

SKILL ACTIVITY NO: 1

Date : 19/01/2025

(To be filled by the Instructor)

Title : Real time ECG Signal Acquisition and processing Using Arduino.

Skills / competencies to be acquired :

1. Ability to interface ECG module with Arduino.
2. Ability to Acquire the data as a graph output.
3. Ability to analyze the graph output.
4. _____
5. _____
6. _____
7. _____
8. _____

Duration of activity (hours) : 01

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

The purpose of this activity is to understand and learn the concept of ECG or Electrocardiogram. This understanding is helping, observe and analyse the working of heart. This study can further be responsible to understand and diagnose the abnormalities with the organ.

2. Steps performed in this activity (Explain in 5 - 6 lines)

1. Install the Arduino IDE and processing IDE from the provided drive link.
2. ~~Do the connections as shown in the ECG Document.~~
3. ~~Apply the patches to patient's Body.~~
4. Open the ECG.ino file in Arduino ide and upload the code.
5. Open Serial plotter for graph or open serial monitor to observe the values. The Serial plotter will in tools at upper left corner in Arduino Edt.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Arduino - UNO _____
2. PC / Laptop _____
3. Electrode patches _____
4. Arduino IDE _____
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. Ability to interface ECG module with Arduino. _____
2. Ability to acquire the data as a graph output. _____
3. Ability to analyze the graph output. _____
4. _____
8. _____

5. Time taken to complete the activity ? 01. _____ (hours)

(Signature)
Instructor

(Signature)
Student

(To be filled by Instructor)

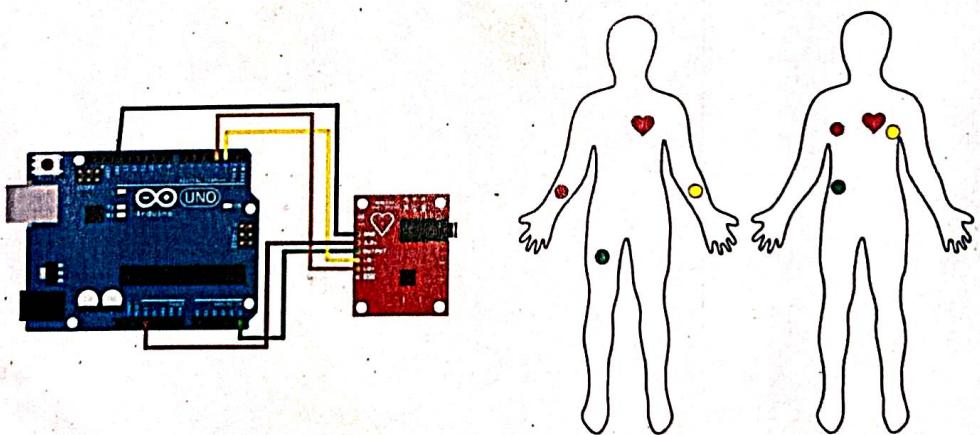
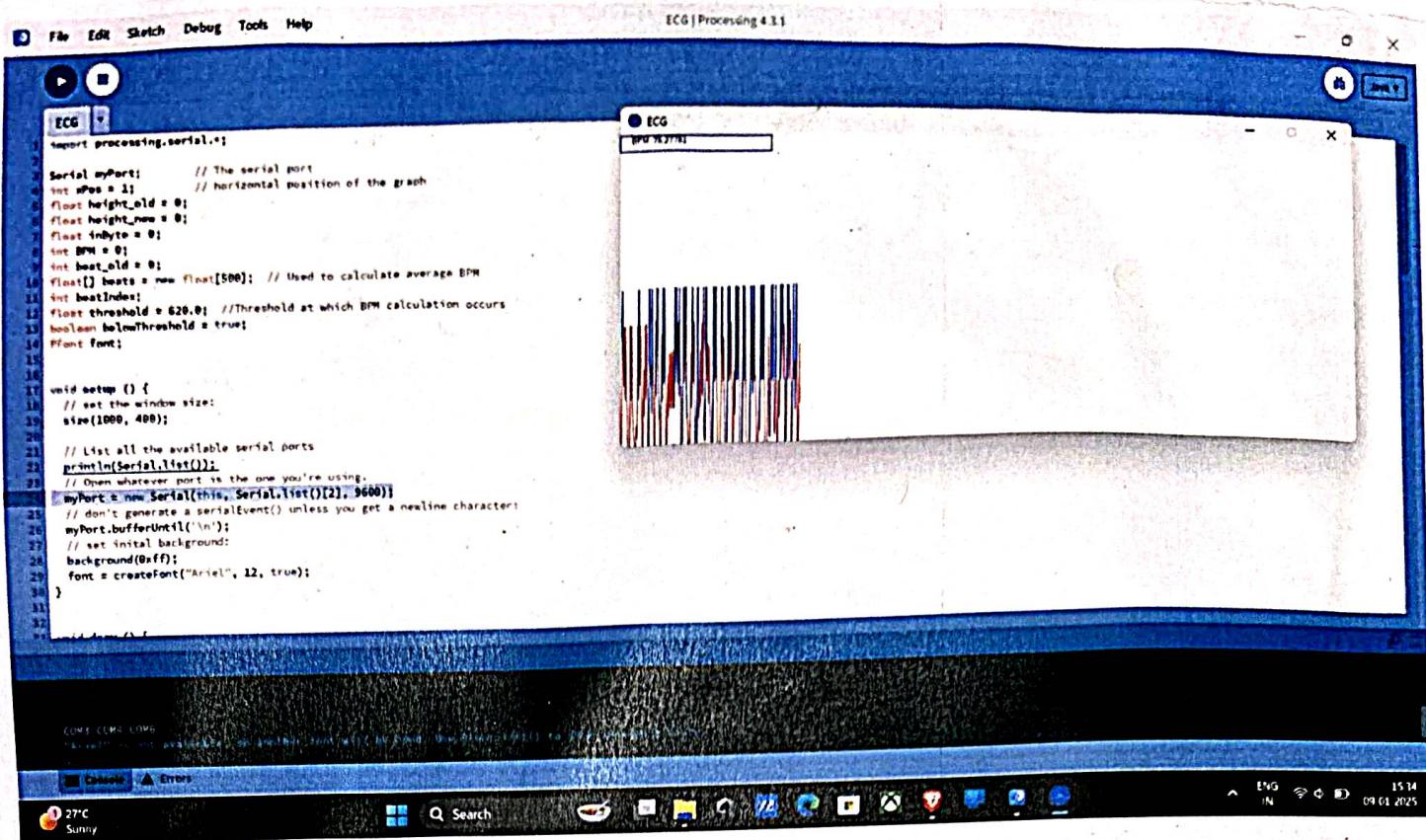
Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	Ability to interface ECG module with Arduino	?
2.	Ability to acquire the data as a graph output.	yes
3.	Ability to analyze the graph output.	

