

LESSON PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
23ME6E08	INDUSTRY 4.0	VII	ROBO	5	2024-25	10-12-2025

**COURSE OUTCOMES:** Students are able to

1	Explain the basics of Industry 4.0, its drivers, enablers, and difference between Industry 4.0 factories with today's factory [K2]
2	Describe the idea of IoT, IIoT, smart manufacturing factories, smart devices, smart cities and smart services [K2]
3	Analyze different technologies enabling Industry 4.0 with some case studies [K2]
4	Distinguish different design principles in Industry 4.0 [K2]
5	define cloud manufacturing and connected factories . [K2]
6	Summarize the impact of Industry 4.0 in different sectors including challenges in implementing Industry 4.0 [K2]

UNIT	Out Comes / Bloom's Level	Topic s No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	CO1: Realize the need of industry 4.0 and its inter-connectivity [K2]	<b>UNIT INTRODUCTION TO INDUSTRY 4.0</b>				
		1.1	Introduction	T2,R1	1	Classroom learning, PPT, Videos, Quiz
		1.2	Various Industrial Revolutions	T2,R1	1	
		1.3	Digitalization	T2,R1	1	
		1.4	Networked Economy	T2,R1	1	
		1.5	Drivers of Industry 4.0	T2,R1	1	
		1.6	Enablers of Industry 4.0	T2,R1	2	
		1.7	Comparison of Industry 4.0 Factory and Today's Factory	T2, R3	1	
		1.8	Trends of Industrial Big Data for Smart Business Transformation	T2,R1	1	
		1.9	Trends of Predictive Analytics for Smart Business Transformation	T2,R1	1	
<b>Total</b>						<b>10</b>

II	CO 2: Interpret the architecture of IOT and its protocols [K2]	<b>UNIT II ROAD TO INDUSTRY 4.0</b>					
		2.1	Internet of Things (IoT)	T2, R3	1	Classroom learning, PPT, Videos, Quiz	
		2.2	Industrial Internet of Things (IIoT)	T2, R3	1		
		2.3	Internet of Services	T2, R3	1		
		2.4	Big data	T2, R3	1		
		2.5	Value chains in Manufacturing companies	T3,R3	1		
		2.6	Smart factories	T3,R3	1		
		2.7	Smart devices	T3,R3	1		



III	CO3: Understand the different technologies used in enabling industry 4.0 [K2]	2.8	Smartproducts	T3,R3	1	Classroom learning, PPT, Videos, Case Study, Quiz	
		2.9	Smart logistics	T3,R3	1		
		2.10	Smart cities	T3,R3	1		
		2.11	Smart services	T3,R3	1		
		2.12	Predictive analytics	T3,R3	1		
		2.13	Case studies in Smart cities &Smart factories	T3,R3	1		
		<b>Total</b>		<b>13</b>			
		<b>UNIT III TECHNOLOGIES FOR ENABLING INDUSTRY 4.0</b>					
		3.1	Cyber Physical Systems	T1, R3	1		
		3.2	Robotic Automation	T1, R3	1		
		3.3	Collaborative Robots	T1, R3	1		
		3.4	Support System for Industry 4.0	T1, R3	1		
		3.5	Mobile Computing	T1, R3	1		
		3.6	Cyber Security	T1, R3	1		
		3.7	Augmented / Virtual reality	T1, R3	1		
		3.8	Artificial Intelligence	T1, R3	1		
		3.9	System integration	T1, R3	1		
		3.10	Digital twin	T1, R3	1		
		3.11	3D printing	T1, R3	1		
		3.12	Case studies	T1, R3	1		
		<b>Total</b>		<b>12</b>			
IV	CO4: Brief on design principles and its connected components [K2]	<b>UNIT IV INDUSTRY 4.0 DESIGN PRINCIPLES</b>					
		4.1	Introduction to Industry 4.0 design principles	T1,R3	1	Classroom PPT, Flipped Class, Case Study Quiz	
		4.2	Interoperability	T1,R3	1		
		4.3	Communication systems for Industry 4.0	T1,R3	1		
		4.4	Communication standards for Industry 4.0	T1,R3	1		
		4.5	Virtualization	T1,R3	1		
		4.6	Decentralization	T1,R3	1		
		4.7	Modularity	T1,R3	1		
		4.8	Real time capability	T1,R3	1		
		4.9	Information transparency	T1,R3	1		
		4.10	Foundation of Industry 4.0	T1,R3	1		



