SRI BHARATHI

ENGINEERING COLLEGE FOR WOMEN

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Kaikkurichi, Pudukkottai -622 303

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NAAC DOCUMENTS

Quality Indicator Frame Work

Criterion – 2

Teaching-Learning and Evaluation

Submitted by

IQAC

Internal Quality Assurance Cell

Sri Bharathi Engineering College for Women

Criteria 2	Teaching-Learning and Evaluation	350

Key Indicator- 2.3. Teaching- Learning Process (40)

2022-2023

ELECTRONICS AND COMMUNICATION ENGINEERING

PARTICIPATIVE LEARNING

Activity	Number of Students Attended	Page No.
Value Added Course (VAC)	62	3
Symposium and Workshop	23	75
TOTAL STUDENTS ATTENDED	85	-

Criteria 2	Teaching-Learning and Evaluation	350

Key Indicator- 2.3. Teaching- Learning Process (40)

2022-2023

ELECTRONICS AND COMMUNICATION ENGINEERING

PARTICIPATIVE LEARNING

VALUE ADDED COURSE

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/ODD SEMESTER

DEPARTMENT CIRCULAR   Date: 09.08.2022

Value Added Course offered by the Department of ECE will be conducted for Second year students on **"Real-time Sensor Data Processing with Python for IoT Applications"** in association with Galwin technology from 22.8.2022 to 26.08.2022. Certificates will be issued to the eligible participants at the end of the programme.

S.No	Name of the Course	Resource Person
1	Real-time Sensor Data Processing with Python for IoT Applications	**Er.K.GOPALAKRISHNAN,** Embedded cum AI Developer, Galwin Technology, 12A, Periyasamy Towers, 3rd floor, Chathiram Bus Stand, Trichy- 620 002. Tamil Nadu . **Mail.Id:** info@galwintech.in

HoD/ECE

HOD / ECE
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303.

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- II Year ECE Students
- Notice Board

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION
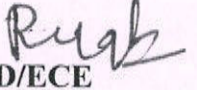## ENGINEERING

Academic Year 2022-20223/ODD Semester

"Real-time Sensor Data Processing with Python for IoT Applications "

SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE
1	Overview of the Internet of Things (IoT) and its applications	2	22.8.22
2	Basic Python syntax, data types, and control structures,Functions, modules, and libraries in Python, Handling sensor data in Python using built-in data structures	1	22.8.22
3	Real-time requirements in IoT applications, Concepts of buffering, sampling rate, and data acquisition,Techniques for efficient handling and processing of real-time sensor data	3	22.8.22
4	Introduction to various types of sensors used in IoT applications,Techniques for interfacing sensors with microcontrollers or single-board computers,Reading and acquiring sensor data using Python libraries and modules	3	23.8.22
5	Filtering and noise reduction techniques for sensor data,Statistical analysis and feature extraction from sensor readings,Real-time data visualization using Python libraries (e.g., Matplotlib, Plotly)	3	23.8.22
6	Challenges of processing large-scale sensor data streams, Introduction to stream processing frameworks (e.g., Apache Kafka, Apache Flink), Techniques for distributed processing of sensor	3	24.8.22
7	Interfacing Python with IoT communication protocols	3	24.8.22
8	Real-time data aggregation, anomaly detection, and predictive analytics	3	25.8.22
9	Integrating real-time sensor data processing with IoT platforms using Python	3	25.8.22
10	Data storage, visualization, and remote monitoring of sensor data in IoT applications	3	26.8.22
11	Security and Privacy in Real-time Sensor Data Processing	3	26.8.22
Total Hours		30	

VAC Coordinator

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DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING

ACADEMIC YEAR ODD SEMESTER (2022-2023)

STUDENT PARTICIPATION LIST FOR VALUE ADDED PROGRAM

<u>Real-time Sensor Data Processing with Python for IoT Applications</u>

S.NO	REG.NO	NAME	YEAR & BRANCH
1	912621106001	AMRIN M	II&ECE
2	912621106002	BHUVANESWARI C	II&ECE
3	912621106003	DHANYASHREE A	II&ECE
4	912621106004	KALAIVANI R	II&ECE
5	912621106005	KAVIYA K	II&ECE
6	912621106006	KEERTHANA V	II&ECE
7	912621106007	PAVITHRA P	II&ECE
8	912621106008	RAJESHWARI R	II&ECE
9	912621106009	SUBALAKSHMI M	II&ECE
10	912621106010	SUGUNA C	II&ECE
11	912621106301	JAYAPRIYA M	II&ECE
12	912621106302	KIRUBASHINI C	II&ECE

VAC Coordinator

HoD/ECE

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PUDUKKOTTAI - 622 303

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PRINCIPAL
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COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
ACADEMIC YEAR ODD SEMESTER (2022-2023)
ATTENDANCE SHEET FOR VALUE ADDED PROGRAM - Real-time Sensor Data Processing with Python for IoT Applications

S.No	REG. NO	NAME	YEAR/ BRANCH	22.8.2022		23.8.2022		24.8.2022		25.08.2022		26.08.2022		No. of Sessions Attended	Sign of Student
				F.N	A.N	F.N	A.N	F.N	A.N	F.N	A.N	F.N	A.N		
1	912621106001	AMRIN M	II/ECE	a	/	/	/	/	/	/	/	/	/	9	M.Awn
2	912621106002	BHUVANESWARI C	II/ECE	/	/	/	/	a	/	/	/	/	/	9	C-Bhuvay's
3	912621106003	DHANYASHREE A	II/ECE	/	/	/	/	/	/	a	a	/	/	8	A·Dhy
4	912621106004	KALAIVANI R	II/ECE	/	/	a	/	/	/	/	/	/	/	9	Kalaivani·R
5	912621106005	KAVIYA K	II/ECE	/	/	a	a	/	/	/	/	/	/	8	K.kaviya
6	912621106006	KEERTHANA V	II/ECE	a	/	/	/	/	/	/	/	/	/	9	V·Keez.
7	912621106007	PAVITHRA P	II/ECE	/	/	/	/	/	/	/	/	/	/	10	P.Pavithra
8	912621106008	RAJESHWARI R	II/ECE	/	/	/	/	/	/	a	/	/	/	9	R.Rry
9	912621106009	SUBALAKSHMI M	II/ECE	/	/	/	/	/	/	a	/	/	/	9	msmry
10	912621106010	SUGUNA C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	C.Sug+
11	912621106301	JAYAPRIYA M	II/ECE	a	/	/	/	/	/	/	/	/	/	9	1Rt
12	912621106302	KIRUBASHINI C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	

VAC Coordinator

Dr. S.THILAGAVATHI M.E.,Ph.D.,
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(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

Report on Value Added Course

Title:	Real-time Sensor Data Processing with Python for IoT Applications in ECE

Resource Person:	**Er.K.GOPALAKRISHNAN,** Embedded cum IoT Developer, Galwin Technology, Trichy- 620 002.

Date of conduct from :	**22.8.2022**	To:	**26.08.2022**	Duration:	**30 Hours**

Organized Department :	**Electronics and Communication Engineering**

Participant Year:	2	Semester:	**ODD**	No. of Students Registered :	12

Venue:	**Seminar Hall, ,Ground Floor, SBECW**

Outcome of Value Added Course (VAC) :At the end of Course ,Students can able to

- Understand the fundamentals of IoT (Internet of Things) and its applications in the field of Electronics and Communication Engineering
- Learn Python programming language and its specific libraries and frameworks for real-time sensor data processing.
- Gain proficiency in collecting, processing, and analyzing sensor data in real-time using Python.
- Develop the ability to interface sensors with microcontrollers or embedded systems and establish communication with the IoT network.
- Learn about different communication protocols used in IoT systems and their implementation using Python .Explore techniques for handling and managing large volumes of sensor data in real-time.

No. of students successfully completed the VAC course is **12 Students** based on the following Assessment process.

Assessment Process

- Students **more than 60% on total score** and secured more than **75%** in attendance is eligible to receive the certificate for the VAC course conducted
- Total Score = (0.5 *Attendance in VAC out of 100 percentage + 0.5 *Test mark in VAC out of 100 marks)

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Principal

29/08/22

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PUDUKKOTTAI DISTRICT

Dr. **S.THILAGAVATHI** M.E.,Ph.D.,
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15/20

Name of the Student : M. Subalakshmi   **Year/Sem:** II / III

AU Register Number: 912621106009

Value Added Course on
"Real-time Sensor Data Processing with Python for IoT Applications"

MCQ QUESTIONS (20X1 = 20 Marks)

1. Which of the following is a key advantage of real-time sensor data processing in IoT applications?
   a) Improved data storage for historical analysis
   b) Reduced dependency on cloud services
   c) Lower sensor data accuracy
   d) Faster decision-making and response time

2. In real-time data processing, which Python library is commonly used for asynchronous programming?
   a) NumPy
   b) Pandas
   c) Asyncio
   d) Requests

3. What is the primary function of a data broker in real-time sensor data processing for IoT?
   a) Data visualization
   b) Data storage
   c) Data encryption
   d) Data routing and distribution

4. Which Python data structure is suitable for efficiently storing sensor data in real-time?
   a) List
   b) Set
   c) Dictionary
   d) Array

5. Which communication protocol is commonly used for real-time data streaming between IoT devices?
   a) HTTP
   b) MQTT
   c) FTP
   d) SMTP

6. What is the role of a "timestamp" in real-time sensor data processing?

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a) It indicates the sensor's physical location.
b) It specifies the type of sensor used.
c) It helps track the time when data was collected.
d) It encrypts the sensor data for security.

7. Which of the following is an example of an IoT sensor used for environmental monitoring?
   a) Heart rate sensor
   b) Proximity sensor
   c) CO2 sensor
   d) RFID sensor

8. In real-time sensor data processing, what does the term "latency" refer to?
   a) Sensor accuracy
   b) Data storage capacity
   c) Time delay in data processing and transmission
   d) Sensor resolution

9. Which Python library is commonly used for real-time data visualization?
   a) Matplotlib
   b) Seaborn
   c) Plotly
   d) SciPy

10. What is the purpose of data preprocessing in real-time sensor data processing?
    a) To make the data available for public access
    b) To eliminate noise and outliers from the sensor data
    c) To physically calibrate the sensors
    d) To encrypt the data for secure transmission

11. Which IoT component is responsible for transforming analog sensor data into digital format?
    a) Actuator
    b) Microcontroller
    c) Gateway
    d) Data broker

12. What does the term "Data Fusion" mean in the context of real-time sensor data processing?
    a) Combining data from multiple sensors to obtain more accurate and reliable information
    b) Encrypting the sensor data during transmission

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    c) Performing statistical analysis on sensor data

    d) Storing sensor data in a centralized database

13. In IoT applications, what is the primary function of an actuator?

    a) To collect sensor data

    b) To process sensor data

    c) To control physical devices based on sensor readings

    d) To store sensor data

14. Which Python library is commonly used for machine learning tasks in real-time sensor data processing?

    a) TensorFlow

    b) Keras

    c) Scikit-learn

    d) PyTorch

15. What is the significance of Quality of Service (QoS) in MQTT communication for real-time sensor data?

    a) It ensures data integrity during transmission

    b) It determines the type of sensor used for data collection

    c) It specifies the size of the sensor data buffer

    d) It controls the order of data transmission between sensors and brokers

16. Which of the following is an example of a time-series sensor data application in IoT?

    a) Object detection in images

    b) Voice recognition

    c) Temperature monitoring over time

    d) Text classification

17. What is the primary purpose of using Python for real-time sensor data processing in IoT applications?

    a) To reduce overall hardware costs

    b) To enable real-time data visualization

    c) To simplify data storage and retrieval

    d) To provide a flexible and powerful programming environment

18. Which Python library allows easy integration of IoT devices with cloud services for data processing?

    a) Tornado

    b) Twisted

    c) Boto3

    d) Requests

19. What is the typical role of edge computing in real-time sensor data processing for IoT applications?

a) Reducing data transmission speed
b) Offloading data processing to local devices
c) Storing data in a centralized cloud server
d) Minimizing data encryption overhead

20. In real-time sensor data processing, what does the term "data sampling rate" refer to?
a) The time it takes to process sensor data
b) The accuracy of the sensor data
c) The frequency at which sensor data is collected
d) The size of the data buffer used for storage

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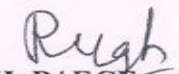## Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

ACADEMIC YEAR ODD SEMESTER (2022-2023)

MARK SHEET FOR VALUE ADDED COURSE- REAL-TIME SENSOR DATA PROCESSING WITH PYTHON FOR IOT APPLICATIONS

S.NO	REGISTER NUMBER	NAME	YEAR & BRANCH	Attendance (A)		VAC –MCQ TEST (B)		OVERALL MARK(100) (50% of A + 50% of B)
				No.of Sessions Attented	Marks (100)	No.of Correct Answer	Marks (100)	
1	912621106001	AMRIN M	II & ECE	9	90	16	80	85
2	912621106002	BHUVANESWARI C	II & ECE	9	90	18	90	90
3	912621106003	DHANYASHREE A	II & ECE	8	80	17	85	83
4	912621106004	KALAIVANI R	II & ECE	9	90	14	60	75
5	912621106005	KAVIYA K	II & ECE	8	80	15	75	78
6	912621106006	KEERTHANA V	II & ECE	9	90	15	75	83
7	912621106007	PAVITHRA P	II & ECE	10	100	18	90	95
8	912621106008	RAJESHWARI R	II & ECE	9	90	15	75	83
9	912621106009	SUBALAKSHMI M	II & ECE	9	90	15	75	83
10	912621106010	SUGUNA C	II & ECE	10	100	19	95	98
11	912621106301	JAYAPRIYA M	II & ECE	9	90	17	85	88
12	912621106302	KIRUBASHINI C	II & ECE	10	100	13	65	83

VAC Coordinator

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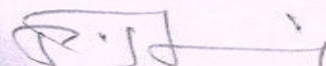COLLEGE FOR WOMEN
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HoD/ ECE

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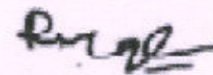SRI BHARATHI ENGINEERING
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KAIKKURICHI

GALWIN™ TECHNOLOGY
Beyond Innovation

CERTIFICATE OF COMPLETION

VALUE ADDED COURSE

This is to Certify that Mr/Ms. **SUGUNA.C** of **II ECE** has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 22.08.2022 to 26.08.2022 during the academic year 2022-2023.

Managing Director
Galwin Technology

HoD/ECE
SBECW

Principal
Dr. **S.THILAGAVATHI** M.E., Ph.D., SBECW
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/ODD SEMESTER

DEPARTMENT CIRCULAR   Date: 27.07.2022

Value Added Course offered by the Department of ECE will be conducted for third and final Year students on **"Real-time Sensor Data Processing with Python for IoT Applications"** in association with Galwin technology from 03.08.2022 to 09.08.2022. Certificates will be issued to the eligible participants at the end of the programme.

S.No	Name of the Course	Resource Person
1	Real-time Sensor Data Processing with Python for IoT Applications	**Er.K.GOPALAKRISHNAN,** Embedded cum AI Developer, Galwin Technology, 12A, Periyasamy Towers, 3rd floor, Chathiram Bus Stand, Trichy- 620 002. Tamil Nadu . **Mail.Id:** info@galwintech.in

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Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- III & IV Year ECE Students
- Notice Board

Dr S.THILAGAVATHI M.E., Ph.D.,
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
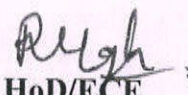
Academic Year 2022-2023/ODD Semester

"Real-time Sensor Data Processing with Python for IoT Applications "

SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE
1	Overview of the Internet of Things (IoT) and its applications	2	03.8.22
2	Basic Python syntax, data types, and control structures,Functions, modules, and libraries in Python, Handling sensor data in Python using built-in data structures	1	03.8.22
3	Real-time requirements in IoT applications, Concepts of buffering, sampling rate, and data acquisition,Techniques for efficient handling and processing of real-time sensor data	3	03.8.22
4	Introduction to various types of sensors used in IoT applications,Techniques for interfacing sensors with microcontrollers or single-board computers, Reading and acquiring sensor data using Python libraries and modules	3	04.8.22
5	Filtering and noise reduction techniques for sensor data,Statistical analysis and feature extraction from sensor readings	3	04.8.22
6	Challenges of processing large-scale sensor data streams, Introduction to stream processing frameworks (e.g., Apache Kafka, Apache Flink)	3	05.8.22
7	Real-time data visualization using Python libraries (e.g., Matplotlib, Plotly)	3	05.8.22
8	Techniques for distributed processing of sensor	3	06.8.22
9	Interfacing Python with IoT communication protocols	3	06.8.22
10	Real-time data aggregation, anomaly detection, and predictive analytics	3	08.8.22
11	Integrating real-time sensor data processing with IoT platforms using Python	3	08.8.22
12	Data storage, visualization, and remote monitoring of sensor data in IoT applications	3	09.8.22
13	Security and Privacy in Real-time Sensor Data Processing	3	09.8.22
Total Hours		**36**	

VAC Coordinator

HoD/ECE

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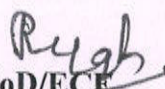### ACADEMIC YEAR ODD SEMESTER (2022-2023)

STUDENT PARTICIPATION LIST FOR VALUE ADDED PROGRAM

Real-time Sensor Data Processing with Python for IoT Applications

S.NO	REG.NO	NAME	YEAR & BRANCH
1	912620106001	ABIRAMI S	III &ECE
2	912620106002	ANUSHYA M	III &ECE
3	912620106003	ARTHI S	III &ECE
4	912620106004	JEYASRI K	III &ECE
5	912620106006	SENPAGAHARINI V	III &ECE
6	912620106007	SONIYA P	III &ECE
7	912620106301	ABITHA S	III &ECE
8	912620106302	DESIKA G	III &ECE
9	912620106303	SABAREESWARI S	III &ECE
10	912619106001	AASHIMA M	IV& ECE
11	912619106002	ANANTHI P	IV& ECE
12	912619106004	JAFFARNISHA R	IV& ECE
13	912619106005	MAHESWARI K	IV& ECE
14	912619106006	MANISHA S	IV& ECE
15	912619106007	MEGAVADHANA A	IV& ECE
16	912619106008	PRIYANGA R	IV& ECE
17	912619106009	RAGAVI V	IV& ECE
18	912619106010	RAJAPRABA M	IV& ECE
19	912619106011	SASIKA K	IV& ECE

VAC Coordinator

HoD/ECE

Dr. S.THILAGAVATHI M.E.,Ph.D.,
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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
ACADEMIC YEAR ODD SEMESTER (2022-2023)

ATTENDANCE SHEET FOR VALUE ADDED PROGRAM - Real-time Sensor Data Processing with Python for IoT Applications

o	REG. NO	NAME	YEAR/ BRANCH	3.8.2022		4.8.2022		5.8.2022		6.8.2022		8.8.2022		9.8.2022		No. of Sessions Attended	Sign Stud
				F.N	A.N	F.N	A.N	F.N	A.N	F.N	A.N	F.N	A.N	F.N	A.N		
	912620106001	ABIRAMI S	III/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	S.A
	912620106002	ANUSHYA M	III/ECE	a	a	✓	✓	✓	✓	✓	✓	✓		✓	✓	10	M.Anush
	912620106003	ARTHI S	III/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	S.Arr
	912620106004	JEYASRI K	III/ECE	✓	ʌ	✓	✓	✓	✓	a	✓	✓	✓	✓	✓	11	K.Jey
	912620106006	SENPAGAHARINI V	III/ECE	✓	✓	✓	✓	✓	✓	a	a	✓	✓	✓	✓	10	venb
	912620106007	SONIYA P	III/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	P.Soy
	912620106301	ABITHA S	III/ECE	✓	✓	a	✓	✓	✓	✓	✓	✓	✓	✓	✓	11	Abi.S
	912620106302	DESIKA G	III/ECE	a	a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	GDie
	912620106303	SABAREESWARI S	III/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	S.Sah
	912619106001	AASHIMA M	IV/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	Aas
	912619106002	ANANTHI P	IV/ECE	✓	✓	a	a	✓	✓	✓	✓	✓	✓	✓	✓	10	P.Ani
	912619106004	JAFFARNISHA R	IV/ECE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12	R.By
	912619106005	MAHESWARI K	IV/ECE	✓	✓	✓	✓	✓	✓	a	✓	✓	✓	✓	✓	11	Mahe

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4	912619106006	MANISHA S	IV/ECE	a	a	/	/	/	/	/	/	/	/	/	/	10	8149
5	912619106007	MEGAVADHANA A	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	
6	912619106008	PRIYANGA R	IV/ECE	/	/	a	/	/	/	/	/	/	/	/	/	11	R
7	912619106009	RAGAVI V	IV/ECE	/	/	a	a	/	/	/	/	/	/	/	/	10	
8	912619106010	RAJAPRABA M	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	
9	912619106011	SASIKA K	IV/ECE	a	/	/	/	/	/	/	/	/	/	/	/	11	

VAC Coordinator

HoD/ ECE

HOD / ECE
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Dr. **S.THILAGAVATHI** M.E.,Ph.D.,
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<u>Report on Value Added Course</u>

Title:	Real-time Sensor Data Processing with Python for IoT Applications in ECE

Resource Person:	**Er.K.GOPALAKRISHNAN,** Embedded cum IoT Developer, Galwin Technology, Trichy- 620 002.

Date of conduct from :	**03.8.2022**	To:	**09.08.2022**	Duration:	**30 Hours**
Organized Department :	**Electronics and Communication Engineering**				

Participant Year:	3/4	Semester:	**ODD**	No. of Students Registered :	19
Venue:	**Seminar Hall, ,Ground Floor, SBECW**				

Outcome of Value Added Course (VAC) :At the end of Course ,Students can able to

- Understand the fundamentals of IoT (Internet of Things) and its applications in the field of Electronics and Communication Engineering
- Learn Python programming language and its specific libraries and frameworks for real-time sensor data processing.
- Gain proficiency in collecting, processing, and analyzing sensor data in real-time using Python.
- Develop the ability to interface sensors with microcontrollers or embedded systems and establish communication with the IoT network.
- Learn about different communication protocols used in IoT systems and their implementation using Python .Explore techniques for handling and managing large volumes of sensor data in real-time.

No. of students successfully completed the VAC course is **<u>19 Students</u>** based on the following Assessment process.

Assessment Process

- Students securing **more than 60% on total score** and secured more than **75%** in attendance is eligible to receive the certificate for the VAC course conducted
- Total Score = (0.5 *Attendance in VAC out of 100 percentage + 0.5 *Test mark in VAC out of 100 marks)

VAC Coordinator

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HOD / ECE
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PUDUKKOTTAI - 622 303.

Principal
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI - 622 303.
PUDUKKOTTAI DISTRICT

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
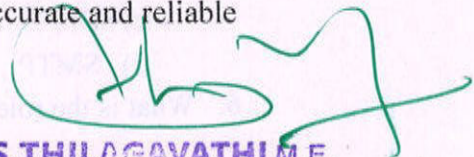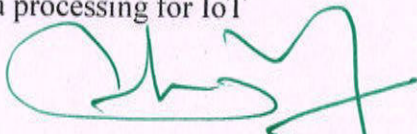Kaikkurchi - 622 303, Pudukkottai Dt.

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Name of the Student :   **Year/Sem:**

AU Register Number:

Value Added Course on
"Real-time Sensor Data Processing with Python for IoT Applications"

MCQ QUESTIONS (20X1 = 20 Marks)

1. Which of the following is a key advantage of real-time sensor data processing in IoT applications?
   a) Improved data storage for historical analysis
   b) Reduced dependency on cloud services
   c) Lower sensor data accuracy
   d) Faster decision-making and response time

2. In real-time data processing, which Python library is commonly used for asynchronous programming?
   a) NumPy
   b) Pandas
   c) Asyncio
   d) Requests

3. What is the primary function of a data broker in real-time sensor data processing for IoT?
   a) Data visualization
   b) Data storage
   c) Data encryption
   d) Data routing and distribution

4. Which Python data structure is suitable for efficiently storing sensor data in real-time?
   a) List
   b) Set
   c) Dictionary
   d) Array

5. Which communication protocol is commonly used for real-time data streaming between IoT devices?
   a) HTTP
   b) MQTT
   c) FTP
   d) SMTP

6. What is the role of a "timestamp" in real-time sensor data processing?

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SRI BHARATHI ENGINEERING
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a) It indicates the sensor's physical location.

b) It specifies the type of sensor used.

c) It helps track the time when data was collected.

d) It encrypts the sensor data for security.

7. Which of the following is an example of an IoT sensor used for environmental monitoring?

    a) Heart rate sensor

    b) Proximity sensor

    c) CO2 sensor

    d) RFID sensor

8. In real-time sensor data processing, what does the term "latency" refer to?

    a) Sensor accuracy

    b) Data storage capacity

    c) Time delay in data processing and transmission

    d) Sensor resolution

9. Which Python library is commonly used for real-time data visualization?

    a) Matplotlib

    b) Seaborn

    c) Plotly

    d) SciPy

10. What is the purpose of data preprocessing in real-time sensor data processing?

    a) To make the data available for public access

    b) To eliminate noise and outliers from the sensor data

    c) To physically calibrate the sensors

    d) To encrypt the data for secure transmission

11. Which IoT component is responsible for transforming analog sensor data into digital format?

    a) Actuator

    b) Microcontroller

    c) Gateway

    d) Data broker

12. What does the term "Data Fusion" mean in the context of real-time sensor data processing?

    a) Combining data from multiple sensors to obtain more accurate and reliable information

    b) Encrypting the sensor data during transmission

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    c) Performing statistical analysis on sensor data

    d) Storing sensor data in a centralized database

13. In IoT applications, what is the primary function of an actuator?

    a) To collect sensor data

    b) To process sensor data

    c) To control physical devices based on sensor readings

    d) To store sensor data

14. Which Python library is commonly used for machine learning tasks in real-time sensor data processing?

    a) TensorFlow

    b) Keras

    c) Scikit-learn

    d) PyTorch

15. What is the significance of Quality of Service (QoS) in MQTT communication for real-time sensor data?

    a) It ensures data integrity during transmission

    b) It determines the type of sensor used for data collection

    c) It specifies the size of the sensor data buffer

    d) It controls the order of data transmission between sensors and brokers

16. Which of the following is an example of a time-series sensor data application in IoT?

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    c) Temperature monitoring over time

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17. What is the primary purpose of using Python for real-time sensor data processing in IoT applications?

    a) To reduce overall hardware costs

    b) To enable real-time data visualization

    c) To simplify data storage and retrieval

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18. Which Python library allows easy integration of IoT devices with cloud services for data processing?

    a) Tornado

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19. What is the typical role of edge computing in real-time sensor data processing for IoT applications?

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20. In real-time sensor data processing, what does the term "data sampling rate" refer to?
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/ODD SEMESTER

Value Added Course on

Real-time Sensor Data Processing with Python for IoT Applications

MCQ ANSWER KEY

1	D	6	C	11	B	16	C
2	C	7	C	12	A	17	D
3	D	8	C	13	C	18	C
4	A	9	A	14	C	19	B
5	B	10	B	15	A	20	C

Dr. **S.THILAGAVATHI** M.E.,Ph.D.,
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Name of the Student : ABIRAMI.S   **Year/Sem:** III / Y

AU Register Number: 912620106001

18/20

Value Added Course on
"Real-time Sensor Data Processing with Python for IoT Applications"

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Name of the Student : Manisha .S   **Year/Sem:** IV / VII

AU Register Number: 912619106006

Value Added Course on
"Real-time Sensor Data Processing with Python for IoT Applications"

MCQ QUESTIONS (20X1 = 20 Marks)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

ACADEMIC YEAR ODD SEMESTER (2022-2023)

MARK SHEET FOR VALUE ADDED COURSE- REAL-TIME SENSOR DATA PROCESSING WITH PYTHON FOR IOT APPLICATIONS

S.NO	REGISTER NUMBER	NAME	YEAR & BRANCH	Attendance (A)		VAC –MCQ TEST (B)		OVERALL MARK(100) (50% of A + 50% of B)
				No.of Sessions Attented	Marks (100)	No.of Correct Answer	Marks (100)	
1	912620106001	ABIRAMI S	III & ECE	12	100	18	90	95
2	912620106002	ANUSHYA M	III & ECE	10	83	13	65	74
3	912620106003	ARTHI S	III & ECE	12	100	15	75	88
4	912620106004	JEYASRI K	III & ECE	11	91	19	90	91
5	912620106006	SENPAGAHARINI V	III & ECE	10	83	14	70	77
6	912620106007	SONIYA P	III & ECE	12	100	19	95	98
7	912620106301	ABITHA S	III & ECE	11	91	17	85	88
8	912620106302	DESIKA G	III & ECE	10	83	16	80	82
9	912620106303	SABAREESWARI S	III & ECE	12	100	15	65	83

Dr. **S.THILAGAVATHI** M.E.,Ph.D.,
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SRI BHARATHI ENGINEERING
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				No.of Sessions Attented	Marks (100)	No.of Correct Answer	Marks (100)	
10	912619106001	AASHIMA M	IV & ECE	12	100	19	90	95
11	912619106002	ANANTHI P	IV & ECE	10	83	16	80	82
12	912619106004	JAFFARNISHA R	IV & ECE	12	100	16	80	90
13	912619106005	MAHESWARI K	IV & ECE	11	91	17	85	88
14	912619106006	MANISHA S	IV & ECE	10	83	16	80	82
15	912619106007	MEGAVADHANA A	IV & ECE	12	100	19	95	98
16	912619106008	PRIYANGA R	IV & ECE	11	91	17	85	88
17	912619106009	RAGAVI V	IV & ECE	10	83	16	80	82
18	912619106010	RAJAPRABA M	IV & ECE	12	100	17	85	93
19	912619106011	SASIKA K	IV & ECE	11	91	16	80	86

VAC Coordinator

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HOD / ECE
SRI BHARATHI ENGINEERING
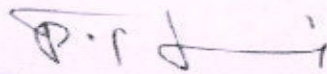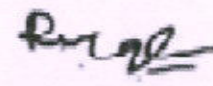COLLEGE FOR WOMEN
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TECHNOLOGY
Beyond Innovation

CERTIFICATE OF COMPLETION

VALUE ADDED COURSE

This is to Certify that Mr/Ms. **SABAREESWARI.S** of **III ECE** has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 03.08.2022 to 09.08.2022 during the academic year 2022-2023 .

Managing Director
Galwin Technology

HoD/ECE
SBECW

Principal
SBECW

Dr. **S.THILAGAVATHI** M.E.,Ph.D.,
PRINCIPAL
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CERTIFICATE OF COMPLETION

VALUE ADDED COURSE

This is to Certify that Mr/Ms. **MANISHA.S** of **IV ECE** has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 03.08.2022 to 09.08.2022 during the academic year 2022-2023.

Managing Director
Galwin Technology

HoD/ECE
SBECW

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/EVEN SEMESTER

DEPARTMENT CIRCULAR   Date: 19.01.2023

Certificate Course offered by the Department of ECE will be conducted for all second, third year students on **"Recent Applications in IOT using Arduino and Raspbery PI"** in our college campus from 30.01.2023 to 03.02.2023.Certificates will be issued to the eligible participants at the end of the course.

S.No	Name of the Course	Resource Person
1	Recent Applications in IOT using Arduino and Raspbery PI	**1. Mrs.R.YOGESHWARI,** HoD/ECE, Department of ECE, Sri Bharathi Engineering College for Women, Kaikkurichi, Pudukkottai.
		2. Mr.C.PALANIYAPPAN, Assistant Professor/ECE, Department of ECE, Sri Bharathi Engineering College for Women, Kaikkurichi, Pudukkottai.

HoD/ECE

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COLLEGE FOR WOMEN
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PUDUKKOTTAI - 622 303

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- II & III Year ECE Students
- Notice Board

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-20223/EVEN SEMESTER

Certificate course on "**Recent Applications in IOT using Arduino and Raspbery PI**"

SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE FN/AN	RESOURCE PERSON
1	Introduction to IOT, IOT Architecture and Communication protocols ,Transducers, Classification, Roles of sensors in IOT	3	30.1.2023	Mrs.R.Yogeshwari
2	Various types of sensors, Design of sensors, sensor architecture, special requirements for IOT sensors, Interfacing to the Real World	3	30.1.2023	Mr.M.Palaniyappan
3	Introduction of Arduino and its Types , Arduino Serial Monitor and Plotter	3	31.1.2023	Mr.M.Palaniyappan
4	Technologies Used In IoT , Protocols ,Creating Classes and Libraries with Arduino	3	31.1.2023	Mrs.R.Yogeshwari
5	Getting started with Raspberry Pi, Booting Up RPi- Operating System and Linux Commands	3	1.2.2023	Mr.M.Palaniyappan
6	C Language- Imbibing RPi with C	3	1.2.2023	Mrs.R.Yogeshwari
7	Working with RPi using Python and Sensing Data using Python, Python vs. Other Languages, Applications of Python	3	2.2.2023	Mrs.R.Yogeshwari
8	Programming with Arduino , Arduino and ThingSpeak	3	2.2.2023	Mr.M.Palaniyappan
9	IoT Design using Raspberry Pi	3	3.2.2023	Mrs.R.Yogeshwari
10	Using Node-RED Visual Editor on Rpi	3	3.2.2023	Mr.M.Palaniyappan
	Total Hours	30		

Course Coordinator

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HoD/ECE

HOD / ECE
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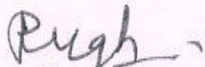COLLEGE FOR WOMEN
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DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING
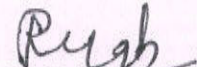
ACADEMIC YEAR EVEN SEMESTER (2022-2023)

STUDENT PARTICIPATION LIST FOR CERTIFICATE COURSE PROGRAM

RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

S.NO	REG.NO	NAME	YEAR & BRANCH
1	912621106001	AMRIN M	II & IV
2	912621106002	BHUVANESWARI C	II & IV
3	912621106003	DHANYASHREE A	II & IV
4	912621106004	KALAIVANI R	II & IV
5	912621106005	KAVIYA K	II & IV
6	912621106006	KEERTHANA V	II & IV
7	912621106007	PAVITHRA P	II & IV
8	912621106008	RAJESHWARI R	II & IV
9	912621106009	SUBALAKSHMI M	II & IV
10	912621106010	SUGUNA C	II & IV
11	912621106301	JAYAPRIYA M	II & IV
12	912621106302	KIRUBASHINI C	II & IV
13	912620106001	ABIRAMI S	III & VI
14	912620106002	ANUSHYA M	III & VI
15	912620106003	ARTHI S	III & VI
16	912620106004	JEYASRI K	III & VI
17	912620106006	SENPAGAHARINI V	III & VI
18	912620106007	SONIYA P	III & VI
19	912620106301	ABITHA S	III & VI
20	912620106302	DESIKA G	III & VI
21	912620106303	SABAREESWARI S	III & VI

Course Coordinator

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR EVEN SEMESTER (2022-2023)

ATTENDANCE SHEET FOR CERTIFICATE COURSE PROGRAM- RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

S.No	REG. NO	NAME	YEAR/ BRANCH	30.01.2023 F.N	30.01.2023 A.N	31.01.2023 F.N	31.01.2023 A.N	1.02.2023 F.N	1.02.2023 A.N	2.02.2023 F.N	2.02.2023 A.N	3.02.2023 F.N	3.02.2023 A.N	No. of Sessions Attended	Sign of Student
1	912621106001	AMRIN M	II/ECE	/	/	a	/	/	/	/	/	/	/	9	M.hmj
2	912621106002	BHUVANESWARI C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	Bhuvt.c
3	912621106003	DHANYASHREE A	II/ECE	a	a	/	/	/	/	/	/	/	/	8	A.Dhy
4	912621106004	KALAIVANI R	II/ECE	/	/	/	/	/	/	a	/	/	/	9	Kalaivani.R
5	912621106005	KAVIYA K	II/ECE	/	/	a	a	/	/	/	/	/	/	8	K.Icavryh
6	912621106006	KEERTHANA V	II/ECE	/	/	/	/	/	/	/	/	/	/	10	V.Keey
7	912621106007	PAVITHRA P	II/ECE	a	/	/	/	/	/	/	/	/	/	10	P.Pavithra
8	912621106008	RAJESHWARI R	II/ECE	a	/	/	/	/	/	/	/	/	/	9	R.Rajes
9	912621106009	SUBALAKSHMI M	II/ECE	a	/	/	/	/	/	/	/	/	/	9	M.cubry
10	912621106010	SUGUNA C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	C.Signy
11	912621106301	JAYAPRIYA M	II/ECE	/	/	/	/	/	/	/	/	/	/	10	MQp
12	912621106302	KIRUBASHINI C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	KBy.
13	912620106001	ABIRAMI S	III/ECE	/	/	/	/	/	/	/	/	/	/	10	S.Ay
14	912620106002	ANUSHYA M	III/ECE	/	/	a	a	/	/	/	/	/	/	8	M.Anuhx.
15	912620106003	ARTHI S	III/ECE	.	.	.	/	/	/	/	/	/	/	10	S / .

16	912620106004	JEYASRI K	III/ECE	/	/	/	/	/	/	/	/	/	/	10	K. Jmyf
17	912620106006	SENPAGAHARINI V	III/ECE	a	a	/	/	/	/	/	/	/	/	8	V. Shpr..
18	912620106007	SONIYA P	III/ECE	/	/	/	/	/	/	/	/	/	/	10	P. Saiya
19	912620106301	ABITHA S	III/ECE	/	/	/	/	a	/	/	/	/	/	9	Abi.S
20	912620106302	DESIKA G	III/ECE	/	/	/	/	a	a	/	/	/	/	8	G-Dlei
21	912620106303	SABAREESWARI S	III/ECE	/	/	/	/	/	/	/	/	/	/	10	S. Sabesy

Course Coordinator

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PUDUKKOTTAI - 622 303

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Report on Certificate Course

Title:	Recent Applications in IOT using Arduino and Raspbery PI

Resource Person:	**1.Mrs.R.YOGESHWARI,** HoD/ECE **2.Mr.M.PALANIAPPAN,** Assistant Professor/ECE

Date of conduct from :	**30.01.2023**	To:	**03.02.2023**	Duration:	**30 Hours**

Organized Department :	**Electronics and Communication Engineering**

Participant Year:	2/ 3	Semester:	ODD	No. of Students Registered :	21

Venue:	**Seminar Hall, ,Ground Floor, SBECW**

Outcome of Certificate Course (CC) :At the end of Course ,Students can able to

- Understand the basic concepts and principles of the Internet of Things (IoT), including the role of sensors, actuators, communication protocols, data processing, and cloud integration.
- Learn how to interface and integrate different sensors with Arduino and Raspberry Pi, collect data from the physical world, and understand data acquisition techniques.
- Explore various communication protocols commonly used in IoT applications, such as MQTT, HTTP, and WebSocket, and implement them to establish data exchange between devices and servers.
- Understand the importance of IoT security and privacy concerns, exploring strategies for securing IoT devices, data, and communication channels.
- Develop troubleshooting and debugging skills to identify and resolve common issues encountered during IoT application development.
- No. of students successfully completed the certificate course is **21 Students** based on the following Assessment process.

Assessment Process

- Students securing **more than 60% on total score** and secured more than **75%** in attendance is eligible to receive the certificate for the Certificate course conducted
- Total Score = (0.5 *Attendance in CC out of 100 percentage + 0.5 *Test mark in CC out of 100 marks)

Course Coordinator

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PUDUKKOTTAI - 622 303.

Principal 06/02/23

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KAIKKURICHI - 622 303.
PUDUKKOTTAI DISTRICT

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PRINCIPAL
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COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

Name of the Student :   Year/Sem: II &III/IV&VI

AU Register Number:

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi"

MCQ QUESTIONS (25X1 = 25 Marks)

1. The Raspberry Pi is defined as the _____
   a) Micro Computer
   b) Mega Computer
   c) Mini computer
   d) Nano Computer

2. Raspbian is _____
   a) Assembler
   b) Language
   c) Compiler
   d) OS

3. Raspberry Pi consists of a _____ quad-core processor or microprocessor.
   a) 16-bit
   b) 32-bit
   c) 64-bit
   d) 128-bit

4. The Raspberry Pi has a _____ interface to allow it to perform serial data communications.
   a) UART
   b) GPIO
   c) I2C
   d) SPI

5. How many USB ports are present in Raspberry Pi 3?
   a) 5
   b) 2
   c) 4
   d) 3

6. What bit processor is used in Pi 3?
   a) 64-bit
   b) 32-bit
   c) 128-bit
   d) Both 64 and 32 bit

7. What is the speed of operation in Pi 3?
   a) 900MHz
   b) 1.2GHz
   c) 1GHz
   d) 500MHz

8. What is the Ethernet/LAN cable used in RPi?
   a) Cat5
   b) Cat5e
   c) Cat6
   d) RJ45

9. How many Input/Output pins on board Raspberry Pi3 has?
   a) 20
   c) 40
   b) 30
   d) 50

10. How much RAM, the Raspberry Pi has?
    a) 2GiB of RAM
    c) 4GiB of RAM
    b) 1GiB of RAM
    d) 8GiB of RAM

11. What is the maximum peripheral current draw allowed in Raspberry Pi 3?
    a) 1200 mA
    c) 500 mA
    b) 700 mA
    d) 100 mA

12. Does micro SD card present in all modules?
    a) True
    b) False

13. Does Raspberry Pi need external hardware?
    a) True
    b) False

14. Does RPi have an internal memory?
    a) True
    b) False

15. Which operating system Raspberry Pi has?
    a) Linux
    c) NetBSD
    b) OpenBSD
    d) All of the above

16. How power supply is done to RPi?
    a) USB connection
    c) Charger
    b) Internal battery
    d) Adapter

17. What are the mode(s) used for addressing the pins in Raspberry Pi?
    a) GPI
    c) BOARD & BCM
    b) BCM
    d) GPIO, BCIM & CAN

18. What are the parameters that are default values?
    a) Port_Name and Bits
    c) Speed and Parity
    b) Speed and Port_Names
    d) Stop bit and Flow Control

19. The BCM 14 pin of Raspberry Pi is
    a) Physical pin 8
    c) Transmitter pin
    b) UART
    d) All of the above

20. What is the command used for easy using of GNU screen?

    a) $useradd -G {dialout} your_name   c) Minicom -b 115200 -o -D
    b) Screen Port_Name115200   d) Prompt> # help

21. GPIO stand for General Purpose Input Output Pins
    a) True   b) False

22. Which instruction set architecture is used in Raspberry Pi?
    a) X86   c) AVR
    b) MSP   d) ARM

23. Which instruction set is used in Raspberry Pi?
    a) CISC   c) MIPS
    b) RISC   d) None of these mentioned

24. Which of the following variants of Raspberry Pi has an inbuilt wi-fi?
    a) Raspberry Pi 2   c) Raspberry Pi A+
    b) Raspberry Pi 3   d) Raspberry Pi Zero

25. Which of the following is not a types of Raspberry Pi?
    a) Raspberry Pi Alternatives   c) Raspberry Pi 3 Model B+
    b) Raspberry Pi Zero W   d) Raspberry Pi 3 Model A+

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/EVEN SEMESTER

Certificate Course on **Recent Applications in IoT Using Ardunio and Raspbery Pi**

MCQ ANSWER KEY

1	C	6	A	11	A	16	A	21	A
2	D	7	B	12	A	17	C	22	D
3	C	8	D	13	B	18	B	23	C
4	A	9	C	14	A	19	D	24	B
5	C	10	B	15	D	20	B	25	D

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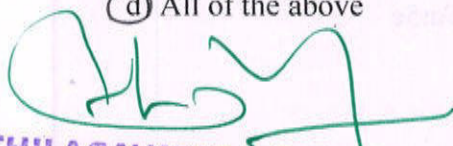Kaikkurchi - 622 303, Pudukkottai Dt.

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Name of the Student : R. kalaivani   **Year/Sem: II &III/IV&VI**

AU Register Number: 9126 211 06 004

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi "

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   d) SPI

5. How many USB ports are present in Raspberry Pi 3?
   a) 5
   b) 2
   c) 4 ✓
   d) 3

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   a) 64-bit ✓
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c) Minicom -b 115200 -o -D
d) Prompt> # help

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b) Raspberry Pi Zero W
c) Raspberry Pi 3 Model B+
d) Raspberry Pi 3 Model A+

Dr. S.THILAGAVATHI M.E.,Ph.D.,
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COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

Name of the Student : P. Soniya   **Year/Sem: II &III/IV&VI**

AU Register Number: 912620106007

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi"

MCQ QUESTIONS (25X1 = 25 Marks)

22 / 25

1. The Raspberry Pi is defined as the _____
   a) Micro Computer
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   d) OS ✓

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   b) 1.2GHz ✓
   c) 1GHz
   d) 500MHz

8. What is the Ethernet/LAN cable used in RPi?
   a) Cat5
   b) Cat5e
   c) Cat6
   d) RJ45 ✓

9. How many Input/Output pins on board Raspberry Pi3 has?
   a) 20
   b) 30
   c) 40
   d) 50

10. How much RAM, the Raspberry Pi has?
    a) 2GiB of RAM
    b) 1GiB of RAM
    c) 4GiB of RAM
    d) 8GiB of RAM

11. What is the maximum peripheral current draw allowed in Raspberry Pi 3?
    a) 1200 mA
    b) 700 mA
    c) 500 mA
    d) 100 mA

12. Does micro SD card present in all modules?
    a) True
    b) False

13. Does Raspberry Pi need external hardware?
    a) True
    b) False

14. Does RPi have an internal memory?
    a) True
    b) False

15. Which operating system Raspberry Pi has?
    a) Linux
    b) OpenBSD
    c) NetBSD
    d) All of the above

16. How power supply is done to RPi?
    a) USB connection
    b) Internal battery
    c) Charger
    d) Adapter

17. What are the mode(s) used for addressing the pins in Raspberry Pi?
    a) GPI
    b) BCM
    c) BOARD & BCM
    d) GPIO, BCIM & CAN

18. What are the parameters that are default values?
    a) Port_Name and Bits
    b) Speed and Port_Names
    c) Speed and Parity
    d) Stop bit and Flow Control

19. The BCM 14 pin of Raspberry Pi is
    a) Physical pin 8
    b) UART
    c) Transmitter pin
    d) All of the above

20. What is the command used for easy using of GNU screen?

   a) $useradd -G {dialout} your_name

   b) Screen Port_Name115200

   c) Minicom -b 115200 -o -D

   d) Prompt> # help

21. GPIO stand for General Purpose Input Output Pins

   a) True

   b) False

22. Which instruction set architecture is used in Raspberry Pi?

   a) X86

   b) MSP

   c) AVR

   d) ARM

23. Which instruction set is used in Raspberry Pi?

   a) CISC

   b) RISC

   c) MIPS

   d) None of these mentioned

24. Which of the following variants of Raspberry Pi has an inbuilt wi-fi?

   a) Raspberry Pi 2

   b) Raspberry Pi 3

   c) Raspberry Pi A+

   d) Raspberry Pi Zero

25. Which of the following is not a types of Raspberry Pi?

   a) Raspberry Pi Alternatives

   b) Raspberry Pi Zero W

   c) Raspberry Pi 3 Model B+

   d) Raspberry Pi 3 Model A+

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PRINCIPAL
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COLLEGE FOR WOMEN
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DEPARTMENT OF ECE

DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

ACADEMIC YEAR EVEN SEMESTER (2022-2023)

MARK SHEET FOR CERTIFICATE COURSE- RECENT APPLICATIONS IN IOT USING ARDUINO

AND RASPBERY PI

S.NO	REGISTER NUMBER	NAME	YEAR & BRANCH	Attendance (A)		VAC –MCQ TEST (B)		OVERALL MARK(100) (50% of A + 50% of B)
				No.of Sessions Attented	Marks (100)	No.of Correct Answer	Marks (100)	
1	912621106001	AMRIN M	II /ECE	9	90	22	88	89
2	912621106002	BHUVANESWARI C	II /ECE	10	100	23	92	96
3	912621106003	DHANYASHREE A	II /ECE	8	80	21	84	82
4	912621106004	KALAIVANI R	II /ECE	9	90	20	80	85
5	912621106005	KAVIYA K	II /ECE	8	80	19	76	78
6	912621106006	KEERTHANA V	II /ECE	10	100	20	80	90
7	912621106007	PAVITHRA P	II /ECE	10	100	21	84	92
8	912621106008	RAJESHWARI R	II /ECE	9	90	19	76	83
9	912621106009	SUBALAKSHMI M	II /ECE	9	90	18	72	81
10	912621106010	SUGUNA C	II /ECE	10	100	22	88	94

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11	912621106301	JAYAPRIYA M	II /ECE	10	100	20	80	90
12	912621106302	KIRUBASHINI C	II /ECE	10	100	19	76	88
13	912620106001	ABIRAMI S	III / ECE	10	100	18	72	86
14	912620106002	ANUSHYA M	III / ECE	8	80	20	80	80
15	912620106003	ARTHI S	III / ECE	10	100	20	80	90
16	912620106004	JEYASRI K	III / ECE	10	100	18	72	86
17	912620106006	SENPAGAHARINI V	III / ECE	8	80	19	76	78
18	912620106007	SONIYA P	III / ECE	10	100	22	88	94
19	912620106301	ABITHA S	III / ECE	9	90	19	76	83
20	912620106302	DESIKA G	III / ECE	8	80	18	72	76
21	912620106303	SABAREESWARI S	III / ECE	10	100	19	76	88

Course Coordinator

Dr. S.THILAGAVATHI M.E., ...,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt,

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SRI BHARATHI ENGINEERING
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE OF PARTICIPATION

This is to Certify that Mr/Ms. **RAJESHWARI R** (Reg.No: **912621106008**), **II** ECE

has successfully completed Certificate Course on "Recent Applications in IOT using

Arduino and Raspbery PI " held at our college campus from 30.01.2023 to 03.02.2023

for the academic year 2022-2023 [5 Days].

COURSE COORDINATOR

Dr. S.THILAGAVATHI M.E., Ph.D.,
PRINCIPAL
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

PRINCIPAL

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE OF PARTICIPATION

This is to Certify that Mr/Ms. **ABITHA S** (Reg.No: **912620106301**), **III** ECE has

successfully completed Certificate Course on "*Recent Applications in IOT using*

Arduino and Raspbery PI" held at our college campus from 30.01.2023 to 03.02.2023

for the academic year 2022-2023 [5 Days].

