



# INTRODUCTION TO INDUSTRY 4.0 AND INDUSTRIAL INTERNET OF THINGS

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Department of Computer Science and Engineering  
IIT Kharagpur

**TYPE OF COURSE** : Rerun | Core | PG

**COURSE DURATION** : 12 weeks (18 Jan' 21 - 9 Apr' 21)

**EXAM DATE** : 25 Apr 2021

**PRE-REQUISITES** : Basic knowledge of computer and internet

**INTENDED AUDIENCE** : CSE, IT, ECE, EE, Instrumentation Engg, Industrial Engineering, Industry Professionals

**INDUSTRIES APPLICABLE TO** : All Industrial Sectors

**COURSE OUTLINE :**

Industry 4.0 concerns the transformation of industrial processes through the integration of modern technologies such as sensors, communication, and computational processing. Technologies such as Cyber Physical Systems (CPS), Internet of Things (IoT), Cloud Computing, Machine Learning, and Data Analytics are considered to be the different drivers necessary for the transformation. Industrial Internet of Things (IIoT) is an application of IoT in industries to modify the various existing industrial systems. IIoT links the automation system with enterprise, planning and product lifecycle. This course has been organized into the following modules:

**ABOUT INSTRUCTOR :**

Prof. Sudip Misra is a Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology Kharagpur. Prior to this he was associated with Cornell University (USA), Yale University (USA), Nortel Networks (Canada) and the Government of Ontario (Canada). He received his Ph.D. degree in Computer Science from Carleton University, in Ottawa, Canada. He has several years of experience working in the academia, government, and the private sectors in research, teaching, consulting, project management, architecture, software design and product engineering roles. His current research interests include Wireless Ad Hoc and Sensor Networks, Internet of Things (IoT), Computer Networks, Learning Systems, and algorithm design for emerging communication networks.

**COURSE PLAN :**

**Week 1:** Introduction: Sensing & actuation, Communication-Part I, Part II, Networking-Part I, Part II

**Week 2:** Industry 4.0: Globalization, The Fourth Revolution, LEAN Production Systems

**Week 3:** Industry 4.0: Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management

**Week 4:** Cybersecurity in Industry 4.0, Basics of Industrial IoT: Industrial Processes-Part I, Part II, Industrial Sensing & Actuation

**Week 5:** IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models-Part I, Part II, IIoT Reference Architecture-Part I, Part II.

**Week 6:** Industrial IoT- Layers: IIoT Sensing-Part I, Part II, IIoT Processing-Part I, Part II, IIoT Communication-Part I.

**Week 7:** Industrial IoT- Layers: IIoT Communication , IIoT Networking-Part I, Part II, Part III.

**Week 8:** Industrial IoT: Big Data Analytics and Software Defined Networks: IIoT Analytics - Introduction, Machine Learning and Data Science

**Week 9:** Industrial IoT: Big Data Analytics and Software Defined Networks: SDN in IIoT-Part I, Part II, Data Center Networks, Industrial IoT

**Week 10:** Industrial IoT: Security and Fog Computing - Fog Computing in IIoT, Security in IIoT-Part I, Part II, Industrial IoT- Application Domains

**Week 11:** Industrial IoT- Application Domains: Healthcare, Power Plants

**Week 12:** Industrial IoT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies