



INTRODUCTION TO INTERNET OF THINGS

PROF. SUDIP MISRA

Department of Computer Science and Engineering
IIT Kharagpur

PRE-REQUISITES : Basic programming knowledge

INTENDED AUDIENCE : CSE, IT, ECE, EE, Instrumentation Engineering, Industrial Engineering

COURSE OUTLINE :

Internet of Things (IoT) is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defence sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

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. Prof. Misra is the author of over 260 scholarly research papers, including 140+ reputed journal papers. He has won seven research paper awards in different conferences.

COURSE PLAN :

- Week 1:** Introduction to IoT: Part I, Part II, Sensing, Actuation, Basics of Networking: Part-I
- Week 2:** Basics of Networking: Part-II, Part III, Part IV, Communication Protocols: Part I, Part II
- Week 3:** Communication Protocols: Part III, Part IV, Part V, Sensor Networks: Part I, Part II
- Week 4:** Sensor Networks: Part III, Part IV, Part V, Part VI, Machine-to-Machine Communications
- Week 5:** Interoperability in IoT, Introduction to Arduino Programming: Part I, Part II, Integration of Sensors and Actuators with Arduino: Part I, Part II
- Week 6:** Introduction to Python programming, Introduction to Raspberry Pi, Implementation of IoT with Raspberry Pi
- Week 7:** Implementation of IoT with Raspberry Pi (contd), Introduction to SDN, SDN for IoT
- Week 8:** SDN for IoT (contd), Data Handling and Analytics, Cloud Computing
- Week 9:** Cloud Computing(contd), Sensor-Cloud
- Week 10:** Fog Computing, Smart Cities and Smart Homes
- Week 11:** Connected Vehicles, Smart Grid, Industrial IoT
- Week 12:** Industrial IoT (contd), Case Study: Agriculture, Healthcare, Activity Monitoring