GIAN Course on

Sustainable Infrastructure Monitoring with AI-Inspired Machine Learning

Course Code: 2700063

SEPTEMBER 15-25, 2025

DEPARTMENT OF CIVIL ENGINEERING

INDIAN INSTITUTION OF TECHNOLOGY (BHU), VARANASI

Overview

A vital part of contemporary development initiatives aiming at building robust, environmentally friendly, and socially just infrastructure systems is sustainable infrastructure monitoring. It entails the ongoing evaluation and management of infrastructure assets to guarantee that they minimize negative environmental effects while meeting the demands of present and future generations. Incorporating AI-inspired machine learning for sustainable infrastructure monitoring is a paradigm change in how we handle the maintenance and oversight of essential systems. The need for infrastructure solutions that are not just reliable and effective but also resilient and sustainable is growing as the world's population rises, urbanization picks up speed, and environmental problems worsen. We can maximize asset performance, anticipate possible failures, and reduce risks by incorporating AI-inspired machine-learning techniques into infrastructure monitoring procedures. This will minimize environmental impact and foster long-term sustainability. The goal of this course is to provide participants with the information and abilities needed to monitor and manage infrastructure projects using cutting-edge AI techniques. The course is called Sustainable Infrastructure Monitoring with AI-Inspired Machine Learning. The need for sustainable infrastructure solutions is developing in the quickly changing modern world, and machine learning with an AI influence provides effective tools to improve the durability, resilience, and efficiency of infrastructure systems. Hence, to expose Indian engineers and scientists to these aspects and to train them to serve the Indian industry to be globally competitive, this course focuses on some multidisciplinary scientific aspects of AI and infrastructure monitoring.

Modules	✓ AI and its applications ✓ Machine learning algorithms ✓ Data collection and sensors ✓ Pre-processing and feature extraction ✓ AI models for infrastructure monitoring ✓ Multi-modal data fusion and integration ✓ Bio-inspired AI in structural health monitoring ✓ Real-time structural health monitoring ✓ Advanced topics: meta-learning in infrastructure monitoring
Who can attend	i) Students at all levels (BTech/BE/BSc/MSc/MTech/ME/PhD), both undergraduate as well as postgraduate of all technical institutions, including Post-Doctoral Fellows. ii) Executives, engineers, and researchers from manufacturing, service, and government organizations including R&D laboratories. iii) Faculty, Teachers from Academic and Technical Institutions

Fees	The participation fees (including GST) for taking the course are as follows: **Participants from abroad (Except Students): US $500** **Industry/ Research Organizations: Rs. 11,800/-** **Academic Institutions:** ● **Rs. 5,900/- (Faculty)** ● **Rs. 1,180/- (Students)** ● **Rs. 500/- (IIT BHU Students)** ● **Rs. 1770/- (Technical staff/Officer)** ● **US $350 (Foreign Students)** The payment should be made to the following bank account: Name of Bank: **State Bank of India** Account Name: IIT(BHU)-Main Account (Institute Development Fund) Account Number: **32778803937** Account Type: **Current Account** Account Holder's Name: **The Registrar, IIT(BHU)** IFSC Code: **SBIN0011445** ***Please save the screenshot of successful transaction**
Accommodation	The participants may be provided with accommodation on a payment basis based on availability. 1. IIT(BHU) Guest House: Single/Double occupancy AC rooms, Charges ₹2000/- per day plus GST (Exclusive of food). 2. Hostel: Single/Twin sharing a non-AC room, Charges ₹70/- per day (Exclusive of food). 3. Hotels/Guest Houses just outside the campus at your own cost.
Registration	★ The number of seats is limited to **60** only. ★ Last date of registration is **31st August, 2025**. ★ All registered participants **must fill** out this Google form: https://forms.gle/Yr3bvB1mN7DxZKRa7
Benefits from the courses	i) Participants will understand the fundamentals of sustainable infrastructure and its critical role in addressing contemporary societal and environmental challenges. ii) Participants will be able to interpret and analyse by applying machine learning and artificial intelligence techniques to monitor and manage infrastructure systems. iii) Participants will perform real-world case studies and live projects to gain hands-on experience in AI-enabled sustainable infrastructure applications. iv) Participants will evaluate and interpret the ethical implications and challenges associated with the use of AI in infrastructure monitoring. v) Participants will enhance their ability to contribute to research and industry through informed, responsible, and technologically advanced approaches to sustainable infrastructure.

