KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
DEEMED TO BE UNIVERSITY, BHUBANESWAR - 24

Autumn Semester 2023-24
Course Handout

1.	**Course Code**	**EX20001**
2.	**Course Title**	**INDUSTRY 4.0 TECHNOLOGIES**
3.	**Credit**	02
4.	**Pre-requisite**	Nil
5.	**Course Faculty**	Prof. _____
6.	**Course Objective**	The current manufacturing industries and businesses are moving from the third industrial revolution of the computers and automation to the fourth where the automation becomes even smarter fueled by data analytic and artificial intelligence. This course is designed to offer learners an introduction to use of Internet and Digital technology for better manufacturing and business. Learners will gain deep insights into how smartness is being harnessed from data and appreciate what needs to be done in order to overcome some of the challenges.
7.	**Course Outcomes**	CO1: Understand the key components and enablers of Industry 4.0 Technology CO2: Appreciate the smartness in Smart Factories, smart products and smart Services. CO3: Outline Smart Factory technologies and their role in an Industry 4.0 world CO4: Outline IoT technology and scope of implementing IoT in Industries and businesses. CO5: Comprehend distributed cyber-physical and digital manufacturing system CO6: Demonstrate the opportunities, challenges brought about by Industry 4.0 and how organizations and individuals should prepare to reap the benefits
8	**Course Details**	
	Introduction: The Fourth Industrial Revolution, Difference between conventional automation and Industry 4.0, Case Studies: Health, Agriculture, Manufacturing **Industry 4.0 and its components**: Internet of Things (IoT) & Industrial Internet of Things (IIoT), Internet of Services, Value chains in manufacturing companies, Digital Twins **Digital Manufacturing and Design**: Cyber Physical Systems and Next Generation sensors, Collaborative Platform and Product Life-cycle Management, Robotics and Automation **Industrial IoT**: Cloud Computing, Big Data Analytic, AI & ML, Virtual and	

	Augmented Reality, Block-chain **Challenges & Opportunities in Industry 4.0:** A Digital Strategy alongside Resource Scarcity, Standards and Data security, Financing conditions, availability of skilled workers, Comprehensive broadband infra- structure, Legal framework, protection of corporate data, liability, handling personal data.
9.	**Textbooks:** **1.** Tech Trends of the 4th Industrial Revolution,by D. Pyo, , J. Hwang, , and Y. Yoon, PUBLISHER: Mercury Learning & Information Understanding Industry 4. 0 : AI, the Internet of Things, and the Future of Work, by Bruno S. Sergi, , Elena G. Popkova, , Aleksei V. Bogoviz, , and Tatiana N. Litvinova, PUBLISHER:Emerald Publishing Limited **Reference Books:** 1. Introduction to IoT. Cambridge University Press, by S. Misra, A. Mukherjee, and A. Roy, 2020. I Emerging Technologies for Health and Medicine: Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0, Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp , Gia Nhu Nguyen, Wiley, ISBN: 978-1-119-50987-5, 2018 Industry 4.0: The Industrial Internet of Things 1st ed. Edition by Alasdair Gilchrist

Lesson Plan

	Topic	CO
1	Course Introduction	
2	Evolution of Industrial Revolutions	CO1
3	Industry 4.0 Environment and Design Principle	CO1
4	Core Tecnologies: AI	CO3
5	Core Technologies: Big Data and Analytics	CO3
6	Core Technologies: Cyber Physical Systems	CO3
7	Core Technologies: Cloud Computing and Fog Computing	CO3
8	Core Technologies: Block Chain and Cybersecurity	CO3
9	Core Technologies: Additive Technology (CAD, 3D Printing)	CO3
10	Core Technologies: Augmented Reality and Virtual reality	CO3
11	Internet of Services	CO4
12	Industrial IoT and its Architecture	CO4
13	Industrial Internet System	CO4

14	Value chain in manufacturing Industry	CO5
15	Sensing and Computing	CO5
16	Digital Twins	CO5
17	Digital and human work space	CO5
18	Collaboration platform and lifecycle management	CO5
19	Introduction to Smart Factory	CO5
20	Health 4.0	CO2
21	Case Study: Agriculture	CO2
22	Case Study: Oil and Petrolium	CO2
23	Case Study: Energy and Smart Grid	CO2
24	Case Study: Textile Industry/ Real Estate/ Maritime/ Tourism/ Forestry	CO2
25	Infrastructure/ Food & Beverage/ Insurance/Legal/ HR/ Customer,	CO2
26	Adaptation Challenges	CO6
27	Implementation Framework Challenges	CO6
28	Futuristic Opportunity	CO6
29	Economical Impact	CO6
30	Robotics and Automation, Actuators	CO2

12	**Assessment Components**		
Sl. No	**Evaluation Component**	**Marks / Weightage**	**Date**
1	**Activities**	Pre-midsem quiz test-**6 marks** Pre-midsem assignment (Industry 4.0 core technology)-**8 marks**: CO1, CO3, CO4 Post-midsem quiz test-**6 marks** Case study report and presentation - **10 marks:** CO2, CO5, CO6	To be notified by the concerned faculty
2	Mid Semester Examination	20	16th October 2023–21st October 2023
3	End Semester Examination	50	18th December 2023–23rd December 2023

The details of activities will be notified prior to the conduction of the activity through email / google classroom/ in class

13. Attendance

Every student is expected to be regular (in attendance) in all lecture classes, tutorials, labs, tests, quizzes, seminars etc. and in fulfilling all tasks assigned to him / her. Attendance will be recorded and 75% attendance is compulsory.

Course Faculty