

SYLLABUS

FOUR YEARS UNDERGRADUATE PROGRAMME IN MDC_FUNDAMENTALS OF REMOTE SENSING



**UNIVERSITY OF NORTH BENGAL
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W.E.F: ACADEMIC SESSION 2023-24

Semester: 1

PAPER: MDC

Paper Description: Fundamentals of Remote Sensing

This paper provides an overview of the fundamentals of remote sensing. It deals with definition of remote sensing, historical development of remote sensing processes and techniques. The basics of remote sensing like electromagnetic spectrum, interaction of energy with atmospheric and earth surface features, types of sensors, platforms, satellite and resolution will be introduced. The basics of air photo and GPS will also be covered. Since remote sensing is an emerging technology with widespread applications, therefore its application in various fields of studies will also be looked into.

Paper Code: UPOAMDC11009

Paper Type: Theory + Practical Lab Based-PLB

Credit: 2 credit theory and 1 credit practical.

Class hours: 2 theory classes per week and 2 practical classes per week. Total 4 classes per week.

Duration of the Examinations: 2 hrs. Theoretical and 2 hrs. Practical Examinations.

Syllabus:

Paper Objectives:

Knowledge acquired:

1. Concept of remote sensing and its historical development.
2. Essential components and fundamental principles involved in remote sensing, including data acquisition, data analysis, and interpretation.
3. Different types of sensors, platforms (such as satellites), aerial photography and GPS.
4. Widespread applications of remote sensing in various fields.

Skills gained:

1. Data acquisition and interpretation.
2. Spatial and temporal analysis of remote sensing data.
3. Integration of remote sensing with other geospatial technologies.

Competency developed:

1. Develop the competence to integrate remote sensing data with other geospatial technologies.
2. Develop the ability to make informed decisions based on remote sensing data and analysis.
3. Develop the competence to apply remote sensing techniques and data in various domains, including disaster management, land use and land cover studies, forestry, hydrology and urban planning.

Syllabus Overview:

Theory

Unit	Content	Hours/Week
1	Definition of remote sensing; History of remote sensing; Elements, principles and process of remote sensing; Electromagnetic spectrum, interaction of energy with atmosphere and earth surface features, spectral reflectance curve, types of sensors, platforms, types of satellite, resolution	2

	and types; Types of aerial photograph and elements of air photo; Elements and components of GPS.	
2	Applications of remote sensing in disaster management, meteorological studies, forestry, hydrological studies, land use and land cover studies, natural resource, oceanic and coastal mapping, soil resource mapping, urban expansion and rural development.	

Practical

Unit	Content	Hours/Week
1	Air photo interpretation using pocket stereoscope	2
2	GPS survey: Introduction to GPS and on-field data collection.	

Suggested reading

Jensen, John. (2006) Remote Sensing of the Environment: An Earth Resource Perspective (Prentice Hall Series in Geographic Information Science) - Second Edition.

Bhatta, B. (2011) Remote Sensing and GIS, Second Edition.

Lillesand T.M. (2003) Introduction to Remote Sensing and Image Interpretation.

Chipman, J.W., Kiefer, R.W., Lillesand (2015) Remote sensing and image interpretation. Wiley.

Campbell, James B., Wynne, Randolph H. (2011) Introduction to Remote Sensing, Fifth Edition.

Lavender, A., Lavender, S. (2016) Practical handbook of remote sensing, First Edition.

Jensen, John R. (2015) Introductory Digital Image Processing: A Remote Sensing Perspective, Fourth Edition.

Liu, Jian-Guo., Mason, Philippa J. (2016) Image processing and GIS for remote sensing: techniques and applications; Second Edition.

Practical guidelines: Students will prepare a laboratory notebook covering all the practical units duly signed by the internal faculty members. Viva-voce is compulsory at the time of practical examination.

Question pattern

Type	Marks			Total
Theoretical	1: 5 out of 5	5: 3 out of 5	10: 2 out of 4	40
Practical	15 : 1 out of 1	5: Laboratory notebook and viva-voce.		20
CE	10: Mid-term test, class test, seminar presentation, term paper (Any one to be decided by the respective departmental faculty members)			10
Attendance	5			5
Full marks				75