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COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)
S.P.G.Chidambara Nadar - C.Nagammal Campus
S.P.G.C. Nagar, K.Vellakulam – 625 701 (Near VIRUDHUNAGAR).

S.No	Particulars		Details
1.	Academic Year	:	2021-2022
2.	Regulation	:	2017
3.	Department Name	:	EIE
4.	Name of the Value-added course	:	Industrial IoT
5.	No. of Credits	:	2
6.	Category: Theory/Lab/Hands-on/Skill based etc	:	Hands-on
7.	Name and Details of the Joint-organization (industry/NGO etc) if any	:	InCrix Techlutions LLP
8.	Resource person details	:	Er.S.Avinash, Trainer InCrix Techlutions LLP
9.	Three Member Committee details	:	Dr.S.Jeyadevi, Prof/EIE Dr.A.Rajavel, AP/EIE Mrs.M.Vigneswari, AP/EIE
10.	VAC Coordinator Details	:	Mrs.L.V.Revathi,AP/EIE
11.	Duration (30 h mandatory)	:	30 Hours
12.	Period (From-To)	:	24-03-2022 to 29-03-2022 (5 days)
13.	Venue	:	Virtual Instrumentation Laboratory

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COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution - Affiliated to Anna University, Chennai)
S.P.G. Chidambara Nadar - C.Nagammal Campus
S.P.G.C. Nagar, K. Vellakulam - 625 701, (Near Virudhunagar), Madurai District.

Submitted to the SECRETARY for approval through the PRINCIPAL

Book No. EIE

SL.No. 10

Date 21.03.2022.

An approval may please be granted to conduct Value added course for third year EIE students for 5 days.

Total no. of students = 10

Amount per student = Rs. 2,000/-

Enclosure

1. Quotation from Incrix technologies

Signature of Faculty 21/3/2022

HOD 21/03/2022

PRINCIPAL 22/3/22

OFFICE USE

1) Account Head — Value added Course Fee
2) Budget allotted
3) Amount committed / Spent sofar
4) Balance available

OM

Treasurer

Secretary

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22.03.2022

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

Circular

The Department of Electronics and Instrumentation Engineering in association with Incrix Techlutions LLP, Chennai is planned to conduct Value added Course on **"Industrial IoT"** to the Third year students of EIE department from 24-03-2022 to 29-03-2022.

- **Venue:** VI Lab EIE -3rd floor
- **Session Time:** 9.00 am to 4.00pm
- **VAC Schedule:**

  24-03-2022 to 29-03-2022 -Sessions handled by Industrial expert (5 Days)

Industrial Expert details:

Er.S.Avinash, Trainer,
InCrix Techlutions LLP,
Chennai.

Co ordinator **HOD/EIE**

INDUSTRIAL INTERNET OF THINGS

Programme: B.E Electronics and Instrumentation Engineering

Ref no: IE/VAC/IIOT22

Category: Value Added Course

Duration: 30 Hours

Institute: Kamaraj College of Engineering and Technology

INTRODUCTION — 2 Hours

Introduction to Industrial Internet of Things, Nature and scope of IIoT, Components of IoT, Categories and properties of IIoT, Applications of IIoT

EMBEDDED SYSTEM — 6 Hours

Introduction to Embedded systems, Embedded C programming essentials, Architecture of NodeMCU, Input Devices, ADC and PWM, Communication protocols, Series and parallel Communication, UART, SPI and I2C Protocols, Simulation of multiple applications, Sensor Interface with NodeMCU

INTERNET OF THINGS — 8 Hours

Introduction to Internet of Things, Internet Protocols and OSI Layers, Working of Internet, Architecture of IoT, Connecting MCU to the Internet, Introduction to HTTP protocol, HTTP request from MCU, Introduction to Arduino IOT cloud Platform and its interface

ARCHITECTURE OF INDUSTRIAL INTERNET OF THINGS — 8 Hours

Introduction to API's, Interfacing Microcontroller with Arduino IoT Cloud, Controlling Things over Internet and Monitoring Sensor values with Arduino IoT Cloud's Web and Android Application, building solutions for Industrial problems using IoT Architecture

PROJECT AND ASSESSMENT — 6 Hours

Introducing Industrial Application case studies, Building Home Automation model, Real time monitoring system, Project Assignment and Evaluation, Final Assessment.

