ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (Phy Sc) Electronics						
Semester	**Course Code**	**Course Title**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Credit (C)**
VI	32223909	Weather Forecasting	02	00	02	04
Teacher/Instructor(s)		Dr. Amit K Vishwakarma				
Session		2022-23				

Course Objective:

The aim of this course is to impart theoretical knowledge to the students and also to enable them to develop an awareness and understanding of the causes and effects of different weather phenomena and basic forecasting techniques.

Course Learning Outcomes:

The student will gain the following:

- Acquire basic knowledge of the elements of the atmosphere, its composition at various heights, variation of pressure and temperature with height.
- Learn basic techniques to measure temperature and its relation with cyclones and anti-cyclones.
- Knowledge of simple techniques to measure wind speed and its directions, humidity and rainfall.
- Understanding of absorption, emission and scattering of radiations in atmosphere; Radiation laws.
- Knowledge of global wind systems, jet streams, local thunderstorms, tropical cyclones, tornadoes and hurricanes.
- Knowledge of climate and its classification. Understanding various causes of climate change like global warming, air pollution, aerosols, ozone depletion, acid rain.
- Develop skills needed for weather forecasting, mathematical simulations, weather forecasting methods, types of weather forecasting, role of satellite observations in weather forecasting, weather maps etc. Uncertainties in predicting weather based on statistical analysis.
- Develop ability to do weather forecasts using input data.
- In the laboratory course, students should be able to learn: Principle of the working of a weather Station, Study of Synoptic charts and weather reports, Processing and analysis of weather data, Reading of Pressure charts, Surface charts, Wind charts and their analysis

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
1.	**Introduction to atmosphere**	1	Elementary idea of atmosphere: physical structure and composition;
		2	compositional layering of the atmosphere;
		3	variation of pressure and temperature with height; air temperature;
		4	requirements to measure air temperature;
		5	temperature sensors: types; atmospheric pressure: its measurement
2.	**Measuring the weather**	6	Wind; forces acting to produce wind;
		7	wind speed direction: units, its direction;
		8	measuring wind speed and direction;
		9	humidity, clouds and rainfall, radiation:
		10	absorption, emission and scattering in atmosphere; radiation laws
		11	
		12	
3.	**Weather systems**	13	Global wind systems;
		14	air masses and fronts: classifications;
		15	jet streams; local thunderstorms;
		16	tropical cyclones: classification;
		17	tornadoes;
		18	hurricanes
4.	**Climate and Climate Change**	19	Climate: its classification; causes of climate change;
		20	global warming and its outcomes; air pollution and its measurement,
		21	particulate matters PM 2.5, PM 10.
		22	Health hazards due to high concentration of PM2.5;
		23	aerosols
		24	ozone depletion
5.	**Basics of weather forecasting**	25	Weather forecasting: analysis and its historical background;
		26	need of measuring weather; types of weather forecasting;
		27	weather forecasting methods; criteria of choosing weather station;
			basics of choosing site and exposure;
			satellites observations in weather forecasting;
			weather maps; uncertainty and predictability; probability forecasts.

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		50
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	50

Details of the Course		
Unit	**Contents**	**Contact Hours**
1	**Introduction to atmosphere:** Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement	09
2	**Measuring the weather:** Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.	04
3	**Weather systems:** Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.	03
4	**Climate and Climate Change**: Climate: its classification; causes of climate change; global warming and its outcomes; air pollution and its measurement, particulate matters PM 2.5, PM 10. Health hazards due to high concentration of PM2.5; aerosols, ozone depletion	06
5	**Basics of weather forecasting:** Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.	08
	Total	**60**

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1	Aviation Meteorology, I.C. Joshi, 3rd edition, Himalayan Books	2014
2	The weather Observers Hand book, Stephen Burt, Cambridge University Press.	2012
3	Meteorology, S.R. Ghadekar, Agromet Publishers, Nagpur	2001
4	Text Book of Agrometeorology, S.R. Ghadekar, Agromet Publishers, Nagpur.	2005
5	Atmosphere and Ocean, John G. Harvey, The Artemis Press.	1995

Mode of Evaluation:	Internal Assessment / End Semester Exam