

Automatic Weather Monitoring Station

Introduction

Poornima University has the legacy of meteorological observatory since the establishment of university. In the present time, it is observed that the people are very much aware about the weather and shows the interest in meteorological parameters like temperature, humidity, rainfall etc. before going outside from home. To understand the importance of weather and to provide the real time weather information to our stakeholders. To provide the near real time weather information to students, faculty and staff of Poornima University, we have installed the Automatic Weather Station manufactured by M/s. Spectrum Technologies, USA with digital Display. Automatic Weather Monitoring Station is providing the near real time weather observations with the display on 32' LED near reception of Poornima University. The cost of the weather station is about 2.5 Lakh and it is sponsored by Poornima University.

The aim of the automatic weather station (AWS) is to monitor weather phenomena for forecasting, climatology, and research. An automated weather station is an integrated system of components that are used to measure, record, and often transmit weather parameters such as temperature, wind speed and direction, solar radiation, and precipitation. Weather stations are used on land and sea for a variety of operational and research purposes.



Figure: 1 Automatic Weather Station

The measurement of weather parameters are important because weather has a constant impact on the world and our everyday lives. Extreme weather conditions affect health and safety, investments, agriculture, commerce, shipping, traffic, and quality of life. Weather information and prediction are becoming ever more important. Weather can create significant disruptions in urban areas. Heavy rains can cause severe flooding, snow and freezing rain can disrupt transportation systems, and major storms with accompanying lightning, hail, and high winds can cause power failures. Day-to-day weather has a significant impact on air quality, as weather determines the speed of pollutant dispersal.

Automatic Weather stations have the following sensors:

- Thermometer for measuring air temperature
- Barometer for measuring atmospheric pressure
- Hygrometer for measuring humidity
- Anemometer for measuring wind speed
- Wind Vane Sensor for measuring wind direction
- Rain gauge for measuring liquid precipitation over a set period of time
- Pyranometer for measuring Solar Radiation

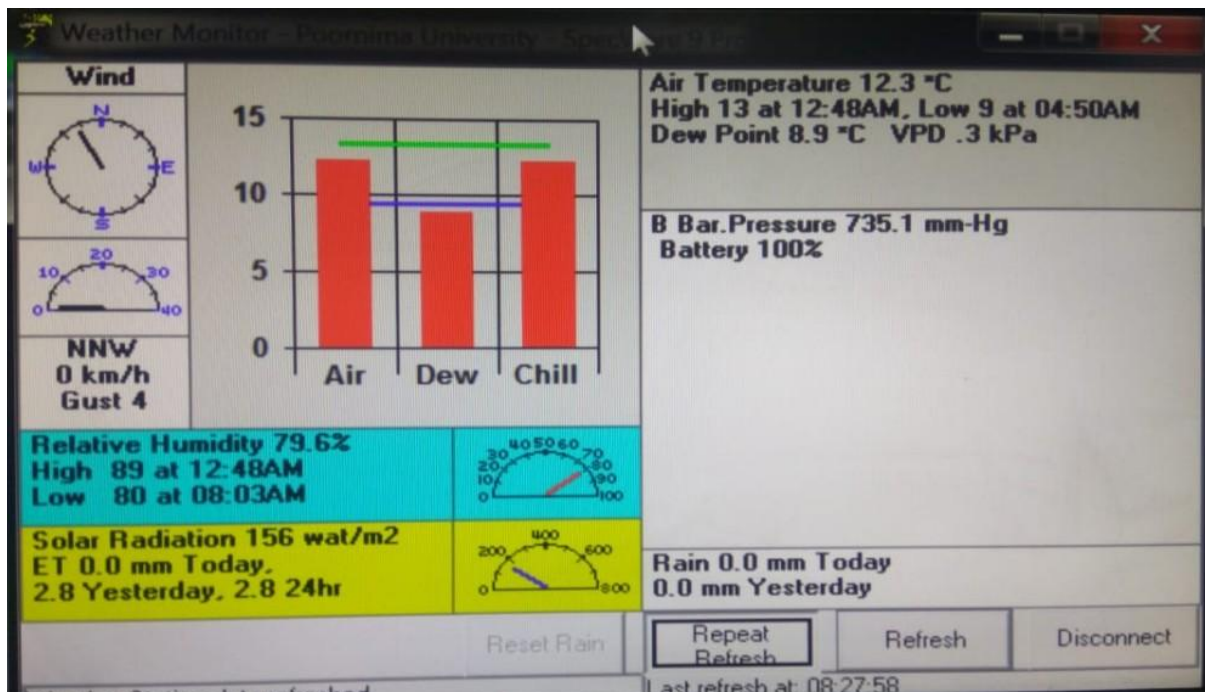


Figure: 2 Display of Meteorological parameter on LED near reception area of Poornima University