Course Outcomes

At the Successful Completion of this course, the students can able to

1. Understand the need for the Industrial Internet of things and be able to implement the best solution for the problems.
2. Can able to develop an electronic prototype for their needs.
3. Receive sensor data remotely.
4. Monitor the condition of a machine using sensor data.
5. Create API's on their own.

incrixEducation™

VALUE ADDED COURSE

INDUSTRIAL INTERNET OF THINGS

In the current 21st century, digitalization creates a great impact, that every individual firm needs to uplift themselves to meet the digital market. Here, in this course as an outcomes the student can able to build their own IoT applications which helps them to meet the current Industrial Revolution. To control the industry over the internet and also monitor the machineries to avoid accident which human cannot notice.

A Learning Platform From Incrix Techlutions LLP

Insights

The industrial internet of things (IIoT) refers to the extension and use of the internet of things (IoT) in industrial sectors and applications. With a strong focus on machine-to-machine (M2M) communication, big data, and machine learning, the IIoT enables industries and enterprises to have better efficiency and reliability in their operations. The IIoT encompasses industrial applications, including robotics, medical devices, and software-defined production processes.

The IIoT goes beyond the normal consumer devices and internetworking of physical devices usually associated with the IoT. What makes it distinct is the intersection of information technology (IT) and operational technology (OT). OT refers to the networking of operational processes and industrial control systems (ICSs), including human machine interfaces (HMIs), supervisory control and data acquisition (SCADA) systems, distributed control systems (DCSs), and programmable logic controllers (PLCs).

The convergence of IT and OT provides industries with greater system integration in terms of automation and optimization, as well as better visibility of the supply chain and logistics.

Why do we need to learn IIoT?

