



Model Institute of Engineering  
& Technology (Autonomous)  
**Course Handout**

Kot, Bhalwal, Jammu

## COURSE HANDOUT

FOUNDATIONS OF INTERNET OF THINGS AND INDUSTRY 4.0  
(COM-802(C))

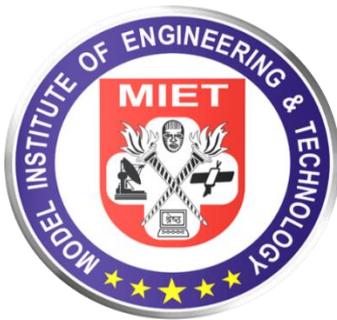
CSE-8<sup>th</sup> SEMESTER

ACADEMIC YEAR (2024-25)

**Ms. Gurpreet Kour Sodhi**

Assistant Professor

Electronics and Communication Engineering Department



Department of Computer Science and Engineering

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1



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Course Code	Course Name	Cd	L	T	P	Marks Sessional	Course Code		
							Sessional	Final Exam	Total
COM-802(C)	Foundations of Internet of things and Industry 4.0	4	3	1	0	50	COM-802(C)	Foundations of Internet of things and Industry 4.0	4

### COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Describe the importance of Industry 4.0 for meeting future societal needs.
CO2	Develop critical understanding on cyber-physical systems amalgamating sensors, AI, Big Data analytics and cybersecurity and their applications.
CO3	Explain the architecture of Industrial Internet-of-Things.
CO4	Evaluate the structure operations of Industrial Internet-of-Things through supporting technologies such as SDNs and Big Data Analytics.
CO5	Appraise the diverse application of Industry 4.0 and related management concepts.

#### Section A

**Unit I:** Introduction: Sensing & actuation, Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Smart and Connected Business Perspective, Smart Factories. (9 Hrs.)

**Unit II:** Industry 4.0: Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis. Cybersecurity in Industry 4.0, Basics of Industrial IoT: Industrial Processes, Industrial Sensing & Actuation, Industrial Internet Systems. (9 Hrs.)

**Unit III:** Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models, IIoT Reference Architecture, Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication, Industrial IoT- Layers: IIoT Communication, IIoT Networking. (9 Hrs.)

#### Section B

**Unit IV:** Industrial IoT: Big Data Analytics and Software Defined Networks: IIoT Analytics - Introduction, Machine Learning and Data Science, Data Management with Hadoop, Industrial IoT: Big Data Analytics, Software Defined Networks: SDN in IIoT, Data Center Networks, Industrial IoT: Security and Fog Computing: Cloud Computing, Security in IIoT, Industrial IoT- Application Domains: Factories and Assembly Line, Food Industry. (9 Hrs.)

**Unit V:** Industrial IoT- Application Domains: Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security (Including AR and VR safety applications), Facility Management, Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies like Milk Processing and Packaging Industries, Manufacturing Industries. (9 Hrs.)

#### Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Introduction to Industrial Internet of Things and Industry 4.0	S. Misra, C. Roy, and A. Mukherjee	CRC Press	1 <sup>st</sup> (2020)
2.	Industry 4.0: The Industrial Internet of Things	Alasdair Gilchrist	Apress	1 <sup>st</sup> (2019)



**Reference Books**

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Introduction to IoT	S. Misra, A. Mukherjee, and A. Roy	Cambridge University Press	1 <sup>st</sup> (2020)
2.	Industry 4.0: Revolutionizing Manufacturing	Berend Denkena, Helmut Krcmar, et al.	Springer	1.(2017)

**COURSE PLAN**

**Unit-I Introduction**

S.No	Topics	Recommended Books
1	Sensing & actuation	Book 1, Ch.5
2	Industry 4.0: Globalization and Emerging Issues	Book 1, Ch.5
3	The Fourth Revolution	Book 1, Ch.5
4	LEAN Production Systems	Book 1, Ch.5
5	Smart and Connected Business Perspective	Book 1, Ch.5
6	Smart Factories	Book 1, Ch.5
<b>Unit-II Industry 4.0</b>		
7	Cyber Physical Systems and Next Generation Sensors,	Book 1, Ch.2
8	Collaborative Platform and Product Lifecycle Management	Book 1, Ch.2
9	Augmented Reality and Virtual Reality	Book 1, Ch.2
10	Artificial Intelligence	Book 1, Ch.2
11	Big Data and Advanced Analysis	Book 1, Ch.2
12	Cybersecurity in Industry 4.0	Book 1, Ch.2
13	Basics of Industrial IoT: Industrial Processes, Industrial Sensing & Actuation	Book 1, Ch.2
14	Industrial Internet Systems.	Book 1, Ch.2
<b>Unit-III Industrial IoT</b>		
16	IIoT-Business Models	Book 2, Ch.1
17	IIoT Reference Architecture	Book 2, Ch.1
18	Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication	Book 2, Ch.1
19	Industrial IoT- Layers: IIoT Communication, IIoT Networking.	Book 2, Ch.1
<b>Unit-IV Big Data Analytics and Software Defined Networks</b>		
20	IIoT Analytics - Introduction, Machine Learning and Data Science	Book 1, Ch.15
21	Data Management with Hadoop	Book 1, Ch.15
22	Industrial IoT: Big Data Analytics	Book 1, Ch.15
23	Software Defined Networks: SDN in IIoT	Book 1, Ch.15
24	Data Center Networks	Book 1, Ch.15
25	SDN in IIoT	Book 1, Ch.15
26	Data Center Networks	Book 1, Ch.15
27	Industrial IoT: Security and Fog Computing: Cloud Computing	Book 1, Ch.10



28	Security in IIoT	Book 1, Ch.15
29	Industrial IoT-Application Domains: Factories and Assembly Line	Book 1, Ch.15
30	Food Industry	Book 1, Ch.15
<b>Unit-V Industrial IoT- Application Domains:</b>		
31	Healthcare	Book 1, Ch.14
32	Power Plants, Inventory Management & Quality Control	Book 1, Ch.14
33	Plant Safety and Security (Including AR and VR safety applications)	Book 1, Ch.14
34	Facility Management, Oil, chemical and pharmaceutical industry	Book 1, Ch.14
35	Applications of UAVs in Industries	Book 1, Ch.14
32	Real case studies like Milk Processing and Packaging Industries	Book 1, Ch.14
33	Manufacturing Industries.	Book 1, Ch.14

#### ADDITIONAL WEB RESOURCES

1.	<b>MOOC:</b> <a href="#">Learning IoT Foundations on Udemy</a>
2.	<b>NPTEL:</b> <b>Introduction to Industry 4.0 and Industrial Internet of Things</b> <b>By Prof. Sudip Misra   IIT Kharagpur</b> <a href="https://onlinecourses.nptel.ac.in/noc20_cs69/preview">https://onlinecourses.nptel.ac.in/noc20_cs69/preview</a>

#### GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 10 marks
- **Attendance:** 5 marks
- **Final Examination:** 100 marks

#### COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

#### FACULTY INFORMATION

- **Office Hours**  
Monday (12:05 PM - 12:55 PM)  
Friday (12:05 PM - 12:55 PM)
- **Contact Information**  
[gurpreetsodhi.ece@mietjammu.in](mailto:gurpreetsodhi.ece@mietjammu.in)