The continuous observations of meteorological parameters is carried out from February 2019. The climatology of Jaipur shows that summers are very hot while winters are cold. The average temperatures are high during the summer season in April through June with an average monthly value ranging from 31°C to 37°C. The month of May experiences average maximum temperatures during summer time. Heat wave prevails for a few days in the season, when day temperature rises to 4 – 6 °C above normal. In winter, December and January are typically the coldest months with mean surface temperature of 10–15° C and the minimum temperature

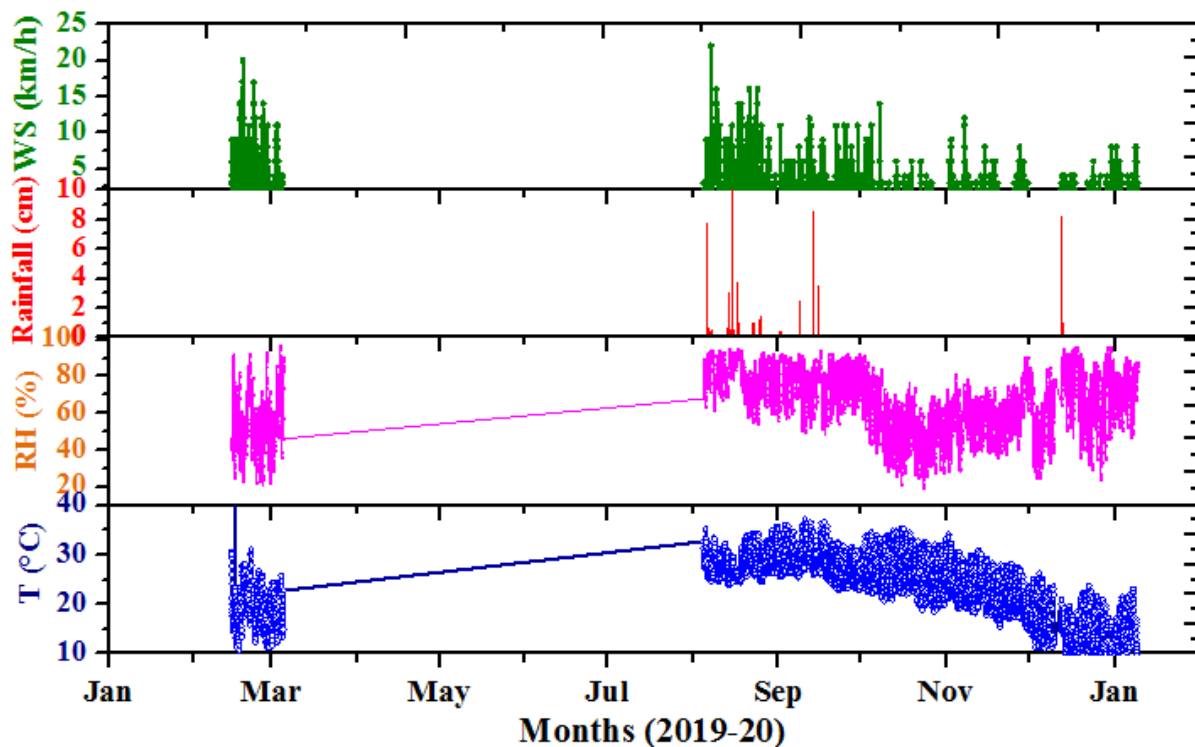


Figure: 3 Hourly Variation of Meteorological parameter

reached about 2° C which was observed on 28th December, 2019. Wind speed at Jaipur gradually seems to decrease from 11 km/h in May to 4 km/h in November. The wind direction at Jaipur shows its flow with maximum frequency from the southwest direction (from the Thar Desert area of India). The relative humidity shows an increase from ~18 % in April to ~88 % in August. Thereafter RH decreases to ~32% in October showing that summer is less humid than monsoon but more humid than the onset of the winter season. The average annual precipitation for the study period is ~80 cm. The highest monthly rain fall occurred in August.

The monthly variation of the meteorological parameter during 2019 is observed. The monthly mean temperature varies in the range from 14.4° to 36.3° C during the study period.

The monthly mean temperature shows the same trend with the maximum value in summer (AMJ) and minimum in winter (DJF). The monthly mean Relative Humidity (RH) varies in the range from 14.1 to 88.1 %. The monthly mean RH shows highest value in monsoon (JAS) and lowest in the summer. The monthly mean wind speed has the higher value in summer and lower value in post monsoon.

Applications

1. It can provide the near real time data of weather parameters.
2. Useful for Weather and climate study.
3. Weather data can be used to gauge current weather conditions and to predict the future weather forecast, like temperature high / lows, cloud cover and probability of precipitation.
4. Meteorological observations can be used for research purpose.