



FORMAT FOR COURSE CURRICULUM

Course Title: Fundamentals of Satellite Meteorology

Course Code: to be decided later

Credit Units: 4

Level: PG

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	1	2	0	4

Course Objectives:

The primary objective of this course is to

- To provide fundamental understanding about meteorological and atmospheric processes and its associations with coupled human – environment system
- To provide fundamental understanding about current and future satellite missions and numerical weather forecasting.
- To utilize satellite based observations to monitor the environment and various meteorological processes/phenomena

Prerequisites:

Generic competences:

- a) Ability to apply knowledge to solve problems.
- b) Basic computing skills and Professional knowledge.
- c) Skilled at utilizing and processing information.

Specific competences:

- a) Basic knowledge of Remote Sensing, GIS, Mathematics/Statistics and Computers.

Course Contents/Syllabus:

	Weightage (%)
Module I	25
Descriptors/Topics <ul style="list-style-type: none"> • Introduction to Meteorological Remote sensing, • Role of Sun and Atmosphere in Meteorological system, • Overview of meteorological satellites, • Indian scenario of meteorological satellite systems, • Data requisite for meteorological studies. 	

Module II	25
Descriptors/Topics <ul style="list-style-type: none"> • Introduction to meteorological satellite systems–INSAT series, Meteosat, NOAA, TRMM, DMSP, QUICKSCAT, Megha-Tropiques etc. • Operational and Forthcoming meteorological satellite missions. • Types of Meteorological Remote Sensing Sensors like Microwave Radiometers, Microwave Scatter meter, Microwave Altimeter. • Airborne and Space born Platforms and Sensors, SEASAT, SIR-A, SIR-B, JERS, ERS and EOS. 	
Module III	25
Descriptors/Topics <ul style="list-style-type: none"> • Spatial Resolutions in Meteorological Remote Sensing. • Satellite Image interpretation and enhancement techniques, • Measurements of atmospheric temperature, Humidity, Aerosols, CO, Ozone, Clouds, Precipitation, Sea Surface temperature. 	
Module IV	25
Descriptors/Topics <ul style="list-style-type: none"> • Satellite based tracking of tropical cyclones, • Cyclone warning system in India, • Rainfall variability, • Extremes of Temperature and Precipitation (Cold/heat waves, Flood/Drought, Rainfall) Regional/local weather systems, • Advanced Weather Forecasting, • Case studies highlighting long term climate monitoring and meteorological satellite datasets utilization, • Discussion on latest research findings and seminar 	

Student Learning Outcomes:

On successful completion of this course, students will be able to:

- Operational and future satellite missions for atmospheric and meteorological parameters
- How satellite images are acquired and interpreted for meteorological applications and weather forecasting
- How atmospheric and meteorological parameters are retrieved and utilized for studying meteorological and atmospheric processes

Pedagogy for Course Delivery:

The class will be taught using theory and practical based method. In addition to assigning the case studies, the course instructor will spend considerable time in understanding the concept of innovation through the eyes of the consumer. The instructor will cover the ways to think innovatively liberally using thinking techniques. Tutorials helps the students to generate the logic of assigned assignments. The course instructor will spend considerable time in understanding the concept of subject from the scratch and covers most of concepts for satellite meteorology.

List of Professional Skill Development Activities (PSDA):

- i. _____
- ii. _____
- iii. _____
- iv. _____

Lab/ Practicals details, if applicable:

List of Experiments:

- _____

- _____
- _____

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination (%)
30	N.A.	70

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment (____ %)					End Term Examination (____ %)
Components (Drop down)	Mid Term Exam	Project	Viva	Attendance	
Linkage of PSDA with Internal Assessment Component, if any					
Weightage (%)	10	10	5	5	70

Text Reading:

Materials

Required text

1. Ahrens C.D. (1999) Meteorology today, Brooks/Cole, 6th edition.
2. Cobb A.B. (2003) Weather Observation Satellites, Rosen Publishing Group.
3. Kelkar R.R. (2007) Satellite Meteorology, B S Publications, Hyderabad.
4. Kidder S.Q. and Vonder T.H. (1995) Satellite Meteorology–An Introduction, Haar Academic Press, New York.
5. Rao P.K. and Ray P.S. (1986) Weather Satellites: Systems, Data and Environmental Applications, American Meteorological Society, Boston.

Suggested readings

1. Bader M. J., Forbes G.S., Grant J.R., Lilley R.B.E. and Waters A.J. (1995) Images in Weather Forecasting, Cambridge University Press.
2. Barette E.C. and Curtis L.F. (1999) Introduction to Environmental Remote Sensing, Chapman and Hill Publication.
3. Conway E M (2008) Atmospheric Science at NASA: A History, Michener & Rutledge Bookseller, Baldwin City, KS, USA.
4. Menzel P. (1991) W M O Notes on Satellite Meteorology, NOAA/CIMSS.
5. Steven A.A. and John A.K. (2006) Meteorology: Understanding the Atmosphere.

Journals

1. Advances in Meteorology
2. Atmospheric Environment
3. Climate Dynamics
4. International Journal of Climatology
5. International Journal of Remote Sensing
6. Journal of Atmospheric Sciences

7. **Journal of Geophysical Research**
8. **Meteorological Applications**
9. **Meteorology and Atmospheric Physics**
10. **Quarterly Journal of Royal Meteorological Society**
11. **Remote Sensing of the Environment**