COURSE COORDINATOR

Dr. S.THILAGAVATHI M.E.,Ph.D.,
PRINCIPAL
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/EVEN SEMESTER

DEPARTMENT CIRCULAR   Date: 01.02.2023

Certificate Course offered by the Department of ECE will be conducted for Final year students on **"Recent Applications in IOT using Arduino and Raspbery PI"** in our college campus. The Classes will be held as per the schedule mentioned in the class time table. Certificates will be issued to the eligible participants at the end of the course.

S.No	Name of the Course	Resource Person
1	Recent Applications in IOT using Arduino and Raspbery PI	**Mr.M.PALANIYAPPAN,** Assistant Professor/ECE, Department of ECE, Sri Bharathi Engineering College for Women, Kaikkurichi, Pudukkottai.

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Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- IV Year ECE Students
- Notice Board

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-20223/EVEN SEMESTER

Certificate course on **"Recent Applications in IOT using Arduino and Raspbery PI"**

SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE FN/AN	RESOURCE PERSON
1	Introduction to IOT, IOT Architecture and Communication protocols ,Transducers, Classification, Roles of sensors in IOT	3	9.2.2023	Mr.M.Palaniyappan
2	Various types of sensors, Design of sensors, sensor architecture, special requirements for IOT sensors, Interfacing to the Real World	3	16.2.2023	Mr.M.Palaniyappan
3	Introduction of Arduino and its Types , Arduino Serial Monitor and Plotter	3	23.2.2023	Mr.M.Palaniyappan
4	Technologies Used In IoT , Protocols ,Creating Classes and Libraries with Arduino	3	2.3.2023	Mr.M.Palaniyappan
5	Getting started with Raspberry Pi, Booting Up RPi- Operating System and Linux Commands	3	9.3.2023	Mr.M.Palaniyappan
6	C Language- Imbibing RPi with C	3	16.3.2023	Mr.M.Palaniyappan
7	Working with RPi using Python and Sensing Data using Python, Python vs. Other Languages, Applications of Python	3	23.3.2023	Mr.M.Palaniyappan
8	Programming with Arduino , Arduino and ThingSpeak	3	30.3.2023	Mr.M.Palaniyappan
9	IoT Design using Raspberry Pi	3	6.4.2023	Mr.M.Palaniyappan
10	Using Node-RED Visual Editor on Rpi	3	13.4.2023	Mr.M.Palaniyappan
11	IoT-based Health and Wellness Applications.	3	20.4.2023	Mr.M.Palaniyappan
12	Implementing data analytics on collected IoT data.	3	27.4.2023	Mr.M.Palaniyappan
Total Hours		36		

Course Coordinator

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DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING

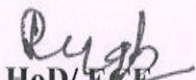## ACADEMIC YEAR EVEN SEMESTER (2022-2023)

STUDENT PARTICIPATION LIST FOR CERTIFICATE COURSE PROGRAM

RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

S.NO	REG.NO	NAME	YEAR & BRANCH
1	912619106001	AASHIMA M	IV& ECE
2	912619106002	ANANTHI P	IV& ECE
3	912619106004	JAFFARNISHA R	IV& ECE
4	912619106005	MAHESWARI K	IV& ECE
5	912619106006	MANISHA S	IV& ECE
6	912619106007	MEGAVADHANA A	IV& ECE
7	912619106008	PRIYANGA R	IV& ECE
8	912619106009	RAGAVI V	IV& ECE
9	912619106010	RAJAPRABA M	IV& ECE
10	912619106011	SASIKA K	IV& ECE

Course Coordinator

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR EVEN SEMESTER (2022-2023)

ATTENDANCE SHEET FOR CERTIFICATE COURSE PROGRAM- RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

S.NO	REG. NO	NAME	YEAR/ BRANCH	2/2/2023 AN	9/2/2023 AN	16/2/2023 AN	23/2/2023 AN	2/3/2023 AN	9/3/2023 AN	16/3/2023 AN	23/3/2023 AN	30/3/2023 AN	6/4/2023 AN	13/4/2023 AN	20/4/2023 AN	No. of Sessions Attended	Sign of Student
1	912619106001	AASHIMA M	IV/ECE	a	a	/	/	/	/	/	/	/	/	/	/	10	
2	912619106002	ANANTHI P	IV/ECE	/	/	/	/	/	/	/	/	/	a	/		11	
3	912619106004	JAFFARNISHA R	IV/ECE	/	/	/	/	/	a	a	/	/	/	/	/	10	
4	912619106005	MAHESWARI K	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	Mahi
5	912619106006	MANISHA S	IV/ECE	/	/	a	a	/	/	/	/	/	/	/	/	10	S.Mao
6	912619106007	MEGAVADHANA A	IV/ECE	a	/	/	/	/	/	/	a	a	/	/	/	9	
7	912619106008	PRIYANGA R	IV/ECE	/	/	/	/	/	/	/	/	/	a	/		11	R.
8	912619106009	RAGAVI V	IV/ECE	/	/	/	/	/	/	/	a	/	/	/	/	11	
9	912619106010	RAJAPRABA M	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	
10	912619106011	SASIKA K	IV/ECE	/	/	a	a	/	/	/	/	/	/	/	/	10	

Course Coordinator

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Report on Certificate Course

Title:	Recent Applications in IOT using Arduino and Raspbery PI

Resource Person:	**Mr.M.PALANIAPPAN,** Assistant Professor/ECE

Date of conduct from :	**02.02.2023**	To:	**12.05.2023**	Duration:	**30 Hours**

Organized Department :	**Electronics and Communication Engineering**

Participant Year:	**4**	Semester:	**ODD**	No. of Students Registered :	**10**

Venue:	**Seminar Hall, ,Ground Floor, SBECW**

Outcome of Certificate Course (CC) :At the end of Course ,Students can able to

- Understand the basic concepts and principles of the Internet of Things (IoT), including the role of sensors, actuators, communication protocols, data processing, and cloud integration.
- Learn how to interface and integrate different sensors with Arduino and Raspberry Pi, collect data from the physical world, and understand data acquisition techniques.
- Explore various communication protocols commonly used in IoT applications, such as MQTT, HTTP, and WebSocket, and implement them to establish data exchange between devices and servers.
- Understand the importance of IoT security and privacy concerns, exploring strategies for securing IoT devices, data, and communication channels.
- Develop troubleshooting and debugging skills to identify and resolve common issues encountered during IoT application development.

No. of students successfully completed the certificate course is **10 Students** based on the following Assessment process.

Assessment Process

- Students securing **more than 60% on total score** and secured more than **75%** in attendance is eligible to receive the certificate for the Certificate course conducted
- Total Score = (0.5 *Attendance in CC out of 100 percentage + 0.5 *Test mark in CC out of 100 marks)

Course Coordinator	HoD/ ECE	Principal

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PUDUKKOTTAI - 622 303.

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PUDUKKOTTAI DISTRICT

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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Name of the Student :   Year/Sem:IV/VIII

AU Register Number:

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi"

MCQ QUESTIONS (25X1 = 25 Marks)

1. Which of the following is a popular microcontroller board commonly used in IoT projects?
   a) Raspberry Pi
   b) b) Arduino
   c) c) BeagleBone
   d) d) NVIDIA Jetson

2. What is the primary function of the Arduino in IoT applications?
   a) Handling complex computations
   b) Data visualization
   c) Sensor data processing
   d) Cloud-based data storage

3. Which programming language is commonly used to program Arduino boards for IoT applications?
   a) Java
   b) C++
   c) Python
   d) JavaScript

4. What is the role of Raspberry Pi in IoT projects?
   a) Real-time sensor data processing
   b) Wireless communication between devices
   c) Cloud-based data analytics
   d) Edge computing and data aggregation

5. Which of the following wireless communication protocols is commonly used in IoT projects with Arduino and Raspberry Pi?
   a) Bluetooth
   b) Zigbee
   c) Wi-Fi
   d) All of the above

6. Which board is well-suited for power-constrained IoT applications due to its low energy consumption?
   a) Arduino Uno
   b) Raspberry Pi 3 Model B+
   c) Arduino Nano
   d) Raspberry Pi 4 Model

7. What is the significance of GPIO (General Purpose Input Output) pins on both Arduino and Raspberry Pi boards?
   a) They provide power to the board.
   b) They enable communication with external devices and sensors.
   c) They store the boot configuration of the board.
   d) They allow access to the internet

8. Which of the following is an example of an IoT application using Arduino and Raspberry Pi?
   a) Facial recognition system
   b) Autonomous car
   c) Smart home automation
   d) Online shopping platform