Remarks

Total marks 10 out of 10.

Sign of Instructor

Date: 7/02/25

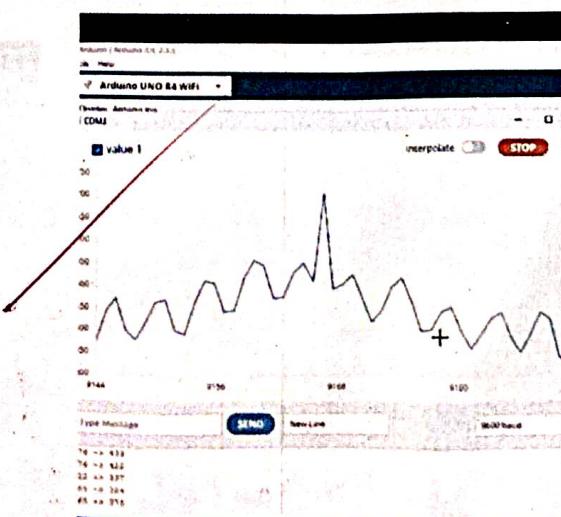


Heart_Rate_Display_Arduino.ino

```

1 // Define the pin for the ECG output
2 const int ecgPin = A2;
3
4 void setup() {
5   // Start the Serial communication
6   Serial.begin(9600);
7 }
8
9 void loop() {
10  // Read the ECG signal
11  int ecgValue = analogRead(ecgPin);
12
13  // Print the value to the Serial Monitor
14  Serial.println(ecgValue);
15
16  // Small delay to stabilize the readings
17  delay(20);
18 }

```



SKILL ACTIVITY NO: 2

Date : 24/01/2025

(To be filled by the Instructor)

Title : Real time ECG Signal acquisition and processing using Arduino.

Skills / competencies to be acquired :

1. Ability to interface ECG module with arduino.
2. Ability to acquire the data as a graph output.
3. Ability to analyse the graph output.
4. _____
8. _____

Duration of activity (hours) : 01.

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

The purpose of this activity is to understand and learn the concept of ECG or Electro-Cardiogram. Thus helping us understand, observe and analyze the working of heart. This study can further be responsible to understand and diagnose the abnormalities with the organ.

2. Steps performed in this activity (Explain in 5 - 6 lines)

1. ~~Install Arduino IDE and processing IDE from the provided drive link.~~
2. Do the connections as shown in the ECG document.
3. Apply the patches/Electrodes to patients body
4. Open the ECG into file in Arduino IDE and upload the code.
5. Open Sireal plotters for graph or open Serial monitor to observe.
6. For more accurate and graphical visualization open TDE.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Arduino Uno. _____
2. ECG module AD8232 _____
3. Arduino IDE. _____
4. Electrode patches. _____
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. Ability to interface Arduino uno with ECG module. _____
2. Ability to acquire the data as a graph plot. _____
3. Able to analyze the graph. _____
4. _____
5. _____
6. _____
7. _____
8. _____