		4.11	Cloud Manufacturing	T1,R3	1	
		4.12	Connected factories	T1,R3	1	
		<b>Total</b>				
		<b>UNIT V IMPACT OF INDUSTRY 4.0</b>				
V	<p>CO5: Plan the uses of IOT, cloud computing, data analytics and Industry 4.0 technologies. [K2]</p> <p>CO5: Summarize the impact of Industry 4.0 in different sectors including challenges in implementing Industry 4.0 [K2]</p>	5.1	Impact of Industry 4.0 on service and business models	T1, R3	1	
		5.2	Impact of Industry 4.0 on IT security	T1, R3	1	
		5.3	Impact of Industry 4.0 on manufacturing	T1, R3	1	
		5.4	Impact of Industry 4.0 on machine safety	T1, R3	1	
		5.5	Impact of Industry 4.0 on product life cycle	T1, R3	1	
		5.6	Impact of Industry 4.0 on socioeconomic factors	T1, R3	1	
		5.7	Impact of Industry 4.0 on textile industries	T1, R3	1	
		5.8	Impact of Industry 4.0 on healthcare industries	T1, R3	1	
		5.9	Impact of Industry 4.0 on real estate industries,	T1, R3	1	
		5.10	Impact of Industry 4.0 on maritime industries,	T1, R3	1	
		5.11	Impact of Industry 4.0 on tourism industries	T1, R3	1	
		5.12	Compelling Forces and Challenges in implementing Industry 4.0	T1, R3	1	
		5.13	Case studies	T1, R3	1	
	CBS	5.14	Industry 5.0: Transforming the Manufacturing Landscape	Web	1	
		<b>Total</b>				

**CUMULATIVE PROPOSED PERIODS**

61

Classroom learning, PPT, Videos, Seminars, Quiz

**Text Books:**

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Alasdair Gilchrist, "Industry 4.0: The Industrial Internet of Things", A press, 2016
2	Bruno S.Sergi, Elena G.popkova, et al. " Understanding Industry 4.0: AI, The internet of things, and the future of work", 2019, Emerald publishing limited.

**Reference Books:**

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Kaushik kumar, DivyaZindani, J. Paulo Davim, " Digital manufacturing and assembly systems in Industry 4.0", CRC Press, Taylor and Francis group, 2020.
2	Antonio sartal, Diego Carou, J.PauloDavim, " Enabling technologies for the successful deployment of Industry 4.0, CRC press, 2020.



# SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

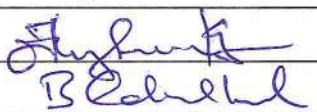
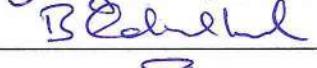
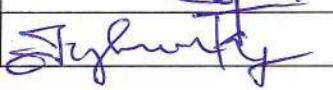
Narsapur, West Godavari District, A.P. 534280

## DEPARTMENT OF ROBOTICS

3	Alp Ustundag, Emrecavikcan, "Industry 4.0 : Managing the digital transformation", springer international publishing , 2018.
---	---

### Web Details

1	<a href="https://onlinecourses.nptel.ac.in/noc20_cs69/preview">https://onlinecourses.nptel.ac.in/noc20_cs69/preview</a>
2	<a href="https://www.ibm.com/topics/industry-4-0">https://www.ibm.com/topics/industry-4-0</a>
3	<a href="https://www.twi-global.com/what-we-do/research-and-technology/technologies/industry-4-0">https://www.twi-global.com/what-we-do/research-and-technology/technologies/industry-4-0</a>
4	<a href="https://radixweb.com/blog/what-is-industry-4-0">https://radixweb.com/blog/what-is-industry-4-0</a>
5	<a href="https://www.intechopen.com/chapters/80514">https://www.intechopen.com/chapters/80514</a>

		Name	Signature with Date
i.	Faculty	Dr. Francis Luther King M	
ii.	Course Coordinator	Mr.B.Mahesh Krishna	
iii.	Module Coordinator	Dr. R. Sanjeev Kumar	
iv.	Programme Coordinator	Dr. Francis Luther King M	

  
Principal