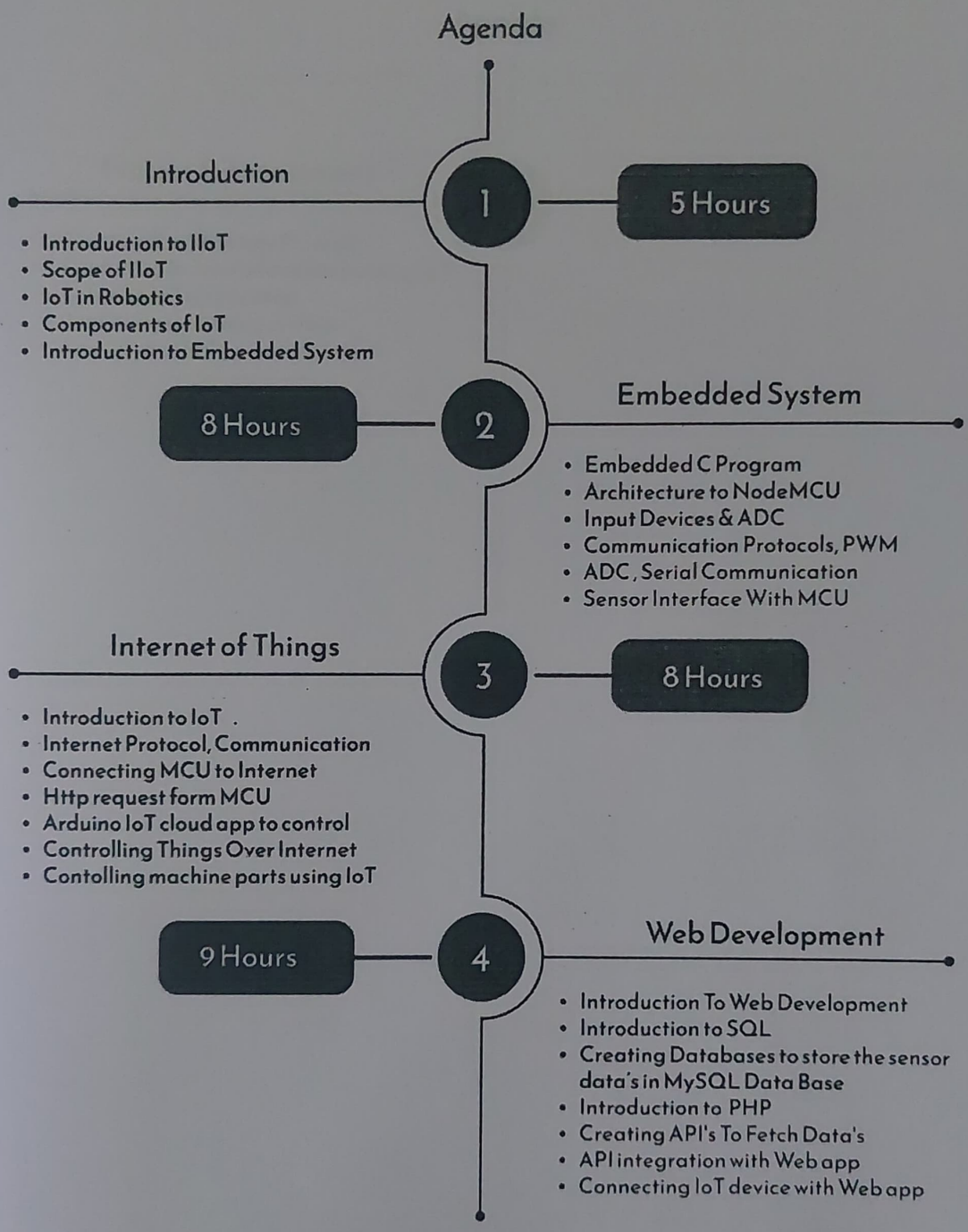
- IIoT is a network of intelligent devices connected to form systems that monitor, collect, exchange and analyze data.
- In near future IIoT are in high demand and receive a well pay to build IIoT products.
- IIoT also improves facility management. Manufacturing equipment is susceptible to wear and tear, which can be exacerbated by certain conditions in a factory.

Course Outcome:

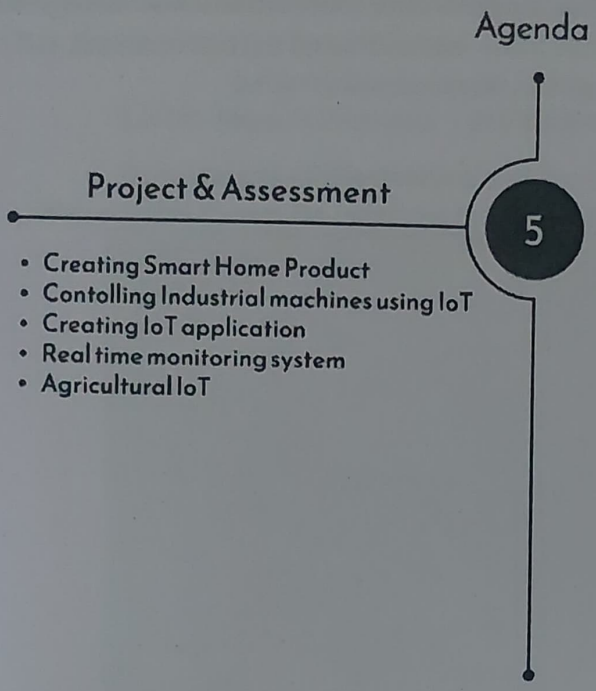
At the successful completion of this course the students can able to :

- Understand the need for the Industrial Internet of Things and be able to implement the best solution for the problems
- Understand the architecture of Microcontrollers
- Can able to develop an electronic prototype for their needs
- Using Web development they can create their backend process for their application
- Able to receive sensor data remotely
- Using Blink application they can create a rapid prototype
- Using IFTTT, able to voice control the IoT devices
- Understand the Internet protocol and communication method
- Able to create API's on their own
- Monitor the condition of the machine using sensor data

Industrial Internet of Things (IIoT)



Industrial Internet of Things (IIoT)



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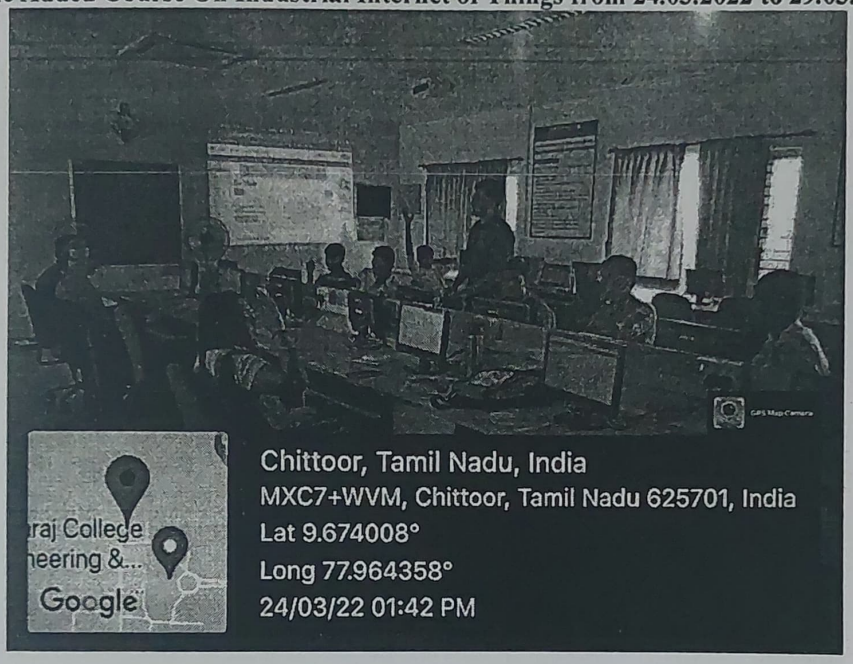
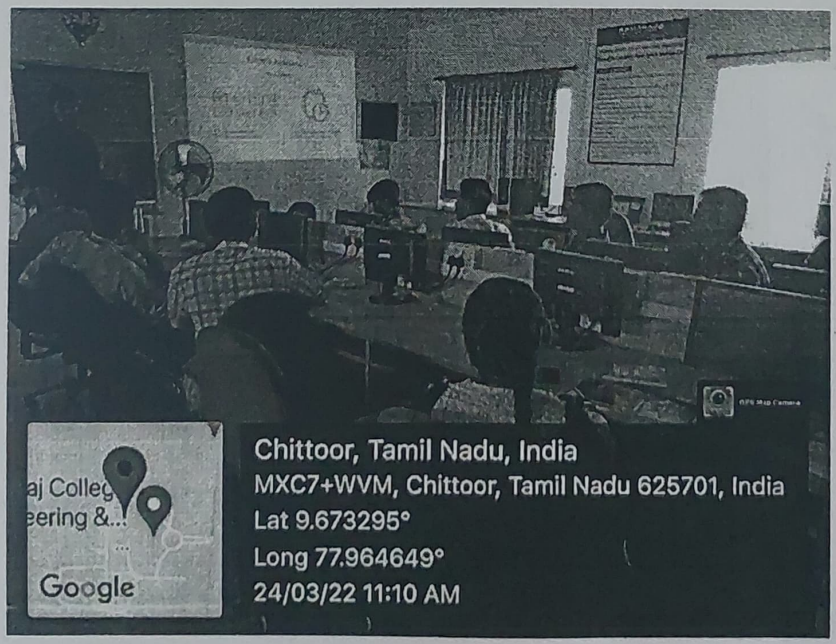
Department of Electronics and Instrumentation Engineering