9. Which board has more computational power, enabling it to handle more complex tasks like running web servers or databases?
   a) Arduino
   b) Raspberry Pi
   c) Both have similar computational power
   d) None of the above

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10. Which board is more suitable for real-time data processing directly at the source of data collection?

   a) Arduino

   b) Raspberry Pi

   c) Both are equally suitable

   d) It depends on the specific application requirements

11. What is the primary benefit of using MQTT (Message Queuing Telemetry Transport) in IoT applications with Arduino and Raspberry Pi?

   a) Real-time video streaming

   b) Secure data storage

   c) Low latency communication

   d) Scalability for handling large datasets

12. Which of the following is NOT a sensor commonly used with Arduino and Raspberry Pi in IoT projects?

   a) Temperature sensor b) Motion sensor c) Camera sensor d) RFID sensor

13. What does the term "IoT gateway" refer to in the context of Arduino and Raspberry Pi applications?

   a) A physical entrance to an IoT network

   b) A device that bridges communication between IoT devices and the cloud

   c) A secure connection protocol for IoT devices

   d) A platform for developing IoT applications

14. Which programming language is commonly used for Raspberry Pi development in IoT projects?

   a) C#

   b) Python

   c) Java

   d) Ruby

15. Which board is typically used for battery-powered IoT applications due to its energy efficiency?

   a) Raspberry Pi Zero

   b) Raspberry Pi 4 Model B

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c) Arduino Mega 2560

d) Arduino Uno

16. Which of the following communication protocols is commonly used for short-range communication between IoT devices in a home automation scenario?
    a) Wi-Fi
    b) b) Bluetooth
    c) c) LoRaWAN
    d) d) 5G

17. In IoT applications with Arduino and Raspberry Pi, what is MQTT used for?
    a) Data storage
    b) Sensor calibration
    c) Real-time communication between devices
    d) Machine learning model training

18. What is the primary role of a sensor node in an IoT network?
    a) Data visualization
    b) Data analysis
    c) Data storage
    d) Sensing and collecting data from the environment

19. Which of the following is an example of a recent IoT application that combines Arduino and Raspberry Pi technology?
    a) Autonomous drone delivery   b) Virtual reality gaming
    c) Satellite communication   d) Online banking

20. Which board provides a more suitable platform for prototyping and experimentation in IoT projects?
    a) Raspberry Pi
    b) Arduino
    c) Both are equally suitable
    d) None of the above

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023/EVEN SEMESTER

Certificate Course on **Recent Applications in IoT using Ardunio and Raspbery Pi**

MCQ ANSWER KEY

1	B	6	C	11	C	16	B
2	C	7	B	12	C	17	C
3	B	8	C	13	B	18	D
4	D	9	B	14	B	19	A
5	D	10	A	15	A	20	C

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PRINCIPAL
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COLLEGE FOR WOMEN
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Name of the Student : Rajapraba. M   Year/Sem:IV/VIII

AU Register Number: 912619106010

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi "

MCQ QUESTIONS (25X1 = 25 Marks)

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   c) Both are equally suitable
   d) It depends on the specific application requirements

11. What is the primary benefit of using MQTT (Message Queuing Telemetry Transport) in IoT applications with Arduino and Raspberry Pi?
   a) Real-time video streaming
   b) Secure data storage
   c) Low latency communication
   d) Scalability for handling large datasets

12. Which of the following is NOT a sensor commonly used with Arduino and Raspberry Pi in IoT projects?
   a)   Temperature sensor b) Motion sensor c) Camera sensor d) RFID sensor

13. What does the term "IoT gateway" refer to in the context of Arduino and Raspberry Pi applications?
   a) A physical entrance to an IoT network
   b) A device that bridges communication between IoT devices and the cloud
   c) A secure connection protocol for IoT devices
   d) A platform for developing IoT applications

14. Which programming language is commonly used for Raspberry Pi development in IoT projects?
   a) C#
   b) Python
   c) Java
   d) Ruby

15. Which board is typically used for battery-powered IoT applications due to its energy efficiency?
   a) Raspberry Pi Zero
   b) Raspberry Pi 4 Model B

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c) Arduino Mega 2560

d) Arduino Uno

16. Which of the following communication protocols is commonly used for short-range communication between IoT devices in a home automation scenario?

    a) Wi-Fi

    b) b) Bluetooth

    c) c) LoRaWAN

    d) d) 5G

17. In IoT applications with Arduino and Raspberry Pi, what is MQTT used for?

    a) Data storage

    b) Sensor calibration

    c) Real-time communication between devices

    d) Machine learning model training

18. What is the primary role of a sensor node in an IoT network?

    a) Data visualization

    b) Data analysis

    c) Data storage

    d) Sensing and collecting data from the environment

19. Which of the following is an example of a recent IoT application that combines Arduino and Raspberry Pi technology?

    a) Autonomous drone delivery b) Virtual reality gaming

    c) Satellite communication   d) Online banking

20. Which board provides a more suitable platform for prototyping and experimentation in IoT projects?

    a) Raspberry Pi

    b) Arduino

    c) Both are equally suitable

    d) None of the above

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ACADEMIC YEAR EVEN SEMESTER (2022-2023)

MARK SHEET FOR CERTIFICATE COURSE- RECENT APPLICATIONS IN IOT USING ARDUINOAND RASPBERY PI

S.NO	REGISTER NUMBER	NAME	YEAR & BRANCH	Attendance (A)		VAC –MCQ TEST (B)		OVERALL MARK(100) (50% of A + 50% of B)
				No.of Sessions Attented	Marks (100)	No.of Correct Answer	Marks (100)	
1	912619106001	AASHIMA M	IV&ECE	10	83	16	80	82
2	912619106002	ANANTHI P	IV&ECE	11	92	18	90	91
3	912619106004	JAFFARNISHA R	IV&ECE	10	83	17	85	84
4	912619106005	MAHESWARI K	IV&ECE	12	100	14	60	80
5	912619106006	MANISHA S	IV&ECE	10	83	17	85	84
6	912619106007	MEGAVADHANA A	IV&ECE	9	75	19	95	85
7	912619106008	PRIYANGA R	IV&ECE	11	92	16	80	86
8	912619106009	RAGAVI V	IV&ECE	11	92	16	80	86
9	912619106010	RAJAPRABA M	IV&ECE	12	100	18	90	95
10	912619106011	SASIKA K	IV&ECE	10	83	19	95	89

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for the academic year 2022-2023.

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Criteria 2	Teaching-Learning and Evaluation	350

Key Indicator- 2.3. Teaching- Learning Process (40)

2022-2023

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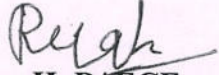
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ACADEMIC YEAR 2022-2023

S.No	Register No	Student Name	Year/Sem	Name of the Learning Method (Participative learning)
1	912619106004	JAFFARNISHA R	IV/VIII	Symposium-Paper Presentation
2	912619106010	RAJAPRABA M		
3	912619106005	MAHESWARI K	IV/VIII	Symposium- Paper Presentation
4	912619106007	MEGAVADHANA A		
5	912619106008	PRIYANGA R	IV/VIII	Symposium- Paper Presentation
6	912619106011	SASIKA K		
7	912619106006	MANISHA S	IV/VIII	Symposium- Paper Presentation
8	912619106009	RAGAVI V		
9	912619106004	JAFFARNISHA R	IV/VII	(Workshop - Embedded Systems)
10	912619106005	MAHESWARI K		
11	912619106008	PRIYANGA R		
12	912619106006	MANISHA S		
13	912619106007	MEGAVADHANA A		
14	912619106010	RAJAPRABA M		
15	912619106011	SASIKA K		
16	912620106001	ABIRAMI S	III/V	Symposium- Paper Presentation
17	912620106007	SONIYA P		
18	912620106001	ABIRAMI S	III/VI	Symposium- Paper Presentation
19	912620106004	JEYASRI K		
20	912620106006	SENPAGAHARINI V	III/VI	Symposium- Paper Presentation
21	912620106007	SONIYA P		
22	912621106009	SUBALAKSHMI M	II/IV	Symposium- Paper Presentation
23	912621106006	KEERTHANA V		

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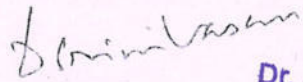
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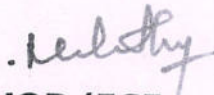www.chendhuran.ac.in

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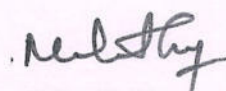Lena Vilakku, Madurai Road, Pilivalam Post, Pudukkottai – 622 507.
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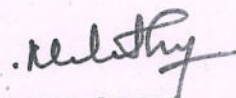www.chendhuran.ac.in

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