5. Time taken to complete the activity ? 01 (hours)

(Signature)
Instructor

(Signature)
Student

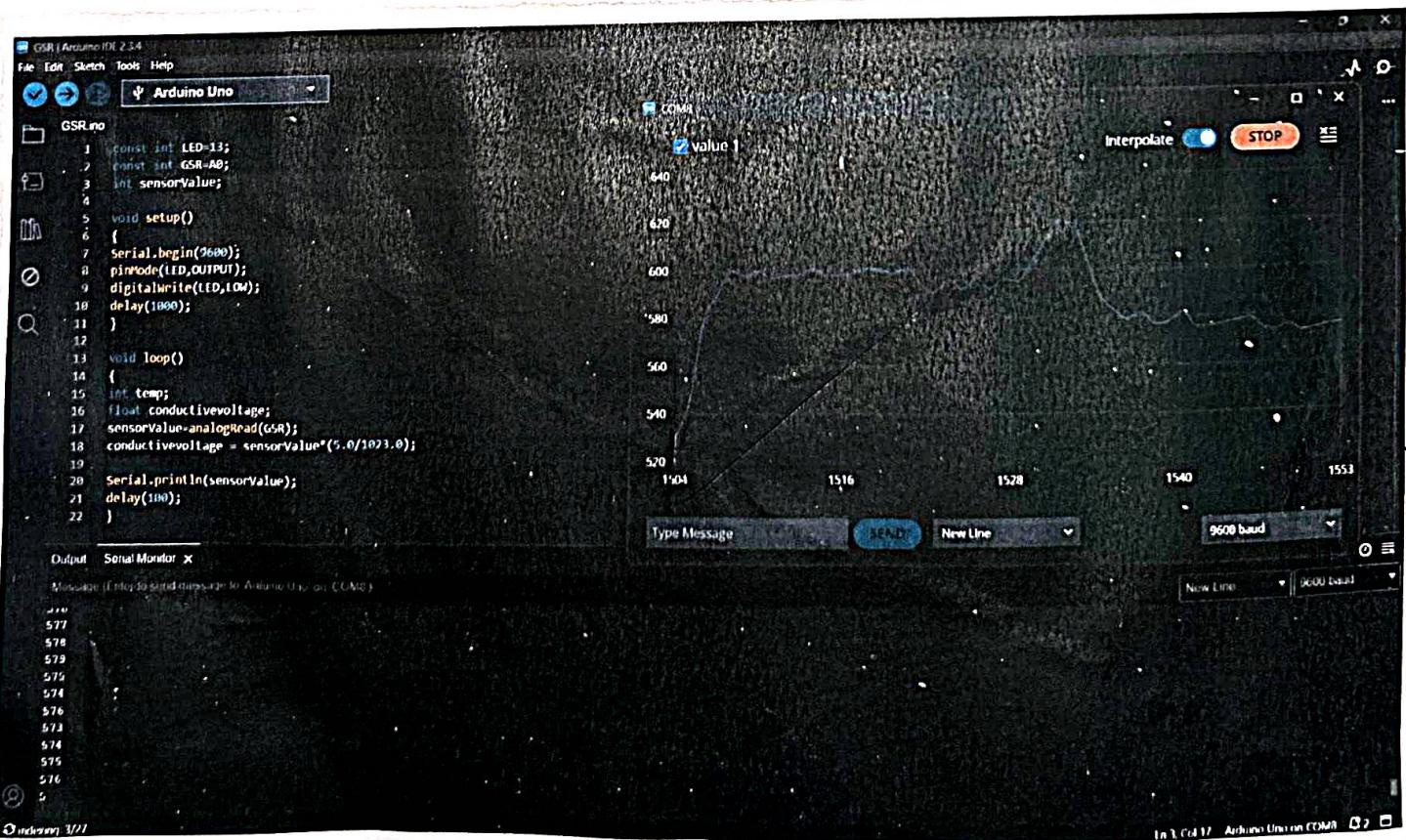
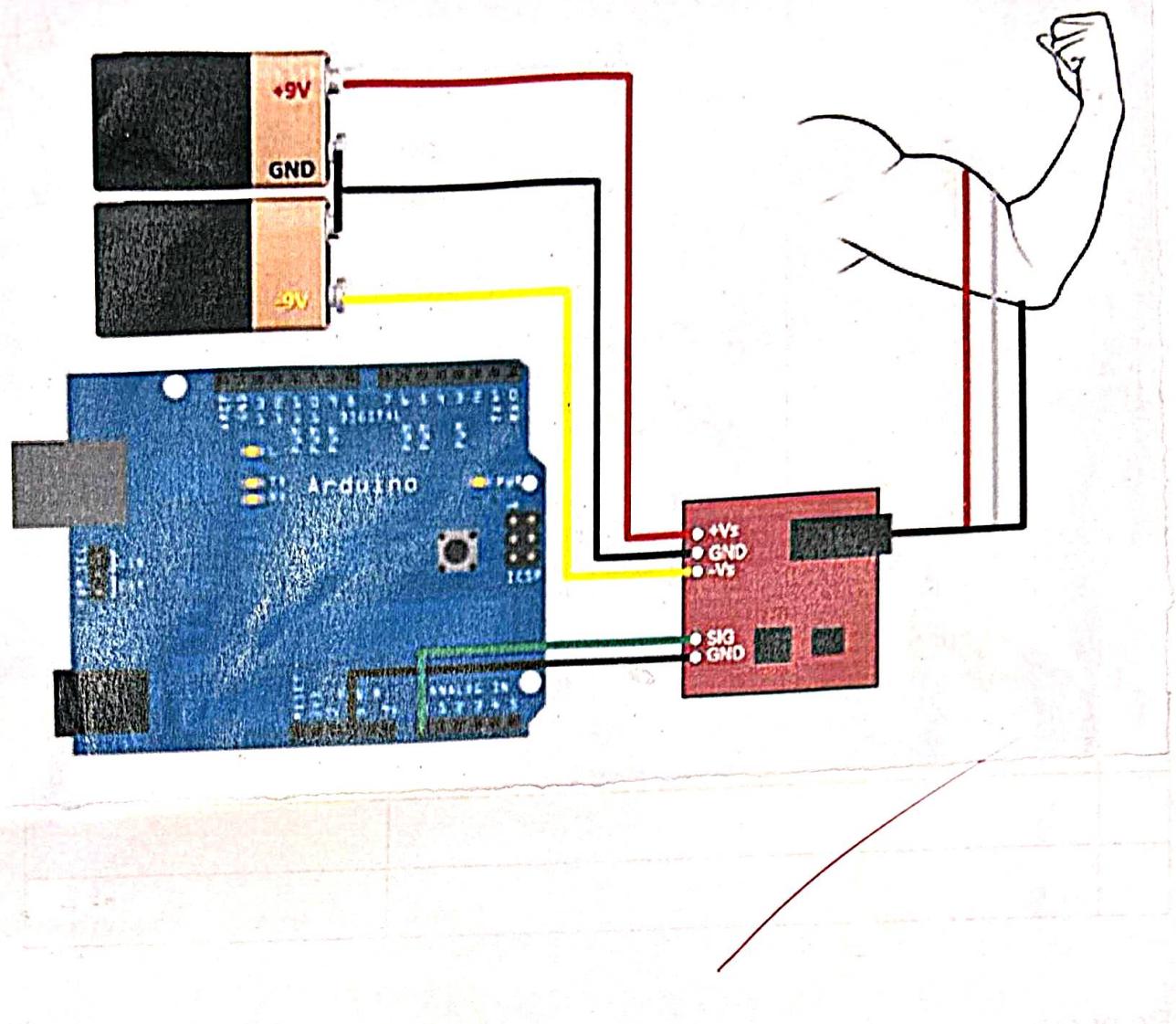
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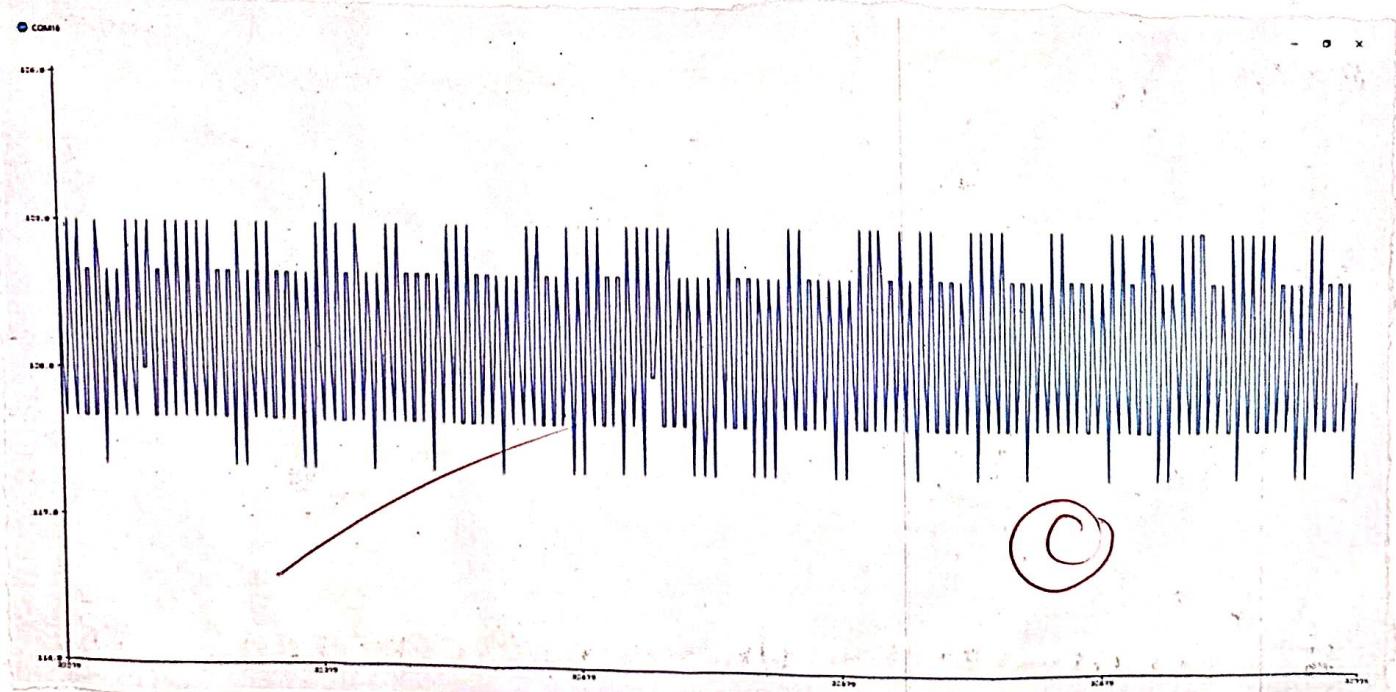