Value Added Course On Industrial Internet of Things from 24.03.2022 to 29.03.2022





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Department of Electronics and Instrumentation Engineering

in association with Incrix Techlutions LLP

Value Added Course

Industrial IoT

2021-2022 Even Semester (March 2022)

Online Exam Schedule

Date of Exam	Time
06-04-2022	02.20pm- 03.50 pm

Test Link

https://docs.google.com/forms/d/e/1FAIpQLSdYLWQbpIBQI5cAyOJuOyuFBqGkt5eMRQtI42YqX3-WeIEKHA/viewform

Co ordinator

HOD/EIE

Industrial IoT (IIOT) Question with Answers:

One Marks:

1) An embedded system is a combination of?

a) Software

b) Hardware

c) Devices

d) Both a & b

Ans: d)

2) Which of the following are the components of a microcontroller?

a) RAM

b) ROM

c) Timers

d) All the above

Ans: d)

3) An embedded system is classified into how many types?

a) 3

b) 5

c) 2

d) 1

Ans: a)

4) How does an embedded system communicate with the outside world?

a) Input

b) Peripherals

c) Output

d) Memory Ans: b)

5) Which of the following embedded system software converts each line of assembly-based code to machine-based code at a time?

a) Compiler

b) Interpreter

c) Assembler

d) Debugger

Ans: c)

6) Which of the following is non-volatile memory?

a) Computer BIOS

b) Motherboard

c) Flash Drives

d) Both a & b

Ans: c)

7) The standard length of the MAC address is?

a) 64 bit

b) 12 bit

c) 48 bit

d) 256 bit

Ans: c)

8) The term IoT was coined in?

a) 2001

b) 1990

c) 1999

d) 2000

Ans: c)

9) Among the following layers, identify the one which is used for wireless connection in IoT devices?

a) Network Layer

b) Application Layer

c) Datalink Layer

d) Transport Layer

Ans: c)

10) Identify the protocol used to link all devices in IoT?

a) HTTP

b) MQTT

c) TCP/IP

d) UDP

Ans: c)

11) How many layers are there in the OSI model?

a) 5

b) 3

c) 7

d) 9

Ans: c)

12) Arduino IDE is written in which programming language?

a) Java

b) Python

c) C/C++

d) C#

Ans: c)

13) First device connected to Internet?

a) Washing Machine

b) Fridge

c) Bread Toaster

d) Coffee maker

Ans: a)

14) Identify the lightweight protocol?

a) HTTP

b) IP

c) MQTT

d) CoAP

Ans: c)

15) How many octects in IPV6?

a) 6

b) 8

c) 4

d) 7

Ans: a)

16) Which is used to send data over the internet?

a) Server

b) Client

c) API

d) SMTP

Ans: c)

17) How many masters in SPI communication?

a) 1

b) 2

c) 3

d) 4

Ans: a)

18) Clock frequency used in ESP32?

a) 16MHz

b) 70MHz

c) 160MHz

d) 240MHz

Ans: d)

19) How to define pin in sketch?

a) PinMode(Type, Pin No)

b) pinMode(Pin No, Type)

c) PinMode(Pin No, Type)

d) pinMode(Type, Pin No)

Ans: b)

20) How do you define a server?

a) Hardware Device

b) A Computer in a Network

c) Storage Device

d) A software handling requests

Ans: d)

21) Operating Voltage of ESP32?

a) 5V

b) 9V

c) 12V

d) 3.3V

Ans: d)

22) The feature of IoT gateway is the ability to download updates over the air?

a) True

b) False

Ans: a)

23) How many analog pins are in Esp8266?

a) 1

b) 2

c) 3

d) 4

Ans: a)

24) In which layer data is converted in binary format?

a) Transport Layer

b) Session Layer

c) Network Layer

d) Physical Layer

Ans: d)

