Lecture Plan

Name of the college: Government College of Arts, science and Commerce Sanquelim Goa

Name of Faculty: Dr. Arati Panshekar	**Subject:** Geography	
Paper code: GOG-301 Principles of Remote Sensing	**Program: BA**	**Division:**
Academic year: 2025-26	**Semester: V**	**Total Lectures: 45**

Course Objectives:

This course is designed to provide a comprehensive introduction to the fundamental principles and applications of remote sensing. The course will cover the basic concepts, technologies, and techniques used in remote sensing, with a focus on understanding the principles behind the collection and analysis of spatial data. The The Practical component of the course serves as an introduction to geospatial data analysis, focusing on fundamental concepts and practical skills. Participants will gain proficiency in utilizing key tools and techniques for interpreting and analyzing geospatial data.

Expected Course Outcome:

At the end of the successful completion of this course, students will be able to:

1. **Comprehend** the fundamental principles underlying remote sensing technology.
2. **Relate** the concepts of data acquisition to the characteristics of dif-ferent remote sensing platforms and sensors.
3. **Develop** skills in visually interpreting features and patterns in remote sensing imagery as well as in the application of remote sensing data in making informed decisions in agriculture, environmental manage-ment, urban planning, and disaster response.
4. **Demonstrate** a working knowledge of Remote Sensing tools and func-tionalities for basic geospatial analysis and **Develop** critical thinking skills for analyzing geospatial data .

Student Learning Outcome:

1. **Understand the basic concepts, types, and historical development of remote sensing.**
2. **Identify various sensors, platforms, and how electromagnetic energy interacts with Earth's surface.**
3. **Explain how remote sensing data is acquired, processed, and interpreted for spatial analysis.**

4. Apply remote sensing techniques to real-world applications like agriculture, environment, urban planning, and disaster management.							
Month	**Lecture From**	**Lecture To**	**No. of lectures allotted**	**Topic, Subtopic to be covered**	**Exercise/ Assignment**	**ICT Tools**	**Reference books**
June	23-06-2025	28-06-2025	3	**Definition and Basic Principles of Remote Sensing** – Concept of remote sensing – Principles: energy source, transmission, interaction, sensor, data processing		Google meet/Power point presentation/ Moodle LMS	1. Campbell, James B., and Randolph H. Wynne. *Introduction to Remote Sensing. Guilford Press, 2011.* 2. Jensen, John R. *Introductory Digital Image Processing: A Remote Sensing Perspective. Pearson, 2016.* 3. Jensen, John R. *Remote Sensing of the Environment: An Earth Resource Perspective. Pearson, 2016.* 4. Lillesand, Thomas M., and Ralph W. Kiefer. *Remote Sensing and Image Interpretation. Wiley,*
July	30-06-2025	05-07-2025	3	**History and Evolution of Remote Sensing** – Timeline from aerial photography to modern satellites – Major milestones and technological developments			
	07-07-2025	12-07-2025	3	**Types of Remote Sensing: Active vs. Passive** – Differences between active and passive systems – Examples and			

				applications (e.g., radar vs. optical)		*2015.* 5. Maune, David F. *Digital Elevation Model Technologies and Applications: The DEM User's Manual. ASPRS Publications, 2007.*
	14-07-2025	19-07-2025	3	**Types of Remote Sensing: Aerial vs. Satellite-Based** – Characteristics and differences – Advantages and limitations		
	21-07-2025	26-07-2025	3	**The Electromagnetic Spectrum in Remote Sensing** – Wavelengths used in remote sensing – Types of EM radiation and their roles (visible, IR, microwave)		
	28-07-2025	02-08-2025	3	**Energy Interactions with the Atmosphere and Surface** – Absorption, reflection, transmission – Factors affecting image quality		
August	04-08-2025	09-08-2025	3	**Remote Sensing Platforms: Satellites, Aircraft, Drones, Ground Sensors** – Overview of each		

				platform – Use cases and platform selection criteria			
	11-08-2025	16-08-2025	3	**Types of Sensors: Optical, Thermal, Radar, and LiDAR** – Sensor technologies and their capabilities – Example satellites/sensors (e.g., Landsat, Sentinel, MODIS)			
	18-08-2025	23-08-2025	3	**Sensor Characteristics and Specifications** – Spectral, spatial, temporal, and radiometric resolution – Comparison between major sensors (e.g., IRS, SPOT, IKONOS)			
25-08-2025 to 30-08-2025 (Chaturthi vacation)							
September	01-09-2025	06-09-2025	3	**Image Resolution and Pixel Size** – Relationship between resolution and detail – Trade-offs in data			

				acquisition			
	08-09-2025	13-09-2025	3	**Georeferencing and Spatial Accuracy in Remote Sensing** – Importance of georeferencing – Methods and tools used for spatial correction			
	15-09-2025	20-09-2025	3	**Remote Sensing Data Formats: Raster vs. Vector** – Key differences, advantages, and uses – Examples of raster (satellite images) and vector (shapefiles) data			
	22-09-2025	27-09-2025	3	**Data Acquisition Techniques: Pushbroom vs. Whiskbroom Scanners** – Working mechanisms – Sensor examples and operational advantages			
	29-09-2025	04-10-2025	3	**Remote Sensing in Agriculture and Crop Monitoring** – Vegetation indices,			

				yield estimation, stress detection – Precision farming applications			
October	06-10-2025	11-10-2025	3	**Remote Sensing in Environmental and Coastal Monitoring** – Land degradation, deforestation, water quality – Shoreline changes, coral reef mapping			
	13-10-2025	18-10-2025	3	**Urban Planning, Land Use Mapping, and Disaster Management** – Change detection, zoning, hazard assessment – Monitoring floods, earthquakes, forest fires			

ISA 1	7.5
ISA 2	7.5
ISA 3	7.5
Practical	25
Project	-
Semester End Exam	60