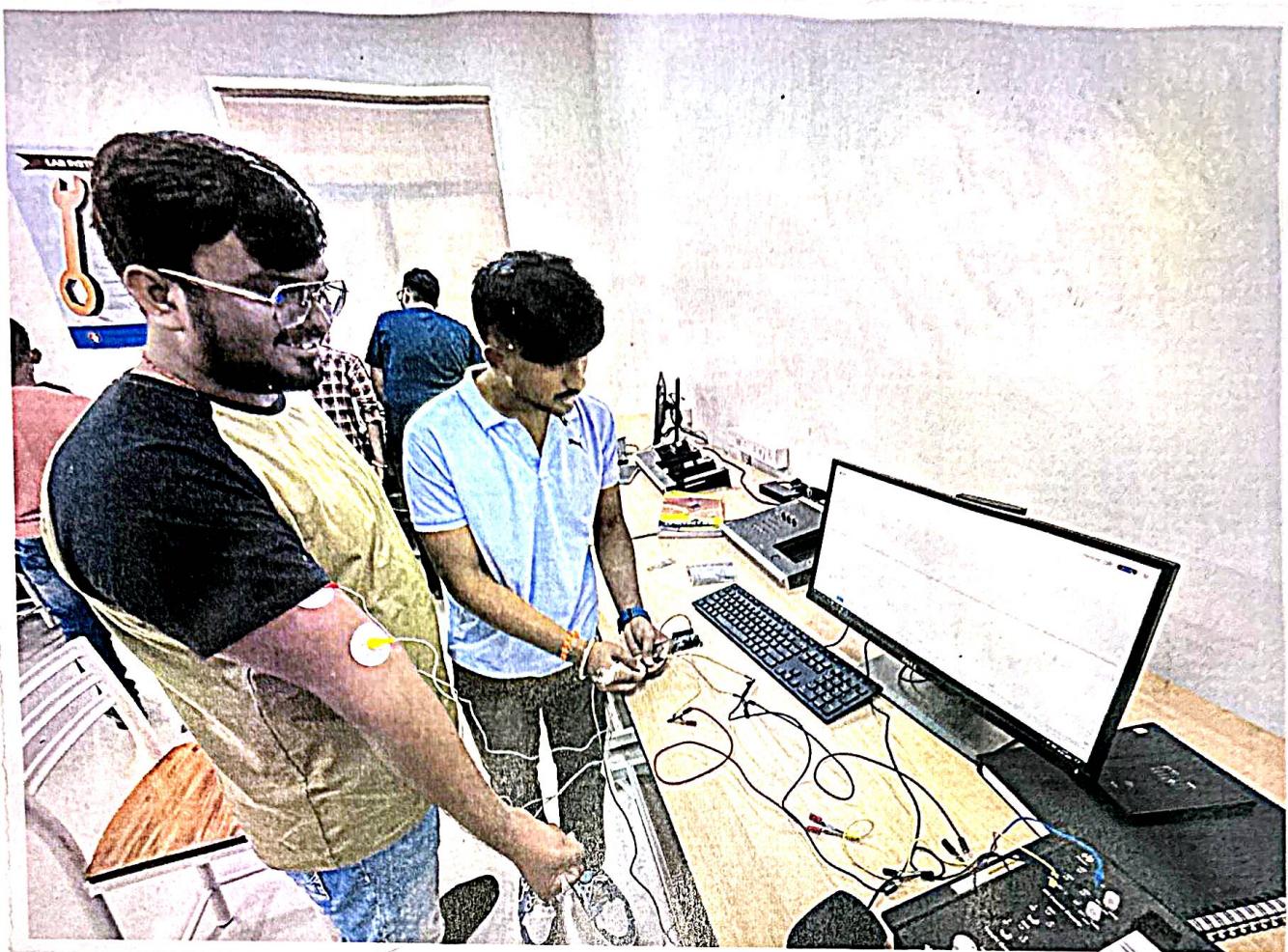
Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	Ability to interface Arduino UNO with ECG module.	Yes
2.	Ability to acquire the data as a graph plot.	
3.	Able to analyze the graph.	

Remarks

Total marks 10 out of 10.


Sign of Instructor
Date:





SKILL ACTIVITY NO: 3

Date : 29/01/2025

(To be filled by the Instructor)

Title : GSR module interfacing with arduino for real-time monitoring.

Skills / competencies to be acquired :

1. To interfacing GSR module with arduino UNO.
2. To write code for operating the GSR module.
3. To acquire the GSR Sensor reading.
4. To observe and analyze the GSR Sensor reading.

Duration of activity (hours) : 01

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

GSR or Galvaine skin response sensor is a Sensor which is used to observe the change in mood or arousal on subjects. Mostly used in humans. This Sensor works due to the change of state of sweat glands which are subjected to either activation or sweating in a response to stimulus.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Install Arduino IDE.
- 2) Upload the code.
- 3) Wear the finger sleeve to the subject.
- 4) Observe the readings on different stimuli.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Arduino UNO
2. GSR module.
3. PC
4. Arduino IDE.
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. To interface GSR with Arduino UNO.
2. To write code for GSR module operation.
3. To acquire the GSR module sensor readings.
4. To observe and analyze the GSR module.

5. Time taken to complete the activity ? 01 (hours)

(Signature)
Instructor

(Signature)
Student

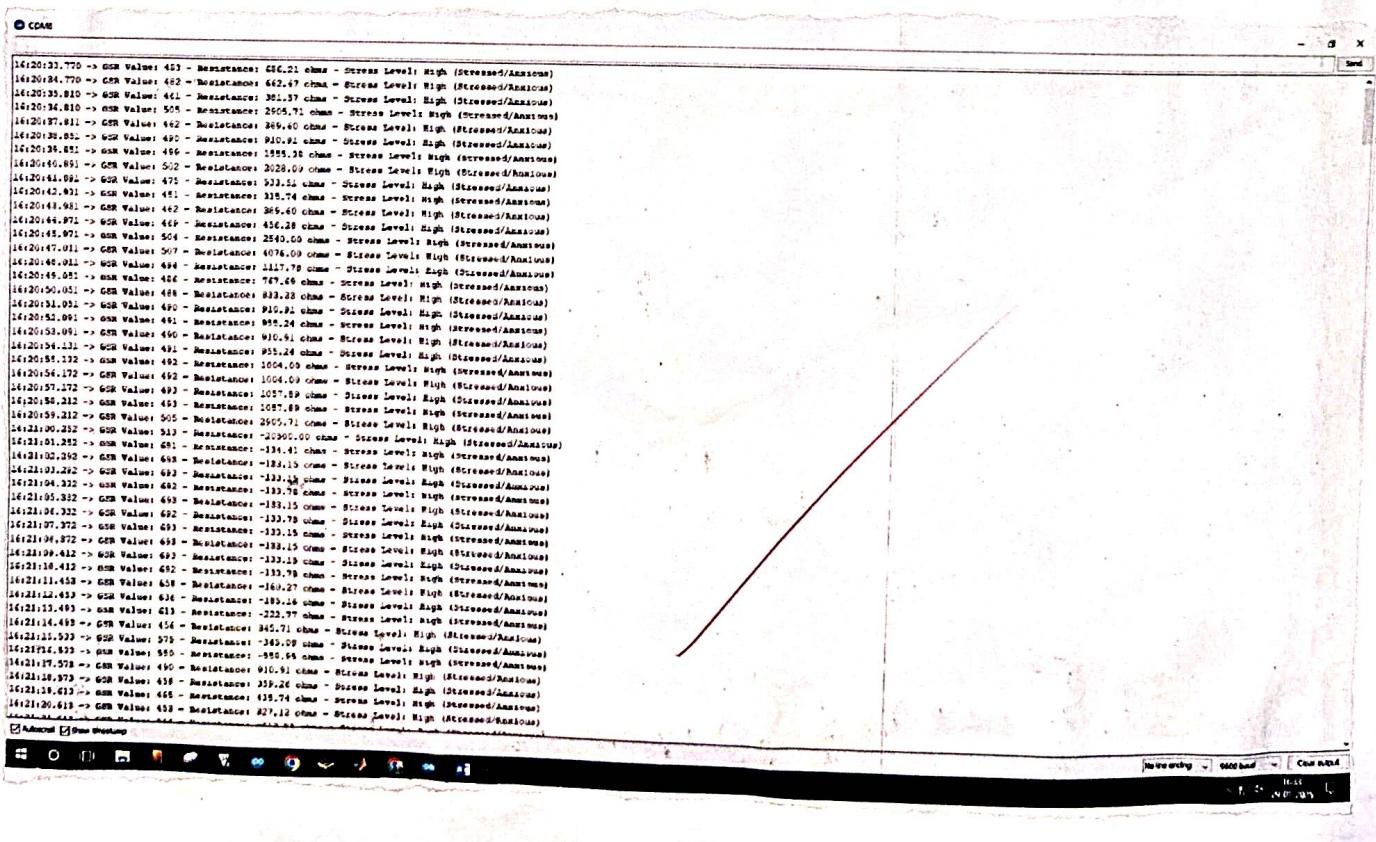
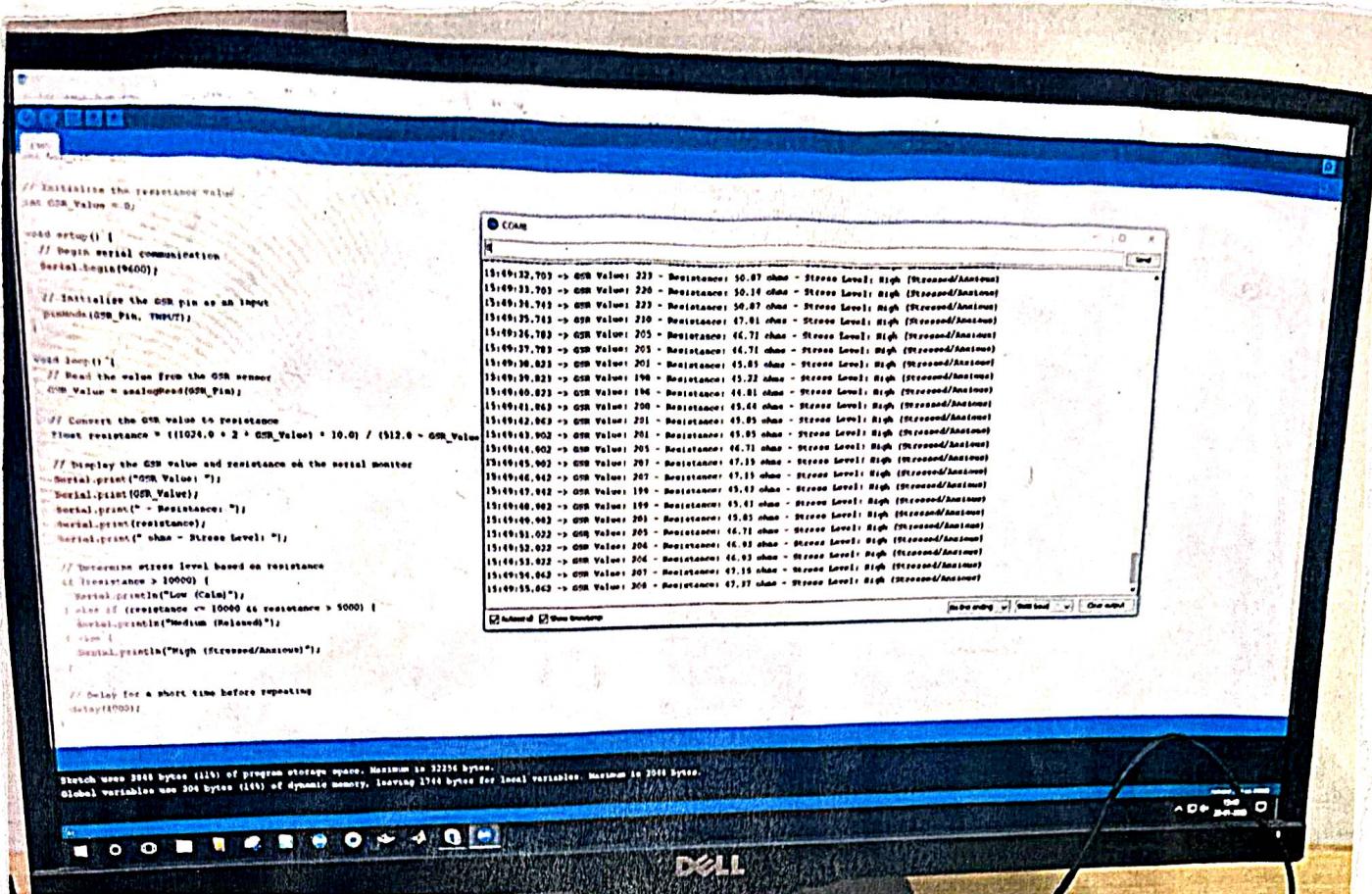
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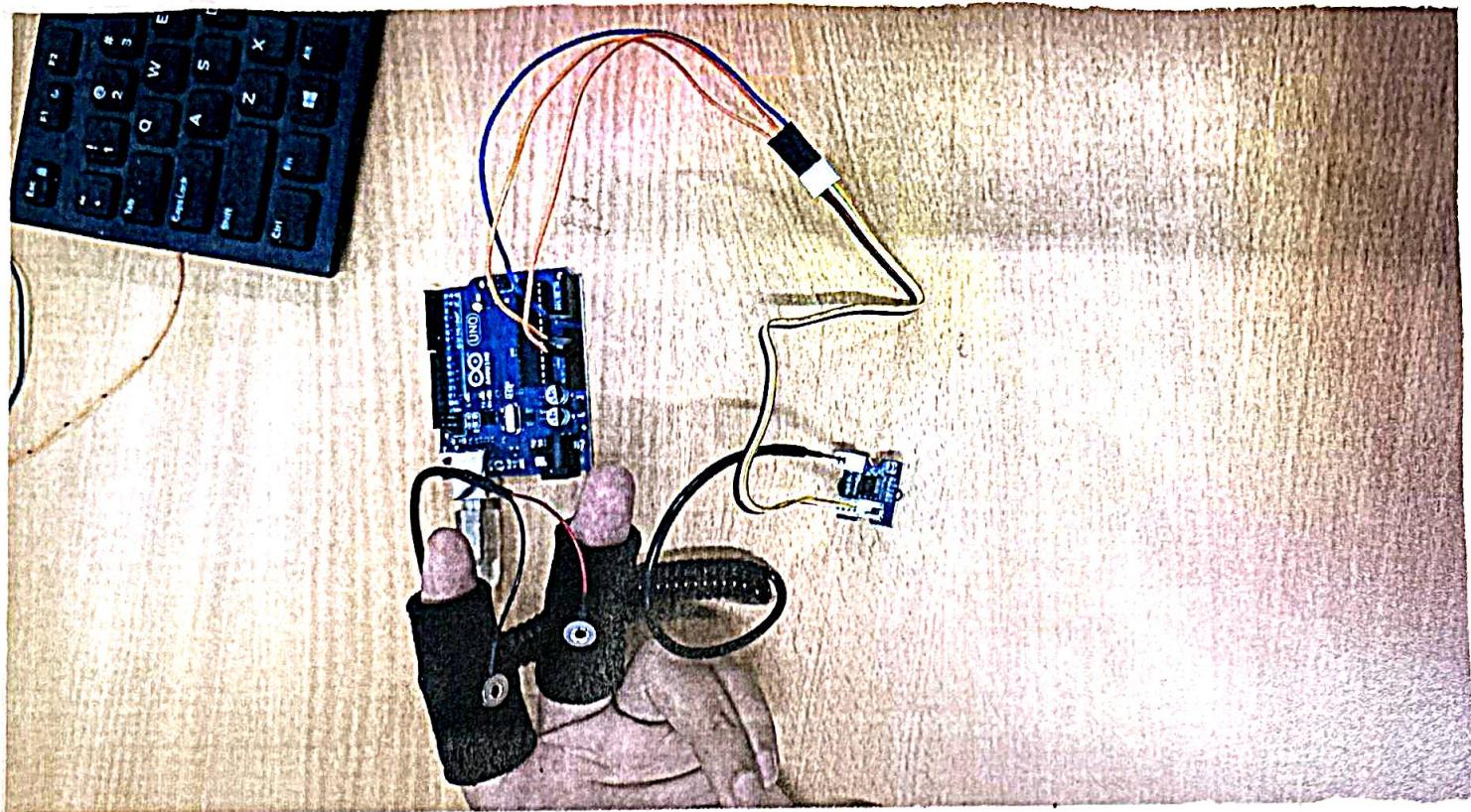
Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	To interface GSR module with Arduino UNO	?
2.	To write code for GSR module operation	Yes
3.	To acquire the GSR Sensor readings	
4.	To observe and analyse the GSR readings.	