25) How many analog pins in ESP32?

a) 15

b) 16

c) 17

d) 18

Ans: a)

26) How many Octects in MAC address?

a) 3

b) 4

c) 5

d) 6

Ans: d)

27) The IPv4 has which type of notation for addressing?

a) Dotted Decimal

b) Hexadecimal

c) Binary

d) All the above

Ans: a)

28) WiFi stands for?

a) Wireless Fidelity

b) Wireless Flexibility

c) WAN Flexibility

d) Wide Fidelity

Ans: a)

29) Communication in UART is?

a) Only simple

b) Only half-duplex

c) Only full-duplex

d) All the above

Ans: d)

30) Protocol used in Video conferencing?

a) HTTP

b) MOTT

c) TCP

d) UDP

Ans: d)

Two Marks Question with Answers:

1) What is the temperature range of DHT22?

a) 0°C to 50°C

b) -10°C to 70°C

c) -25°C to 110°C

d) -45°C to 125°C

Ans: d)

2) What is the resolution of ADC in Esp8266?

a) 16 bit

b) 10 bit

c) 12 bit

d) 8 bit

Ans: b)

3) How many analog pins are there in nodemcu Esp8266?

a) 2

b) 3

c) 1

d) 6 Ans: c)

4) How many types of sensors are there?

a) 28

b) 6

c) 2

d) 1

Ans: c)

5) Which of the following is false about IoT devices?

a) IoT devices use the internet for collecting and sharing data

b) IoT devices need microcontrollers

c) IoT devices use wireless technology

d) IoT devices are completely safe

Ans: d)

6) Operating temperature of ESP32?

a) 0°C to 50°C

b) -10°C to 70°C

c) -45°C to 125°C

d) -25°C to 110°C

Ans: c)

7) Which of the following is not an application of IoT?

a) Smart Home

b) Smart City

c) Self-driven cars

d) DHT-11

Ans: d)

8) What is the use of PWM signals in IoT development boards?

a) They are used by sensors to have analog input

b) They are used by sensors to have digital input

c) They are used by actuators to have analog input

d) They are used by actuators to have digital input

Ans: c)

9) What is IIoT?

a) Information Internet of Things

b) Industrial Internet of Things

c) Innovative Internet of Things

d) None of the above

Ans: b)

10) What is the size of IPV4 address?

a) 128 bits

b) 32 bits

c) 64 bits

d) 256 bits

Ans: b)

11) What is MAC?

a) Macro Access Control

b) Media Access Container

c) Media Access Control

d) Media Adapter Control

Ans: c)

12) Subnet mask for Class C IPv4?

a) 255.255.0.0

b) 255.0.0.0

c) 255.255.255.0

d) 255.255.255.255

Ans: c)

13) Which is not a Synchronous Communication?

a) UART

b) BSC

c) SPI

d) SDLC

Ans: a)

14) How many pins are used in Serial Peripheral Interface communication?

a) 2

b) 3

c) 4

d) 5

Ans: c)

15) How many pins are used in I2C?

a) 2

b) 3

c) 4

d) 5

Ans: a)

Department of Electronics and Instrumentation Engineering

Value Added Course on "Industrial IoT"

Academic Year: 2021-2022 Even **Regulation: 2017**

Attendance Sheet

SI. No	Roll No	Name of the student	24.3.2022		25.3.2022		26.3.2022		28.3.2022		29.3.2022	
			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN
1	19UEIE001	NANDHINI MU										
2	19UEIE002	RANJANA S										
3	19UEIE003	HARIHARAPUTHRAN V										
4	19UEIE004	AVINASH N										
5	19UEIE005	ASHOK PANDIAN G										
6	19UEIE006	VASANTHRAJ S										
7	19UEIE007	VISHWANATH A										
8	19UEIE008	SUJAN K										
9	19UEIE009	SWASTIK KUMAR K							ab	ab		
10	19UEIE010	SRI HARIHARAN K										

