Engineering Education in Change

This discussion explored how digital transformation is reshaping engineering education, emphasizing the shift from traditional lectures to more interactive, technology-driven teaching strategies.

Session 2: Innovative Classroom Pedagogies using Artificial Intelligence

Speaker: Dr. Nimitha Abobaker, Assistant Professor, School of Management Studies, Cochin University of Science & Technology, Kerala.

This session focused on the role of Artificial Intelligence (AI) in education, including AI-based adaptive learning systems, automated assessment tools, and AI-driven student engagement techniques. Real-world applications were demonstrated, showcasing AI's potential in personalized learning experiences.



Day 2: 14th January 2025

Session 3: Industry-Academia Collaboration

Speaker: Dr. Arun Surendran, Strategic Director and Principal, Trinity College of Engineering, Trivandrum.

This session emphasized the importance of collaborating with industries to bridge the gap between academic learning and real-world engineering applications. Strategies such as industry projects, guest lectures, internships, and joint research were discussed.

Article Discussion: Impact of Teaching Methods in Different Engineering Disciplines Participants engaged in a discussion about how teaching methodologies vary across disciplines, highlighting the need for customized pedagogical approaches for different engineering fields.

Session 4: Effective Engagement – Strategies and Protocol for Student Interviews, Lectures, and Presentations

Speaker: Dr. A Sudheer, Dean Alumni Affairs, TKMCE

This session focused on techniques for enhancing student engagement through structured interviews, interactive lectures, and impactful presentations. The speaker emphasized communication skills, audience engagement strategies, and real-world case studies to make lectures more effective.

Day 3: 15th January 2025

Session 5: Skill Development Beyond Technical Knowledge

Speaker: Cmdr. Vinod Sankar, Division Head FR&A, ASAP Kerala.

The session highlighted the importance of soft skills, leadership, and emotional intelligence in engineering education. Topics such as teamwork, problem-solving, and ethical decision-making were discussed.

Article Discussion: Experiential Learning in Engineering Education – A Systematic Literature Review

Participants explored different experiential learning techniques, including project-based learning, internships, and lab-based education, and their impact on student learning.

Session 6: Leadership and Capacity Building for Teachers in Higher Education

Speaker:Dr. S. Radhakrishnan, Joint Director, Directorate of Technical Education.

This session emphasized *leadership qualities among faculty members* and the role of teachers in guiding students beyond academics. Strategies for building a strong *teaching-learning ecosystem* were discussed.

Day 4: 16th January 2025

Session 7: Application of AGILE in Teaching

Speaker: Mr. Abhrachan, Domain Expert, Wrench.

This session introduced Agile methodologies in education, drawing parallels between software development and adaptive teaching strategies. Concepts like Scrum, Kanban, and iterative learning were explored, demonstrating how Agile can be applied to curriculum design and student projects.

Article Discussion: How to Implement Experiential Learning in UG Engineering Education

Participants discussed strategies to incorporate real-world problem-solving techniques in undergraduate education, aligning coursework with industry needs.

Session 8: Life Skills

Speaker: Dr. Minna Ann Andrews, Dept. of Journalism, Sacred Heart College, Ernakulam.

This session emphasized life skills essential for students and faculty, including critical thinking, adaptability, and resilience. It also covered aspects of mental well-being and stress management in academic environments.

Day 5: 17th January 2025

Industrial Visit: KMML Ltd, Chavara

As part of the AICTE ATAL-sponsored 6-day Faculty Development Program (FDP) on "Integrating Technology in Engineering Pedagogy," organized by TKM Institute of Technology, Kollam, an industrial visit to Kerala Minerals and Metals Limited (KMML), Chavara, Kollam, was conducted on January 17, 2025. This visit offered participants an exceptional opportunity to engage with advanced industrial practices and technologies that are revolutionizing various sectors, particularly the production of titanium dioxide.

The journey commenced at 8:00 AM from TKM Institute of Technology, and the team arrived at KMML at approximately 9:15 AM. Upon arrival, the visit officially began with mandatory entry formalities, which included a strict security check and the restriction of electronic devices such as phones, ensuring the safety and confidentiality of the site. Participants were then given a thorough safety orientation session lasting over an hour, which was designed to inform them about the rigorous safety protocols and environmental regulations followed by KMML. The session was led by a safety officer and included a detailed explanation of the measures taken by KMML to protect both its workforce and the surrounding ecosystem. These measures include robust emergency response systems, waste management practices, and continuous monitoring of environmental parameters. The participants were particularly impressed by the company's commitment to upholding high standards of safety and environmental sustainability.

Following the safety orientation, the group was guided on a tour of KMML's state-of-the-art manufacturing units. KMML is India's only Rutile Grade Titanium Dioxide production facility, utilizing the advanced chloride route to produce titanium dioxide of exceptional purity. Titanium dioxide is a critical raw material used in various industries, such as paints, plastics, cosmetics, and pharmaceuticals. The facility's ability to produce such high-grade titanium dioxide is a testament to KMML's technological expertise and commitment to delivering premium-quality products. What sets KMML apart is its commitment to sustainable manufacturing practices. The facility not only minimizes waste but also innovatively reuses by-products, ensuring a zero-waste production model. This dedication to environmental responsibility positions KMML as a leader in the industry, both in terms of production quality and ecological impact.

During the visit, the participants had the opportunity to observe several key units, including the Ilmenite Beneficiation Plant, Acid Regeneration Plant, Pigment Production Plant, Oxygen Plant, and the Utility Section. Each unit is dedicated to specific processes in the production of titanium dioxide, starting with the extraction of ilmenite, followed by reduction, leaching, and beneficiation. The final transformation process turns raw ilmenite into high-purity titanium dioxide pigment. The process involves several stages, each critical to ensuring the purity and quality of the final product. Participants were fascinated by the intricate details of the manufacturing processes, with a particular focus on how KMML's advanced technology reduce energy consumption and optimize production efficiency.

A highlight of the visit was the exploration of the Titanium Sponge Plant (TSP), a pioneering facility that positions India as the 7th country in the world with the capability to produce titanium sponge, a critical material in aerospace and defence industries. The TSP uses the Kroll method under high-purity argon atmospheres, a sophisticated process that extracts titanium from titanium tetrachloride. The

participants were shown how the titanium sponge is produced and its subsequent use in industries like aerospace, nuclear power plants, ocean platforms, and medical fields, including dental implants and artificial bones. The TSP is a joint venture between KMML, Vikram Sarabhai Space Centre (VSSC), and the Defence Metallurgical Research Laboratory (DMRL), marking a significant milestone in India's technological progress and its contribution to global aerospace and defence applications.

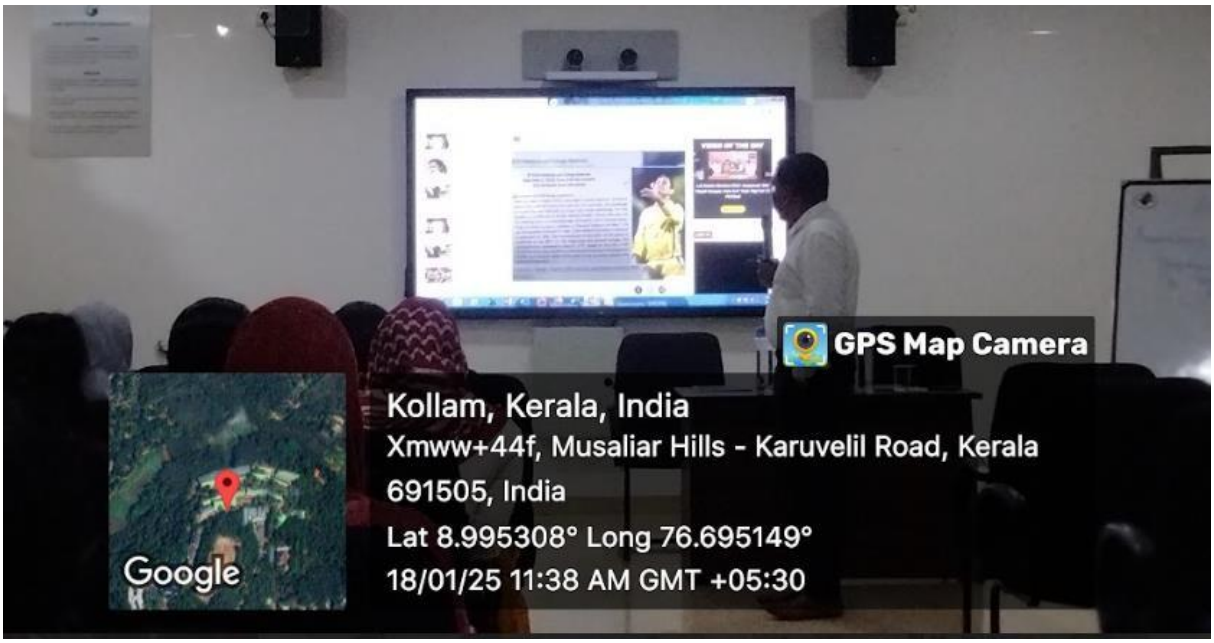
The visit concluded at 1:30 PM, leaving participants with a deeper understanding of KMML's innovative technologies, sustainable practices, and their wide-ranging applications in various industries. This immersive experience bridged the gap between theoretical knowledge and real-world industrial practices, providing valuable insights that can be integrated into engineering pedagogy. By observing how advanced technologies are implemented in manufacturing, participants gained a clearer perspective on how these concepts can be applied in their own academic fields to inspire innovation and foster a deeper connection between academia and industry.

Day 6: 18th January 2025

Session 9: Assessment and Evaluation Innovations

Speaker: Dr. K. S. Giridharan, Associate Professor, NITTTR Chennai.

This session focused on *modern assessment techniques, including **outcome-based education (OBE), continuous evaluation, and AI-powered assessment tools. The discussion highlighted the shift from traditional exams to **competency-based assessment models.



MCQ & Reflection Journal for Participant Evaluation

Participants completed MCQs and reflection journals to assess their understanding and application of the FDP sessions.

Valedictory Session & Certificate Distribution

The FDP concluded with a valedictory session, where participants shared feedback on their learning experience. Certificates were distributed, marking the successful completion of the training program.

Hands-on Training & Labs

Each day concluded with Hands-on Training & Labs, allowing participants to apply the methodologies discussed in the sessions.

Activities included:

Developing AI-powered teaching modules

Creating flipped classroom lesson plans

Implementing Agile principles in course planning

Designing assessment rubrics for outcome-based education

Conclusion

The AICTE-ATAL-sponsored FDP on "Integrating Technology in Engineering Pedagogy" provide valuable insights into modern teaching methodologies. The sessions explored technology-driven pedagogical approaches, AI applications, industry-academia collaborations, experiential learning, and skill development beyond technical knowledge.

The positive feedback from participants highlighted the impact of the FDP* in enhancing the quality of engineering education. Faculty members expressed their appreciation for the interactive sessions, hands-on training, and exposure to innovative teaching-learning strategies.

The FDP successfully empowered educators to integrate technology-driven methodologies into their teaching, ensuring a more engaging and effective learning experience for students.