

Branch Name:	Information and Communication Technology
Program Code:	ET107
Semester/Year:	Semester VII/ Fourth Year
Course Name:	Open Elective – II: Industrial IoT
Course Code:	2ET1070781T
Pre-requisite Course:	Internet of Things, Communication and Networking, information security

Course Objective:

1. IoT will change industries and transform the way we work and live. Industrial companies are already pivoting from Products to Services leveraging IoT technologies – this digital transformation is more broadly called the Industrial IoT or Industrial Internet.
2. The objective of this subject is make students aware about this latest technology, its application and to identify future scope for better manufacturing system.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min	Max.	Min	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Understanding Industrial Internet of Things (IIoT): Industrial Internet of Things and Cyber Manufacturing Systems, Application map for Industrial Cyber Physical Systems, Cyber Physical Electronics Production, Comparison between IOT and IIOT.	8	20
2	Modeling of CPS and CMS: Principles of Modeling for Cyber-Physical Systems, Modeling of Cyber Physical Engineering and manufacturing, Model based engineering of supervisory controllers for cyber physical systems, formal verification of system, components, Evaluation model for assessments of cyber physical production systems.	9	20
3	Architectural Design Patterns for CMS and IIoT: CPS-based manufacturing and Industries 4.0., Integration of Knowledge base, data base and machine vision, Interoperability in Smart Automation, Enhancing Resiliency in Production Facilities through CPS. Communication and Networking of IIoT, Impact of Industry 4.0.	8	20
4	Artificial Intelligence and Data Analytics for manufacturing: Application of CPS in Machine tools, Digital production, Cyber Physical system Intelligence, Introduction to big data and machine learning and condition Monitoring.	6	10
5	Evaluation of Workforce and Human Machine Interaction: Worker and CPS, Strategies to support user intervention. Introduction to Advance manufacturing and Innovation Ecosystems.	6	10
6	Application of IIoT: Smart Metering, e-Health Body Area Networks, City Automation, Automotive	8	20

	Applications, Home Automation, Smart Cards, Plant Automation, Environmental Monitoring, Smart Pollution Control, Agriculture, Use of AI in IIOT and its applications, Real life examples of IIOT in Manufacturing Sector.		
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List of References:

1. Sabina Jeschke, Christian Brecher Houbing Song, Danda B. Rawat Editors Industrial Internet of Things Cyber Manufacturing Systems 1st edition 2017
2. Hakima Chaouchi, “ The Internet of Things Connecting Objects to the Web” ISBN : 978-1- 84821-140-7, Willy Publications Olivier Hersent, David Boswarthick, Omar Elloumi 2010
3. The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2nd Edition, Willy Publications 2012
4. Inside the Internet of Things (IoT), Deloitte University Press
5. Internet of Things- From Research and Innovation to Market Deployment; By Ovidiu & Peter; River Publishers Series 2014
6. Five thoughts from the Father of the Internet of Things; by Phil Wainewright - Kevin Ashton 2015
7. How Protocol Conversion Addresses IIoT Challenges: White Paper By RedLion.
8. Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies Sensors for the Internet of Things Businesses & Market Trends 2014 -2024', Yole Development Copyrights ,2014

E-Resources:

1. <https://www.coursera.org/learn/industrial-internet-of-things>
2. <https://www.techtarget.com/iotagenda/definition/Industrial-Internet-of-Things-IIoT>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe Industrial Internet of Things and Cyber Physical manufacturing	2 Understanding
CLO2	Demonstrate Cyber Physical and Cyber Manufacturing systems	2 Understanding
CLO3	Describe Architectural design patterns for industrial Internet of Things	2 Understanding 3 Applying
CLO4	Analyze AI and data Analytics for Industrial Internet of Things	4 Analyze
CLO5	Evaluation of Workforce and Human Machine Interaction and Application of Industrial Internet of Things	2 Understanding 3 Applying

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	M	L	H	L	M	M				M			H	L		
CLO2	M	L	M	M	M	M				M	L	L	M	L		
CLO3	H	M	M	L	M	H				L		L	M	H		
CLO4	H	M	M	L	M	H		M	L				M	H		
CLO5	H	M	M	H	M	H		M		L			M	H		

H:High, M:Medium, L:Low