

Course No: NRG 173  
 Course Title: **Principles of Remote Sensing**  
 Number of Credits: 4 (3-0.5-0.5)  
 No. of Lectures-Tutorial-Practical: 42-7-14  
 Course Coordinator: Dr. Chander Kumar Singh

### **Aim**

- Gathering the basic concepts and procedures of fundamentals of physical principles of remote sensing
- Understanding different type of remote sensing systems

### **Course Outline**

It introduces the participant to the basic concepts and the operational skills necessary to acquire remote sensing data and extract geo-information from them. The objective is to create a firm basis for successful integration of RS in any field of application.

### **Pre-requisite**

No pre-requisite required

### **Evaluation Procedure**

- 2 minor tests: 15% Each
- Practical: 20%
- Major exam: 50%

### **Details of course content and allotted time**

| SNo | Topic  | Time (Hrs) |   |   |
|-----|--|------------|---|---|
|     |  | L          | T | P |
| 1.  | Introduction to Remote Sensing, History of Remote Sensing                        | 3          |   |   |
| 2.  | Applications of Remote Sensing   | 4          | 1 |   |
| 3.  | Basics of Remote Sensing, EMR and Sources of EMR                                 | 6          |   |   |
| 4.  | Radiation Laws, Atmospheric Windows  | 4          |   |   |
| 5.  | Interaction with Atmosphere and earth surfaces, Spectral Signatures              | 5          |   | 4 |
| 6.  | Remote Sensing Systems<br>(Active & Passive; Imaging & Non-imaging)              | 6          | 2 | 2 |
| 7.  | Resolutions–spatial, spectral, radiometric, temporal                             | 4          | 2 | 2 |
| 8.  | Elements of Image Interpretation, Ground Truth Collection, Visual Interpretation | 6          | 2 | 6 |
| 9.  | Accuracy Assessment (need, application, tools and methods)                       | 2          |   |   |
| 10. | Orbit and Platforms of earth Observation, sensors and                            | 2          |   |   |

|  |              |           |          |           |
|--|--------------|-----------|----------|-----------|
|  | scanners     |           |          |           |
|  | <b>Total</b> | <b>42</b> | <b>7</b> | <b>14</b> |

### Textbooks

1. Asrar Ghassem Theory and applications of optical remote sensing New York: John Wiley and Sons.
2. Campbell J.B. (2002) Introduction to Remote Sensing, 3rd ed., The Guilford Press.
3. Curran P.J., Principles of Remote Sensing, UK, ELBS.

### Suggested Readings

1. Jensen J.R. (2000) *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall.
2. Jensen J.R. (2005) *Digital Image Processing: A Remote Sensing Perspective*, 3rd ed., Prentice Hall.
3. Jensen J.R. (2007) *Remote Sensing of the Environment: An Earth Resource Perspective*, 2nd ed., Prentice Hall.
4. Joseph G., *Fundamentals of Remote Sensing*, Universities Press India.
5. Kondratyev K.Y., Buznitov A.A. and Pokrovoky O.M., *Global Change and Remote Sensing*, John Wiley and Sons.
6. Lillesand T.M., Kiefer R.W. and Chipman J.W. (2003) *Remote Sensing and Image Interpretation*, 5th ed., Wiley.
7. Lillesand T.M., Kiefer R.W. and Chipman J.W. (2003) *Remote Sensing and Image Interpretation*, 5th ed., Wiley.
8. Muralikrishna V., *Geographical Information Systems and Remote Sensing Applications*, Allied Publishers Private Limited.
9. Nag P. and Kudrat M., *Digital Remote Sensing*, New Delhi, Concept Publishing.
10. Richards J.A. and Jia X. (2006) *Remote Sensing Digital Image Analysis: An Introduction*, 4th ed., Springer.
11. Sabins F.F., *Remote Sensing: Principles and Interpretation* New York: WH Freeman and Company.

### Magazines

1. Coordinates
2. Geospatial today
3. GIM International
4. GIS World
5. GIS@development
6. GPS World

### Journals

1. Asian Journal of Geoinformatics
2. Geocarto International
3. International Journal of Geoinformatics

4. International Journal of Remote Sensing
5. ISPRS Journal of Photogrammetry and Remote Sensing
6. Journal of Indian Society of Remote Sensing
7. Remote Sensing of Environment