

# 225 Building Environment Report

NEU Seattle Devs (Hot Sauce)

## Table of contents

<b>1</b>	<b>Sensor Charts</b>	<b>2</b>
1.1	Temperature . . . . .	2
1.2	Humidity . . . . .	2
1.3	CO2 . . . . .	3
1.4	PM2.5 . . . . .	3
<b>2</b>	<b>Comfort Level &amp; Indoor Climate Score</b>	<b>3</b>
<b>3</b>	<b>Indoor Comfort Score (ICS) Calculation</b>	<b>4</b>
3.1	Comfort Levels . . . . .	4
3.2	Scoring Logic . . . . .	4
3.2.1	How the Score is Calculated . . . . .	4

### Sensor Data Summary

Start Time: 6:00

End Time: 11:59

Sensor Name	Temperature		Humidity		CO2		PM2.5	
	min	max	min	max	min	max	min	max
Sensor 3 - Event Space	23	23	43	45	411	436	0	0
Sensor 4 - Room 220	25	26	40	43	470	1054	0	0
Sensor 6 - Room 216	24	24	41	43	454	518	10	10

# 1 Sensor Charts

## 1.1 Temperature

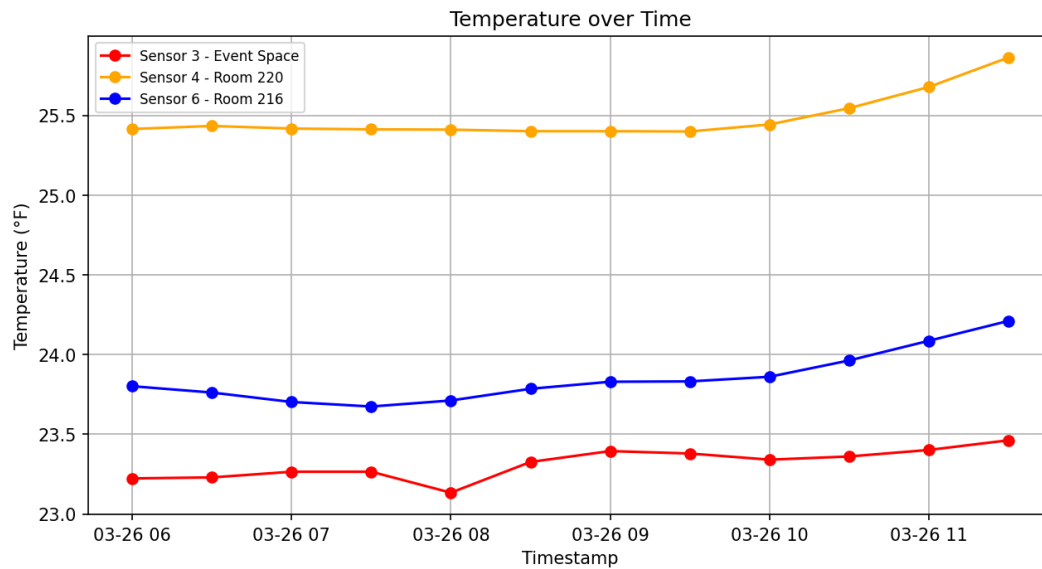


Figure 1: Temperature

## 1.2 Humidity

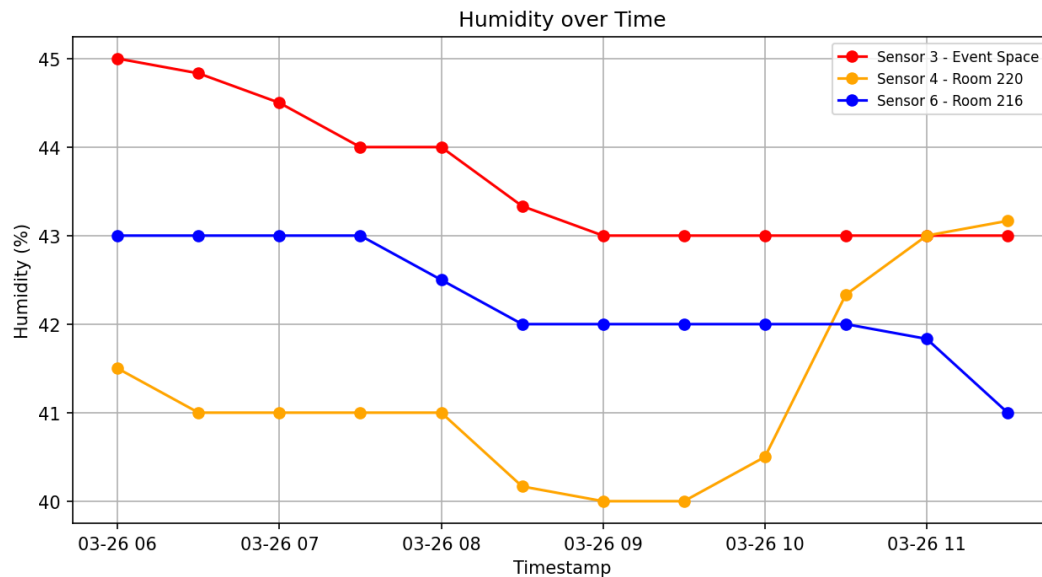


Figure 2: Humidity

### 1.3 CO2

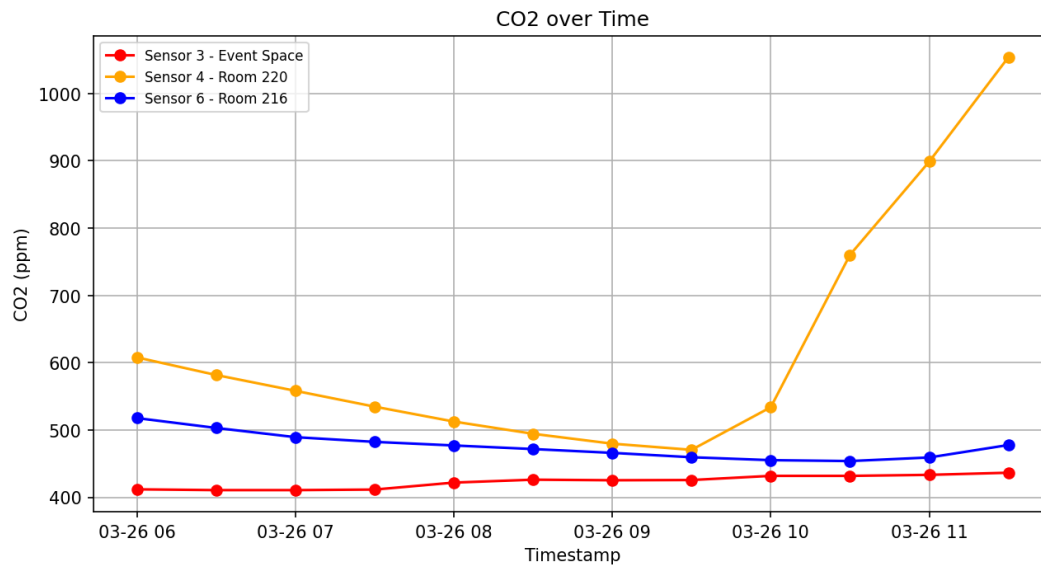


Figure 3: CO2

### 1.4 PM2.5

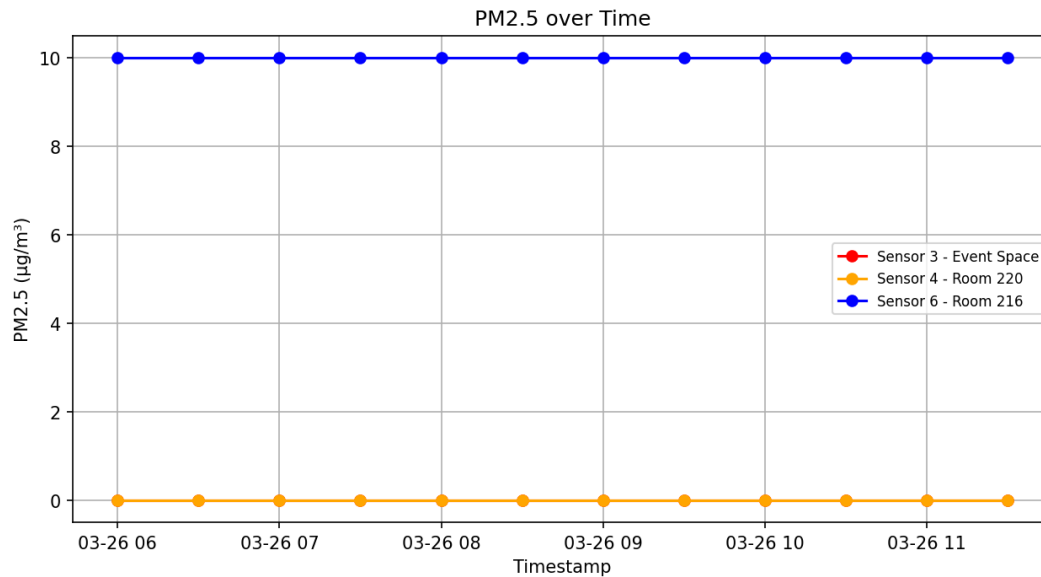


Figure 4: PM2.5

## 2 Comfort Level & Indoor Climate Score

Indoor Comfort Score: 0.2

## 3 Indoor Comfort Score (ICS) Calculation

### 3.1 Comfort Levels

- **Excellent (90-100)** – Ideal indoor conditions, highly comfortable.
