SRI BHARATHI

ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Kaikkurichi, Pudukkottai -622 303

www.sbec.edu.in

NAAC DOCUMENTS

Quality Indicator Frame Work

Criterion – 1

CURRICULAR ASPECTS

Submitted by

IQAC

Internal Quality Assurance Cell

Sri Bharathi Engineering College for Women

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25

KAIKKURUCHI, PUDUKOTTAI – 622 303

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023 / ODD SEMESTER

1.2 Academic Flexibility (30)

1.2.1 Number of Certificate/Value added courses offered and online courses of MOOCs, SWAYAM, NPTEL etc. (where the students of the institution have enrolled and successfully completed during the last five years)

AND

1.2.2 Percentage of students enrolled in Certificate/ Value added courses and also completed online courses of MOOCs, SWAYAM, NPTEL etc. as against the total number of students during the last five years

VAC Title:	**REAL TIME SENSOR DATA PROCESSING WITH PYTHON FOR IOT APPLICATIONS**					
Resource Person:	**Resource Person:** **Er.K.GOPALAKRISHNAN,** Embedded cum IoT Developer, Galwin Technology, Trichy- 620 002.					
Date of conduct from :	**03.08.2022(IV&III)** **22.08.2022(II)**	**To:**	**07.08.2022(IV&III)** **26.08.2022(II)**	**Duration:**	**30 Hrs**	
Organized Department :	**ELECTRONICS AND COMMUNICATION ENGINEERING**					
Participant Year:	**4,3&2**	**Semester:**	**ODD**	**No. of Students Registered :**	**31**	
Venue:	**Seminar Hall, ,Ground Floor, SBECW**					

TABLE OF CONTENTS (IV/III)

TABLE OF CONTENTS (II)

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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

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
- III & IV Year ECE Students
- Notice Board

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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

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

HoD/ECE

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING

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

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

HoD/ECE

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
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.Ar
	912620106004	JEYASRI K	III/ECE	/	/	/	/	/	/	a	/	/	/	/	/	11	K.Jey
	912620106006	SENPAGAHARINI V	III/ECE	/	/	/	/	/	/	a	a	/	/	/	/	10	V.Sen
	912620106007	SONIYA P	III/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	P.Son
	912620106301	ABITHA S	III/ECE	/	/	a	/	/	/	/	/	/	/	/	/	11	Abi.S
	912620106302	DESIKA G	III/ECE	a	a	/	/	/	/	/	/	/	/	/	/	10	G.Des
	912620106303	SABAREESWARI S	III/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	S.Sab
	912619106001	AASHIMA M	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	A.Aas
	912619106002	ANANTHI P	IV/ECE	/	/	a	a	/	/	/	/	/	/	/	/	10	P.Ana
	912619106004	JAFFARNISHA R	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	R.Jaf
	912619106005	MAHESWARI K	IV/ECE	/	/	/	/	/	/	a	/	/	/	/	/	11	Mahe

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

4	912619106006	MANISHA S	IV/ECE	a	a	/	/	/	/	/	/	/	/	/	/	10	
5	912619106007	MEGAVADHANA A	IV/ECE	/	/	/	/	/	/	/	/	/	/	/	/	12	
6	912619106008	PRIYANGA R	IV/ECE	/	/	a	/	/	/	/	/	/	/	/	/	11	
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
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
PUDUKKOTTAI - 622 303

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India
(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 :	**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 **19 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 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

HoD/ ECE

HOD / ECE
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI,
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.

GALWIN™
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
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

GALWIN™
TECHNOLOGY
Beyond Innovation

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

Principal
SBECW

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
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?

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

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

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

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?

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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Name of the Student : ABIRAMI.S **Year/Sem:** III / V

AU Register Number: 912620106001

18/20

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?

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

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

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

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?

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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

16/20

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)

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?

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

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

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

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?

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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

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

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)	
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

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

HoD/ ECE

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
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
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
Kaikkurchi - 622 303, Pudukkottai Dt.

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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

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

HoD/ECE

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING

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	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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
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

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.Amrin
2	912621106002	BHUVANESWARI C	II/ECE	/	/	/	/	a	/	/	/	/	/	9	C.Bhuvaneswari
3	912621106003	DHANYASHREE A	II/ECE	/	/	/	/	/	/	a	a	/	/	8	A.Dhanya
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.Keerthana
7	912621106007	PAVITHRA P	II/ECE	/	/	/	/	/	/	/	/	/	/	10	P.Pavithra
8	912621106008	RAJESHWARI R	II/ECE	/	/	/	/	/	/	a	/	/	/	9	R.Rajeshwari
9	912621106009	SUBALAKSHMI M	II/ECE	/	/	/	/	/	/	a	/	/	/	9	M.Subalakshmi
10	912621106010	SUGUNA C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	C.Suguna
11	912621106301	JAYAPRIYA M	II/ECE	a	/	/	/	/	/	/	/	/	/	9	M.Jayapriya
12	912621106302	KIRUBASHINI C	II/ECE	/	/	/	/	/	/	/	/	/	/	10	C.Kirubashini

VAC Coordinator

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

HoD/ ECE

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India
(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)

VAC Coordinator | **HoD/ ECE** | **Principal**

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

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
Kaikkurichi - 622 303, Pudukkottai Dt.

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
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?

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

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

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

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?

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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)
Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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?

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

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

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

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?

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

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

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

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

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

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

HoD/ ECE

HOD / ECE
SRI BHARATHI ENGINEERING
COLLEGE FOR WOMEN
KAIKKURICHI.