The Faculty

Dr. Susmita Naskar, Foreign Faculty

Dr. Susmita is a Senior Lecturer (UK Associate Professor) in the School of Engineering at the University of Southampton. She worked as a postdoctoral research fellow at the Whiting School of Engineering of Johns Hopkins University in the collaboration of Army Research Lab, USA. She moved to the USA after completing her doctoral degree from the University of Aberdeen. She was also a visiting doctoral student at the University of Oxford during that period.

Dr. Naskar leads the Engineered Materials and Structures Lab (EMSL), where her research focuses on multi-scale structural mechanics, multi-physics analysis, and machine learning-assisted design of engineered materials and structures including metal, metamaterials and composites. Her research works use these basic principles to understand cutting-edge multiscale and multidisciplinary problems in applied science and engineering. She has authored over 60 high-impact journal articles, several book chapters, and two books published by CRC Press in these areas. She is a Fellow of the Royal Aeronautical Society, among other honors, and also holds fellowship for Higher Education Academy, UK.

Dr. Basuraj Bhowmik

Dr. Basuraj Bhowmik is a Lecturer (UK Assistant Professor) in the Department of Civil and Environmental Engineering at the University of Strathclyde. He was a Postdoctoral Research Fellow at the University College Dublin, Ireland, where he co-led EU- and SEAI-funded initiatives on real-time wind turbine monitoring.

Dr. Bhowmik's research advances real-time structural health monitoring, intelligent infrastructure, and renewable energy systems, with special focus on recursive signal processing, single-sensor analytics, and digital twin frameworks. As the lead of the OSCAR Lab, he has authored a CRC Press book and numerous journal articles in high-impact publications. A recipient of multiple international awards - including the SEAI Research Excellence Award and the CII MILCA Award - he has delivered Keynotes and invited talks, and chaired sessions at leading conferences including ASCE EMI, IOMAC, and EWSHM.

Dr. Samim Mustafa, Course Coordinator

Dr. Samim Mustafa is presently working as an Assistant Professor in the Department of Civil Engineering of **Indian Institute of Technology (BHU)**, Varanasi. He was a Postdoctoral Research Fellow in Advanced Research Laboratories of **Tokyo City University**, where he co-led projects with Japanese industries such as Tokyo Metropolitan Expressway Company (Shutoko), Toyota, Epson etc. on real-life problems related to Structural Health Monitoring (SHM) and Condition Assessment. Dr. Mustafa was a recipient of highly prestigious **MEXT scholarship** by the Japanese government during his doctoral study from Saitama University.

Dr. Mustafa leads the Structural Health Monitoring and Condition Assessment (SHMCA) Lab, where his research focuses on Bridge weigh-in-motion, fatigue damage evaluation of existing bridges, Bayesian frameworks, Finite-element model updating, Seismic response analysis, damping analysis, System identification, Distributed optical fiber sensing. He has also served as a reviewer in many reputed international journals and chaired special sessions in conferences worldwide.

Course Coordinator
Dr. Samim Mustafa
Assistant Professor
Department of Civil Engineering
Indian Institute of Technology (BHU), Varanasi
Email: samim.civ@iitbhu.ac.in

GIAN: Global Initiative of Academic Network

Name of the course: Sustainable infrastructure monitoring with AI inspired machine learning
(Course ID: 2700063)
Dates: 15 – 25 September, 2025
Department of Civil Engineering, Indian Institute of Technology (BHU) Varanasi, India

REGISTRATION FORM

All registered participants must fill out this Google form:

https://forms.gle/Yr3bvB1mN7DxZKRa7

or Scan the QR Code for Registration