Remarks

Total marks 10 out of 10.


 Sign of Instructor
 Date: 7/02/25





C



SKILL ACTIVITY NO: 4

Date : _____

(To be filled by the Instructor)

Title : Real time oximeter Signal Acquisition and processing link
Arduino UNO R4 wifi.

Skills / competencies to be acquired :

1. Ability to interface oximeter sensors with Arduino.
2. Ability to analyze the output.
3. Ability to acquire the result.
4. Make a table of BPM and SpO₂ of people

Duration of activity (hours) : 0.1

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

To understand the concept of oximeter signal sensor. It measures the amount of oxygen saturation in a person's blood by detecting how much lights is absorbed by the blood when red and infrared light beams are shown through a thin tissue like fingerprint.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Install Arduino IDE.
- 2) Do the connections.
- 3) Apply a finger on the sensor.
- 4) Note down the reading and also analyze that reading in serial monitor.

SKILL ACTIVITY NO: 5

Date : _____

(To be filled by the Instructor)

Title : Interfacing GSR Sensor with Arduino R4 and displaying GSR value and stress level on Smartphone.

Skills / competencies to be acquired :

1. Working of GSR. 5. _____
2. Integration of GSR with R4. 6. _____
3. Integration of Smartphones app with GSR. 7. _____
4. Able to analyze GSR value and stress level. _____

Duration of activity (hours) : 01

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

To integrate GSR with IOT hardware / Software for human friendly data analysis.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Connect GSR Sensor to Arduino R4 with.
- 2) Setup arduino IOT cloud.
- 3) Create a dashboard Arduino IOT cloud.
- 4) Install Arduino IOT Remote on Your Smartphone.
- 5) Monitor Data on Smartphone / Pc.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Arduino R4 WiFi. _____
2. GSR Module _____
3. Android Smartphone. _____
4. Arduino IoT application _____
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. Working of GSR. _____
2. Integration of GSR with IoT. _____
3. Able to analyze data of GSR. _____
4. Application of IoT in Medical field. _____
5. _____
6. _____
7. _____

5. Time taken to complete the activity ? 01

(hours)

**(Signature)
Instructor**

**(Signature)
Student**

(To be filled by Instructor)

Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	Working of GISR.	
2.	Integration of GISR with IOT.	Y
3.	Able to analyse data of GISR.	
4.	Use of IOT in medical application.	

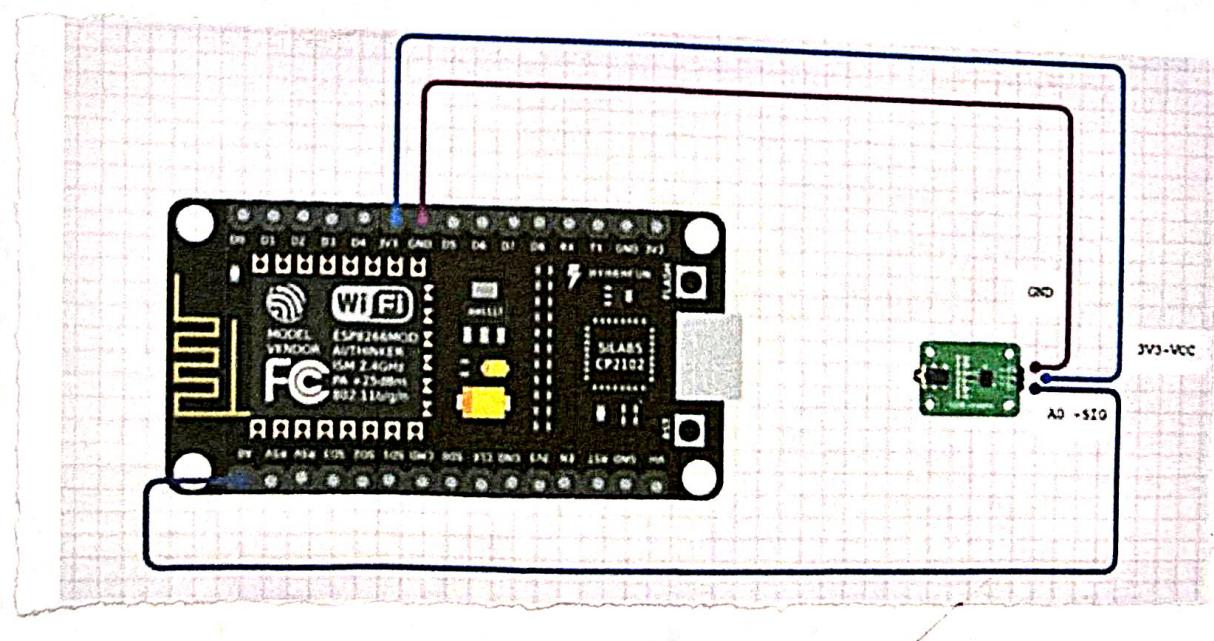
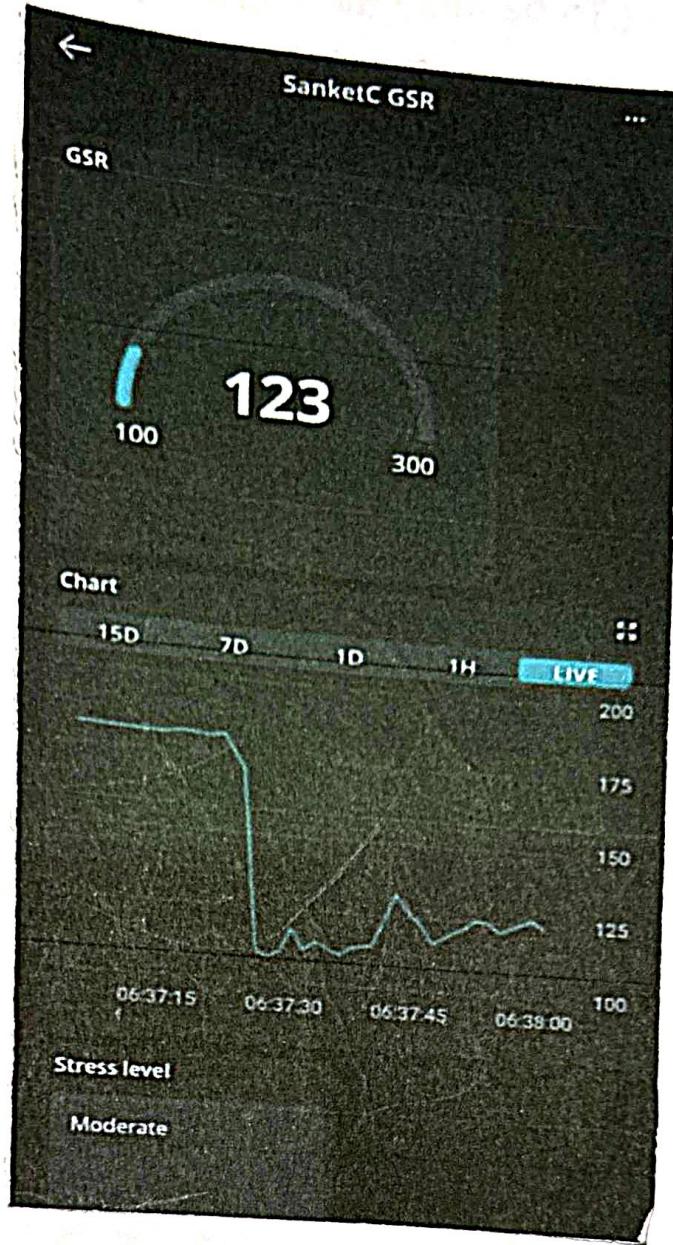
Remarks

