BSP604P					Atmospheric Science and Remote Sensing Lab					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	Viva	
0	0	2	1	2	-	-	-	50	50	100

COURSE OBJECTIVES

- To gain practical knowledge of atmospheric science using remote sensing data as well as in-situ measurements.
- To interpret and analyse atmospheric data for better understanding of short and long term weather patterns.
- To give hands on experience of various instruments to measure atmospheric parameters along with their uncertainty, this would be useful to weather climate models.

List of Experiments

1. To assemble different sensors of Arduino UNO Mini Weather Station on a breadboard to study atmospheric temperature and humidity.
2. To programming Arduino UNO Mini Weather Station for the usable output of atmospheric parameters.
3. To analyse temporal variation of atmospheric temperature, humidity and pressure with Arduino weather station.
4. To determine spatial distribution of humidity at small-scale (100x100m) using dry and wet bulb hygrometer in clean environment.
5. To examine hourly variation in temperature and sound intensity at small-scale (100x100m)using in-situ digital sensors.
6. Introduction to GRADS software to handle remote sensing data.
7. To understand satellite data processing and analysis of atmospheric parameters through contour plotting using GRADS.
8. To observe and analyze u-wind and v-wind through vector analysis using GRADS.
9. To analyze spatial distribution of temperature and rainfall pattern over Gujarat.
10. To compare and understand regional heterogeneity over in-land region (central India) and coastal region (western India) using rainfall data-an approach towards climate change.
11. To determine the relation between Sea Surface Temperature and Sea level Pressure over Arabian Sea for pre-monsoon, monsoon and post-monsoon.
12. To study wind trajectory using Hysplit model.
13. To interpret diurnal variation of humidity/temperature using Smart Thermo Hygrometer/Infrared temperature sensor.
14. Vector analysis of wind direction/speed using Smart Vane Anemometer.
15. To examine indoor and outdoor air quality using ambient CO/CO_2 sensor.

** Any 10 experiments will be conducted relevant to theory course.

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1 - Understand the various concepts of atmospheric science and remote sensing.
CO2 - Apply basic concepts of atmospheric science to understand real time meteorological problem.
CO3 - Demonstrate and implement the variation of basic atmospheric parameters.
CO4 – Analyze in-situ and remote sensing data to study nature and pattern of parameters.
CO5 – Examine and calculate the error in atmospheric data.
CO6 – Design circuits using various components of Arduino kit to study various paramenters.

TEXT/REFERENCE BOOKS

1. The Atmosphere: An introduction to Meterology, Frederick K. Lutgens, Edward J. Tarbuck, Illustrated by Dennis G. Tasa, PHI Learning Private Limited.
2. Introduction to Satellite Remote Sensing, William Emery, Adriano Camps, IEEE publication.

3. Image Processing and GIS for Remote Sensing: Techniques and Applications, Jian Guo Liu, Philippa J. Mason, Wiley Blackwell.
4. Measurement Methods in Atmospheric Sciences: In Situ and Remote, American Meteorological Society Education Program by Stefan Emeis.