Chairperson –III EIE

VAC Coordinator

HoD

NAME	PROBLEM IDENTIFICATION(5M)	IDEATION(5M)	INNOVATION(5M)	PROBLEM IDEABSTRACT(5M)	MICROCONTROLLER SELECTION (5M)	BLOCK DIAGRAM(5M)	COMMUNICATION & ELABORATION (10M)	EXTERNAL MARKS (60M)	TOTAL MARKS SCORED (100M)
K.SRI HARIHARAN	5	4	4	5	5	4	10	51	88
K.SUJAN	5	4	4	5	5	4	9	45	81
V.HARIHARAPUTHRAN	5	5	4	3	4	4	9	49	87
G.ASHOK PANDIAN	5	4	4	5	5	4	9	45	81
N.AVINASH	5	4	4	5	5	4	10	45	82
Mu. NANDHINI	5	4	4	5	5	4	9	43	79
K. SWASTIK KUMAR	5	5	4	3	4	4	8	44	77
S.VASANTHRAJ	5	4	4	5	5	4	10	45	82
S. RANJANA	5	5	4	3	4	4	8	45	78
A.VISHWANATH	5	5	4	3	4	4	8	37	70

Respondent

2 VASANTHRAJ.S

02:03
Time to complete

1. Name of the Participant (Eg:Mr/Ms/) *

S. Vasanthraj

2. Designation *

- (●) Student
- ( ) Staff

3. Roll No *

19ueie006

4. Were objectives of the Program met? *

- (●) Completely agree
- ( ) Strongly agree
- ( ) Agree
- ( ) Partly Agree
- ( ) Disagree

5. Was the Program sequence well planned? *

- (●) Completely agree

- Strongly agree
- Agree
- Partly Agree
- Disagree

6. Were the lectures clear and easy to understand? *

- Completely agree
- Strongly agree
- Agree
- Partly Agree
- Disagree

7. Whether the instructors encouraged the interaction? *

- Completely agree
- Strongly agree
- Agree
- Partly Agree
- Disagree

8. The information delivered at this Program was highly beneficial. *

- Completely agree
- Strongly agree
- Agree
- Partly Agree

- Disagree

9. Organization of the Program was Good *

- Completely agree
- Strongly agree
- Agree
- Partly Agree
- Disagree

10. Comments/Suggestions

It is very useful. We Encourage this type of class for learning beyond the syllabus

Industrial IoT - 29.03.2022

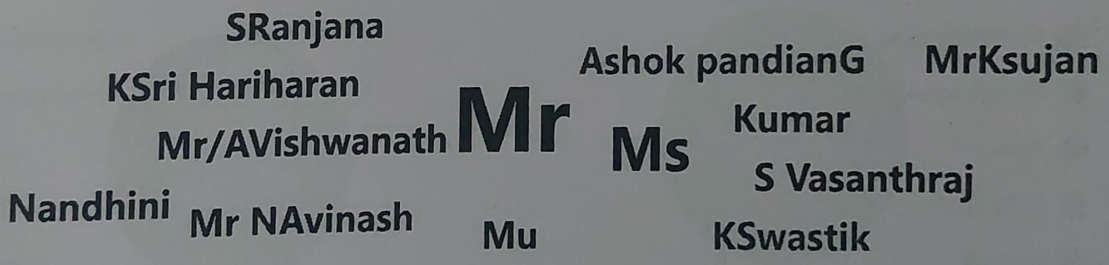
10	01:17	Closed
Responses	Average time to complete	Status

1. Name of the Participant (Eg:Mr/Ms/)

10
Responses

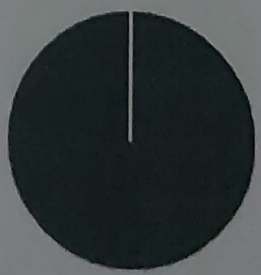
Latest Responses
"Ashok pandian.G"
"Ms. Mu. Nandhini"
"K.Sri Hariharan"

3 respondents (**30%**) answered **Mr** for this question.