  - **Good (75-89)** – Slight deviations, but still comfortable.
  - **Moderate (50-74)** – Noticeable discomfort, but tolerable.
  - **Poor (25-49)** – Significant discomfort, action needed.
  - **Unacceptable (0-24)** – Severe discomfort, unhealthy conditions.
- 

### 3.2 Scoring Logic

The **Indoor Comfort Score (ICS)** is based on four key indoor environmental factors:

Factor	Optimal Range
Temperature (°F)	69.8 - 77
Humidity (%)	40 - 60
CO2 (ppm)	400 - 800
PM2.5 (µg/m³)	0 - 12

#### 3.2.1 How the Score is Calculated

##### 1 Ideal Conditions:

- If a value falls **within the optimal range**, no penalty is applied.

##### 2 Penalty for Deviations:

- If a value is **outside the optimal range**, a **sigmoid-based penalty** is applied:
- **Small deviations** → **minimal penalty**
- **Larger deviations** → **exponentially stronger penalty**

##### 3 Final Score Calculation:

- The **Indoor Comfort Score (ICS)** is computed using a **weighted geometric mean**:
  - Ensures **no single factor dominates**
  - Balances **all environmental parameters proportionally**
  - Generates a **realistic comfort score**
- 

**Sensor Models:** ESP8266, PMS5003(PM2.5), SHT31-D(Temp/Hum), S8(CO2)

**Calibration Date:** January 15, 2025

**Sampling Interval:** 5 minutes