

INDIVIDUAL COURSE DETAILS

ITEC

Smart Technology Integration Frameworks for Transformative 21st Century STEM Teaching and Learning

A. Name of the Institute	National Institute of Technical Teachers Training and Research Institution Deemed to be University under Distinct Category, A Centrally Funded Technical Institute Ministry of Education Government of India, Taramani, Chennai • 600 113.
B. Name / Title of the Course	Smart Technology Integration Frameworks for Transformative 21 st Century STEM Teaching and Learning
C. Course Dates with Duration in Weeks	Weeks:2 Start Date : 16-09-2026 End Date:29-09-2026
D. No. of days of Training	Days: 14 Learning hours (Approximate):80
E. Eligibility Criteria for Participants	
1. Educational Qualification	Graduate Degree/ in Science / Maths/ Education / Engineering / Technology/TVET and good proficiency in spoken, written and comprehension of English.
2. Work Experience required, if any	Working Experience related to Education / TVET / Technical Education / Vocational education / Industrial Education / Technical School / Polytechnic / University / Engineering College
3.Age Limit	Less than 45 years
4. Target Group	Senior Teachers / Academicians / Trainers / Administrators / Senior Faculty of Institutions like TVET Institutes/ Vocational Colleges / Technical Schools / Polytechnics / Engineering Colleges / University Departments
F. Aims & Objectives of the Course	At the end of the two-week international training programme, the participants will be able to: • Understand the need for transformative STEM education in the context of 21st-century global challenges. • Explain smart technology frameworks that enhance teaching, learning, and assessment in STEM education. • Integrate digital, AI-enabled, and intelligent technologies with effective STEM pedagogy. • Design outcome-based, learner-centric STEM courses using smart technology frameworks.

	• Apply innovative instructional strategies such as project-based, inquiry-based, and experiential learning. • Utilize virtual laboratories, simulations, and immersive tools for hands-on STEM learning. • Develop technology-enabled assessment and evaluation strategies aligned with learning outcomes. • Use learning analytics and AI tools to monitor learner performance and support personalized learning. • Design blended, flipped, and smart classroom learning environments. • Formulate individual and institutional action plans for sustainable implementation of smart technologies in STEM education.
G. Course Contents / Syllabus (Day-Wise Schedule, topics covered)	• 21st-Century STEM Education: Concepts and Challenges • Pedagogical Frameworks for Transformative STEM Teaching • Smart Technologies and AI in STEM Education • Virtual Labs, Simulations, and Immersive Technologies • Learning Design for Smart STEM Courses • Innovative Teaching Strategies using Smart Technologies • Smart Assessment and Evaluation Methods • Learning Analytics and Personalized Learning • Smart Classrooms and Digital Learning Ecosystems • Case studies on successful Smart Technology integration in STEM classrooms • Hands-on sessions on utilizing digital resources for STEM education • Creation of engaging digital content for different STEM topics • Strategies for promoting collaboration and teamwork in STEM classes • Group activities and projects using collaborative ICT tools • Integrating Emerging Technologies in STEM Education • Active Learning Strategies and Technology • Real-world applications of problem-solving in STEM disciplines • Designing Technology-Enhanced STEM Lesson Plans • Innovation, Research, and Action Plan Development

	IMPLEMENTATION STRATEGIES The course will be delivered through a modular approach, covering various topics under each subject area and employing a diverse mix of teaching and learning methods, including: • Lectures and interactive discussions • Practical laboratory sessions • Seminars and expert guest lectures • Project-based learning activities • Group discussions and collaborative exercises • Case study-based assignments • Independent self-study sessions • Educational field visits for experiential learning
H. Mode of Evaluation of Performance of the ITEC Participants	The following strategies will be used for effective performance evaluation of participants • Evaluation of assignments • Evaluation of Hands on practice • Paper presentation • Workshop output • Evaluation of Project work and subsequent presentations The participants will be evaluated using the above strategies and the Evaluation Process itself to be used as a tool for learning.
J. Name of the Department	Department of Electrical and Electronics Engineering
K. Name of the Coordinator	Dr. R. Suja Mani Malar Associate Professor, EEE Department