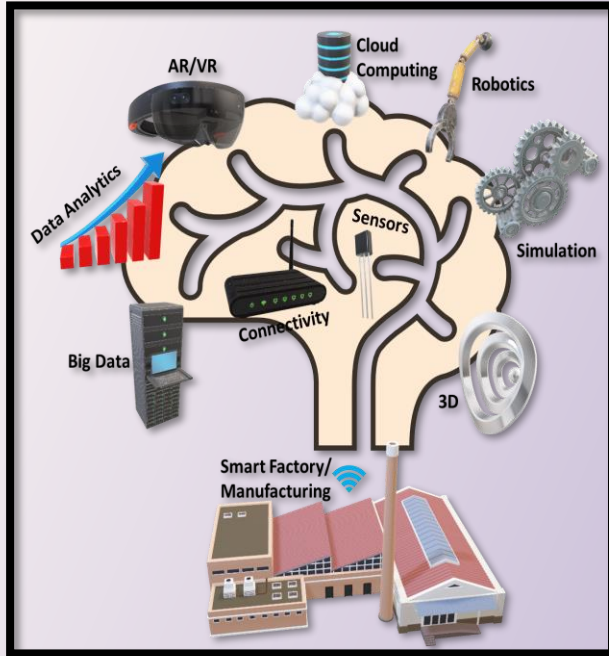


Elements of Smart Manufacturing



REGISTRATION

No registration fee will be charged to the teachers of AICTE recognized technical institutions / Engineering Colleges / Universities.

To register scan here



Or click on the following link:

[ESM2021 @ IIT Madras](#)

Eligibility

Teachers of AICTE recognized Engineering Colleges are eligible to apply for participation.

Important Dates

Receipt of Registration Form: 28.01.2021

Intimation of Selection: 01.02.2021

Confirmation of Participation: 05.02.2021

Contact Information

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Coordinators

STTP on ESM

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Short Term Training Programme on Elements of Smart Manufacturing (ESM)

February 15 - 20, 2021

Coordinators

Dr. Sivasrinivasu Devadula,

Dr. Piyush Shakya

Under

Quality Improvement Programme



Department of Mechanical Engineering

Indian Institute of Technology Madras

Chennai – 600 036, India.

Introduction

The Indian Institute of Technology Madras, established by the Government of India in 1959, is among the foremost of Institutes in India and abroad in higher technical education and fundamental and applied research. The Institute, located in a lush green forest covered land of about 250 hectares in South Chennai, has about 565 Faculty, 8300 Students, and 700 Administrative and Supporting Staff working in various departments and centers.

Mechanical Engineering is one of the major activities in the engineering profession and its principles are involved in the design, study, development and construction of nearly all of the physical devices and systems. Continued research and development have led to better machines and processes helping the mankind. The Department of Mechanical Engineering at IIT Madras is as old as the Institute itself. Its impact on the institute and on society is easily demonstrated by noting the alignment of the department's evolution with key events and technological advances in the India and elsewhere. Today, the department of Mechanical engineering of IIT Madras attracts and features an extraordinary rich diversity and quantity of talented individuals, with nearly 700 undergraduates, 500 graduate students and over 60 faculty members. The impressive array of students makes the department as the largest in the country and one of the largest in Asia.

The Background

The emerging field of “Smart Manufacturing” is defined by NIST (National Institute of Standards and Technology), USA as “systems that are fully-integrated and collaborative, which respond in real time to meet changing demands and conditions”. A survey from NIST indicates that the manufacturer would save up to \$ 57.4 billion annually by implementation of the smart manufacturing concepts. In addition to the reduced costs, the information captured during the

manufacturing will change the way design is approached (e.g. push design for manufacturing) and reduces design cycle time. The field of smart manufacturing is wide and involves expertise from multiple interdisciplinary fields, such as networking, sensors, connectivity, signal processing, computing, data analytics, machine learning, statistics, machine tools, mechatronics, optimization, maintenance strategies etc. Hence, there is an immediate need to have a better understanding on the involved technologies and concepts that help researchers in generating novel ideas in their respective fields and embracing the Industry 4.0 towards a better society.

Objective and Scope

The course objective is to provide a gentle exposure to various enabling technologies that collectively provide a good platform to get started with realization of Industry 4.0 concepts in the manufacturing shop floor environment (as a case study). It will be a starting point for academicians interested in smart manufacturing so that some concepts may percolate the course material taught.

In addition, IIT-Madras has developed Smart Manufacturing solutions for machine tools, in collaboration with industry partners where the core concepts of Smart Manufacturing are applied and implemented to various machining systems, which is a combination of ‘machine tool’ and ‘machining process’. The scope of the program includes introducing the concepts of Smart Manufacturing and enabling technologies: cyber physical systems, machine learning, data analytics, Industrial Internet of things (IIoT), digital twins, implemented in the projects taken up by IIT-Madras and also includes various experts both from industry and reputed academia.

Faculty

The faculty will be eminent personalities drawn from reputed academic and research organizations along with various industries.

Course contents

1. Smart manufacturing/Industry 4.0
 - a. Manufacturing automation
 - b. Smart factories
2. Condition Monitoring (application of various techniques to monitor machine health)
 - Sensors, Signal Processing and monitoring of individual modules of machine tools
3. Machine Tools
 - High precision-, large scale-, multi-axis-, multi-purpose- machine tools and their Characterization
4. Additive Manufacturing (demonstrative case studies)
5. Robotics in Smart Manufacturing
6. Digital Twins (demonstrative case studies from various fields)
7. Industrial Internet of Things (IIoT)
8. Cyber Physical Systems (CPS)
9. Augmented Reality and Virtual Reality (AR/VR) (demonstrative case studies)
10. Data analytics and Machine learning

Demonstrations

Online demonstrations by considering various research- and industry- case studies related to elements of Smart Manufacturing.