10

Total marks _____ out of 10.

6

Sign of Instructor
Date:



SKILL ACTIVITY NO: 6

Date : _____

(To be filled by the Instructor)

Title : Emotion Recognition using Raspberry Pi and E82 camera

Skills / competencies to be acquired :

1. Able to code Raspberry Pi for facial recognition.
2. Able to analyse the facial recognition.
3. Able to predict the emotional status of person based on facial recognition.
4. Able to analyze people's behaviour based on facial recognition.

Duration of activity (hours) : 02

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

To recognize the facial gesture on the basis of these facial gestures classify the emotional gesture and predict the emotional status of the person.

2. Steps performed in this activity (Explain in 5 - 6 lines)

- 1) Setup Raspberry Pi and E82 camera. Enable the camera.
- 2) Download the Pre trained Emotional Model.
- 3) Run Emotion Recognition with Raspberry Pi.
- 4) Run the Script.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Raspberry Pi R4 / 3B+
2. E82 camera module
3. Power Adapter (5V, 3A)
4. Micro SD card (16 GB+)
5. _____
6. _____
7. _____
8. _____

4. What skills did you acquire ?

1. Able to code Raspberry Pi for facial recognition.
2. Able to analyse the facial recognition.
3. Able to predict the emotional status of person based on facial recognition.
4. Able to analyze people's behaviour based on facial recognition.

5. Time taken to complete the activity ? 02

(hours)

**(Signature)
Instructor**

**(Signature)
Student**

(To be filled by Instructor)

Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	Able to code Raspberry Pi for facial Recognition.	?
2.	Able to analyze the facial recognition.	?
3.	Able to predict the emotional status of person based on facial recognition.	?
4.	Able to analyze people emotion based on facial gesture.	?

Remarks

Total marks 10 out of 10.

Sign of Instructor
Date:

SKILL ACTIVITY NO: 7

Date : 09/04/2025

(To be filled by the Instructor)

Title : Mini Project :- Smart Digital Spirometer.

Skills / competencies to be acquired :

1. Basic Knowledge of biomedical sensor.
2. Circuit designing and prototyping
3. Microcontroller programming ESP32.
4. Understanding of respiratory health monitoring.

Duration of activity (hours) : 10

(To be filled by the Student)

1. What is the purpose of this activity ? (Explain in 3 - 4 lines)

To design and develop a smart digital spirometer to measure lung capacity and breathing patterns. It helps in monitor respiratory health is a simple and cost effective way using sensor and a microcontroller.

2. Steps performed in this activity (Explain in 5 - 6 lines)

1. First we researched the working of a spirometer and selected appropriate sensors like the airflow sensor, IR and MG135 Sensor.
2. We designed the circuit and connected the sensor to the microcontroller (ESP32)
3. The data is then processed and displayed on OLED display
4. Did the calibration of the experiment.

3. What resources / materials / equipments / tools did you use for this activity ?

1. Spriometer Module
2. ESP32
3. IR Sensor - 3
4. MQ 135 CO₂ Sensor
5. OLED Display
6. Jumper wires
7. Buzzer
8. Bread Board.

4. What skills did you acquire ?

1. Basic Knowledge of Biomedical sensor.
2. Circuit diagram and prototyping.
3. Microcontroller programming.
4. Data acquisition and processing
5.
6.
7.
8.

5. Time taken to complete the activity ? 10 (hours)

(Signature)
Instructor

(Signature)
Student

(To be filled by Instructor)

Sr. No.	Skills / Competencies	Achieved / Not Achieved (YES / NO)
1.	Basic knowledge of Biomedical Sensor.	
2.	Circuit designing and Prototyping.	
3.	Integration of hardware and Software	Yes
4.	Team Collaboration and Problem Solving.	

Remarks

Total marks 10 out of 10.

Sign of Instructor
Date: