Capacity Building Program for Computer Science Teachers (PGT & TGT) of DOE, GNCTD and DIET/SCERT faculty, Delhi

At

Indian Institute of Technology (IIT), Mandi

From

16th December to 20th December 2024
(5 Days)

Details of the Program

- No. of proposed participants: 40
- No. of participants attended: 39
- Stakeholders: TGT & PGT Computer Science of Directorate of Education, GNCT Delhi
- Transaction Methodology: Experiencial Learning
- Name of Coordinator: Dr. Priyanka Bhardwaj & Mr. Ashu
- Report by: Dr. Priyanka Bhardwaj

Schedule of Training

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Monday	16-12-2024	Inaugural	Introduction and Motivation	Break	ICE Breaking	Lunch	Creative Thinking	Story Telling with Data	Break	Data Visualization Hands on
Tuesday	17-12-2024	Algorithmic Thinking	Pedagogical Innovations and Strtategies		Active and Blended Learning		Visit to IHuB	Visit to IHuB		Visit To Mandi
Wednesday	18-12-2024	Introduction to AI and Automation	Project Based and Inclusive Learning		Project Based and Inclusive Learning		Parashar Visit			Parashar Visit
Thursday	19-12-2024	Digital Content Creation	Digital Content Creation		Ethics in AI		Cybersecurity	Tinkerling Lab		Tinkerling Lab
Friday	20-12-2024	Gamification in Education	Digital and Formative Assessments		Portfolio based Assesment		Information Literacy and 21st century skills in education and learning	Information Literacy and 21st century skills in education and learning		Validictorian Function

Objectives of the Program 

Here are the objectives of the training program:

1. **Enhance AI Integration** – Equip teachers with the knowledge and skills to effectively integrate AI into their teaching methodologies.
2. **Strengthen Computational Thinking** – Foster creative and algorithmic thinking to improve problem-solving skills among students.
3. **Promote Hands-on Learning** – Provide practical exposure to emerging technologies like AI, machine learning, and data science.
4. **Improve Pedagogical Approaches** – Introduce innovative teaching techniques such as gamification, active learning, and Bloom's taxonomy.
5. **Encourage Collaboration and Knowledge Sharing** – Facilitate peer learning, discussions, and the exchange of best practices among educators.

Training Program - Brief Overview

Day 1: Inaugural and Foundational Activities

- **Inauguration:** Faculty from the School of Management and Centre for Continuous Education (CCE), IIT Mandi, welcomed participants with customized goodies.
- **Sessions:**
  - *Introduction and Motivation:* Prof. Pooran Singh emphasized teamwork through interactive activities. Key concepts included breaking down problems and optimizing solutions.
  - *Algorithmic Thinking:* Prof. Anjan Kumar Swain used logical puzzles to introduce algorithms in an engaging manner.
  - *Creative Thinking and Data Visualization:* Prof. Manoj Thakur highlighted unconventional methods to present data through storytelling and visualization.
  - *Late-night Quiz:* A mathematical and logical puzzle competition concluded the day.

Day 2: Advanced Teaching Strategies and Data Techniques

- **Algorithmic Thinking:** Emphasis on structured problem-solving by breaking down complex issues.
- **Pedagogical Innovation:** Prof. Thakur discussed integrating modern tools for student-centric learning.
- **Storytelling with Data:** Participants explored narratives to simplify complex datasets.
- **Visit to IHUB:** Showcased cutting-edge technologies, inspiring ideas for classroom applications.
- **Drawing Activity:** Encouraged visual creativity for enhancing communication.


Day 3: Problem-Solving and Cultural Exploration

- **Sessions:**
  - *Algorithmic Thinking:* Prof. Swain introduced variables, constraints, and objectives for optimized solutions.
  - *Birthday Paradox:* Dr. Thakur used probability theory to challenge intuitive thinking.
  - *Spaghetti Problem:* Focused on optimization and logical reasoning.
- **Cultural Visit:** Participants visited Parashar Lake and its temple, blending learning with local heritage.


Day 4: Digital Tools and Machine Learning

- **Digital Content Creation:** Training on tools like Adobe Premiere Pro, Camtasia, and Canva for creating engaging content.
- **Machine Learning:** Introduction to ML concepts, algorithms, and Python libraries, with hands-on sessions.
- **Tinkering Lab Visit:** Showcased innovative projects like Li-Fi and plasma technology.


Day 5: Pedagogical Techniques and Emerging Technologies

Bloom's Taxonomy Activity: Structured learning objectives and assessments for fostering critical thinking.

- **Artificial Intelligence:** Explored AI categories and their applications in education.
- **LaTeX Technology:** Introduction to professional document preparation for academia.
- **Cultural Exploration:** Participants explored Mandi city, visiting temples and local markets.

Valedictory Session: Certificate ceremony

The valedictory session concluded the 5-day Capacity Building Program with the virtual presence of **Director, SCERT, Delhi**, and **Dr. Sapna Yadav**, who joined to address participants and participate in the certificate distribution ceremony.

The Director appreciated IIT Mandi's efforts in organizing an impactful program and encouraged participants to implement their learnings to transform classrooms. Dr. Sapna Yadav emphasized the importance of innovative teaching and interdisciplinary approaches, urging educators to act as change-makers in their schools.

Certificates were distributed online, and participants shared heartfelt feedback, expressing gratitude to SCERT, IIT Mandi, and the resource persons for the enriching experience.

The session concluded with closing remarks from the organizers, celebrating the program's success and inspiring participants to lead the way in modernizing computer science education.

Outcomes:

Participants gained:

1. Enhanced problem-solving and teaching strategies.
2. Hands-on experience with digital tools and AI integration.
3. Exposure to innovative technologies and cultural heritage.

This well-rounded program provided tools and insights to modernize computer science education and foster dynamic learning environments.

Feedback from participants

Participants found the training highly enriching and engaging, praising the hands-on sessions and exposure to emerging technologies. They appreciated the opportunity to learn from esteemed faculty members and gain insights into AI, programming, and real-world applications. The interactive and practical approach was well-received, with many highlighting the relevance of the training to their teaching methodologies. The integration of pedagogy, gamification, and innovative learning strategies was seen as a major strength. Overall, participants described the experience as insightful and valuable, equipping them with tools to enhance their classrooms effectively.

Plan for Implementation of Learning Outcomes (by Participants)

The feedback from participants of the Capacity Building Program (CBP) on AI conducted at IIT Mandi. The insights gathered reflect their commitment to integrating AI-driven methodologies into their teaching practices.

Takeaways for Classroom Implementation

- Use active and blended learning strategies.
- Implement continuous and customized assessments.
- Apply Bloom's Taxonomy for evaluation and question design.
- Gamify topics using Scratch, Python, and interactive tools.
- Promote collaboration through group projects and discussions.
- Utilize AI platforms for Personalised Learning.
- Use Jigsaw methodology for effective concept delivery.
- Encourage teamwork with structured group activities.
- Design lessons with creative content and engaging tasks.
- Leverage Google Forms for data collection and feedback.
- Foster ethical awareness and inclusivity in learning.
- Mix theoretical knowledge with lab sessions.
- Involve students actively through project-based learning.
- Transform assessments into interactive and fun challenges.
- Reframe activities into puzzle-like situations.
- Integrate other subject teachers for interdisciplinary learning.

Conclusion 

The 5-day Capacity Building Program at IIT Mandi was an enriching experience that blended advanced pedagogical strategies, emerging technologies, and cultural exploration. Each session was meticulously designed to equip educators with innovative teaching methods, practical tools, and conceptual frameworks, ensuring their ability to foster engaging and dynamic learning environments.

The exposure to algorithmic thinking, data visualization, machine learning, and digital content creation, combined with hands-on activities and interactive sessions, has empowered participants to bring modern, student-centric approaches to their classrooms. Moreover, the integration of cultural visits and creative activities added a unique dimension, reinforcing the importance of holistic development in education.

The participants extend their heartfelt gratitude to IIT Mandi's esteemed faculty—Prof. Manoj Thakur, Prof. Anjan Kumar Swain, Dr. Pooran Singh, and others—for their guidance and innovative teaching approaches. The warm hospitality, state-of-the-art facilities, and thoughtful arrangements, including visits to IHUB and the Tinkering Lab, greatly enhanced the learning experience.

Special thanks are due to the organizers at the Centre for Continuous Education (CCE), IIT Mandi, for their dedication to fostering professional growth among educators. Their efforts in planning and delivering this program with precision and passion ensured its resounding success.

The participants look forward to applying these newfound insights and tools in their teaching practices, creating ripple effects in classrooms across the region. IIT Mandi's vision and commitment to empowering educators will undoubtedly contribute to shaping the future of computer science education in India.