2. Designation

Student	10
Staff	0



3. Roll No

10
Responses

Latest Responses
"19UEIE005"
"19ueie001"
"19ueie010"

1 respondents (10%) answered **19UEIE007** for this question.

19ueie009 19UEIE005
19ueie010
19ueie006
19ueie008 19UEIE007
19UEIE002
19UEIE004
19ueie001
19UEIE003

4. Were objectives of the Program met?

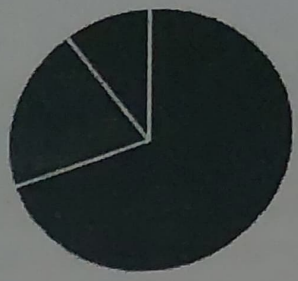
Completely agree	7
Strongly agree	2
Agree	1
Partly Agree	0
Disagree	0

5. Was the Program sequence well planned?

Completely agree	7
Strongly agree	3
Agree	0
Partly Agree	0
Disagree	0

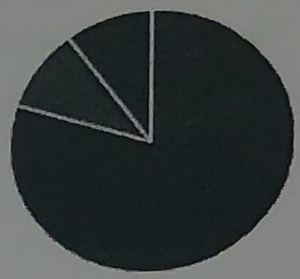
Were the lectures clear and easy to understand?

Completely agree	7
Strongly agree	2
Agree	1
Partly Agree	0
Disagree	0



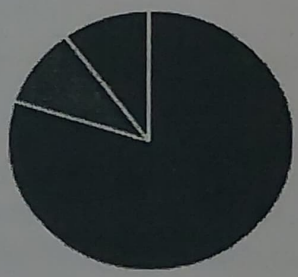
Whether the instructors encouraged the interaction?

Completely agree	8
Strongly agree	1
Agree	1
Partly Agree	0
Disagree	0



The information delivered at this Program was highly beneficial.

Completely agree	8
Strongly agree	1
Agree	1
Partly Agree	0
Disagree	0



Organization of the Program was Good

Completely agree	8
Strongly agree	2
Agree	0
Partly Agree	0
Disagree	0

10. Comments/Suggestions

2

Responses

Latest Responses

"It was good"

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DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

Value added Course on "Industrial Internet of Things"

24.03.2022 to 29.03.2022

Offered by the Company : Incrix Techlutions LLP

Resource Person: Mr.S.Avinash, Trainer

Offered to III EIE Students: 10

They Covered the below module in five days (30 Hours)

INTRODUCTION — **2 Hours**

Introduction to Industrial Internet of Things, Nature and scope of IIoT, Components of IoT, Categories and properties of IIoT, Applications of IIoT

EMBEDDED SYSTEM — **6 Hours**

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Introduction to API's, Interfacing Microcontroller with Arduino IoT Cloud, Controlling Things over Internet and Monitoring Sensor values with Arduino IoT Cloud's Web and Android Application, building solutions for Industrial problems using IoT Architecture

PROJECT AND ASSESSMENT — **6 Hours**

Introducing Industrial Application case studies, Building Home Automation model, Real time monitoring system, Project Assignment and Evaluation, Final Assessment.

Chairperson-III EIE

HOD/EIE

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DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

08-04-2022

Report on Value added course

The Department of Electronics and Instrumentation Engineering is conducted the Value added course on the titled "Industrial IoT" to the third year students of EIE department from 24-03-2022 to 29-03-2022 (5 days). The course was handled by an Industry expert from Incrix Techlutions LLP. The Industry expert, Mr.S.Avinash, trainer from Incrix Techlutions LLP handled the sessions of Introduction to Industrial Internet of Things. The students had hands on experience with Sensor Interface with NodeMCU. They performed simulation projects as well as accomplished small projects with real time sensors and hardware modules. The students are also given activities like creating programs, implementation of small projects, assessments. This will help the students to do the curriculum projects and scope to place in the core companies.

Co ordinator

HoD/EIE