Detailed Guidelines

FUNDAMENTALS OF REMOTE SENSING (PRACTICAL)
B.A. (Hons) Geography (NEP) Semester III

The online meetings were held on 18th and 26th September, 2023 at 5:30/6:00 pm to formulate detailed guidelines. Following members attended the meeting:

Prof Daljit Singh, P r o f . Pratibha Bhalla, Dr. Renu Bali, Dr. Rakhi Parijat, D r . Monica Ahlawat, Dr. Rajesh Kr. Abhay, Dr. Dilip Kumar, Dr. Bratati Barik, Dr. Anjali Yadav, Dr. Ashwani Kumar Agnihotri, Dr. Suraj Kumar Mallick, Dr. Ankur Srivastava, Dr. Vijendra Pandey, Dr. Rishabh Singh, Dr. Shubhmay Pramanik, Ms. Shipra Singh, Dr.Ankita Medhi, Dr.Avijit Mahalaya, Dr.Tara Shankar , Dr. Roshni Beri and Prof. Poonam Sharma.

(Practical Paper of 4 credit = 8 periods per group per week)

UNIT I (20 Hours)

Syllabus
Introduction to Remote Sensing
• Meaning and Definition
• Historical Evolution of Remote Sensing
>   *(i) Platforms (Ground, Air, Space)*
>   *(ii) Types of Remote Sensing (Passive, Active).*
>   *(iii) Resolution Types (Spatial, Spectral, Radiometric, Temporal)*
• Satellite data sources/Search engines: EARTHDATA, USGS, GLCF, LP-DAAC
• Software: QGIS, Arc GIS, ERDAS, IDRISI, TerrSet, ENVI, R, SAGA

Guidelines
Theory: All the topics and subtopics mentioned in the unit.
Practical 1: Website demonstration for the mentioned Remote Sensing Data Search
                Engines
Practical 2: Website demonstration for the mentioned Remote Sensing Software

UNIT – II (30 Hours)

Syllabus

Aerial Photos: Geometry and Types of Aerial Photography, Stereoscope,
Annotation, Interpretation Keys, and Interpretation
>   *• Calculation of photo scale*
>   *• Orientation of Aerial Photo*
>   *• Annotation and Interpretation Keys*

Guidelines
Theory: Types and Geometry of Aerial photograph; Stereoscope

Practical 1: Calculation of Scale of Aerial Photograph

                Method 1: Using Focal Length and Flying Height of the Aircraft

Method 2: Using Photo Distance and Ground Distance

Method 3: Using Photo Distance and Map Distance

Practical 2: Orientation of Aerial Photo using available Stereoscope (Mirror or Pocket Stereoscope)

Practical 3: Identification, Image Interpretation Key and interpretation of Feature Types in Aerial Photographs using a stereoscope

UNIT III (20 Hours)

Syllabus

Satellite Remote Sensing: Principles, Resolutions, EMR Interaction with Atmosphere and Earth Surface Features; Major Satellites and Sensors (LANDSAT, IRS, IKONOS, SPOT, MODIS, Sentinel, QUICKBIRD, any two)
   * *Downloading Bhuvan Data*
   * *Downloading LANDSAT data (EARTHDATA)*
   * *Band-wise reflection of EMR*

Guidelines

Theory: Principles, Resolutions, EMR Interaction with Atmosphere and Earth Surface Features; Sensors and Major Satellites (Any TWO from the mentioned names); Band-wise reflection of EMR

Practical 1: Downloading various remote sensing data (Bhuvan and Landsat data).

Practical 2: Preparation of spectral signatures curves for different Various Feature Types (LU/LC) types (only four: Water body, Vegetation, Open/fallow land and built up).

UNIT IV (30 Hours)

Syllabus

Satellite Image Processing:
* *Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Classification Basics (Supervised and Unsupervised), DN to reflectance conversion*
* *Geometric Correction*

Guidelines

Practical 1: Clip, merge, band stacking / virtual raster

Practical 2: Satellite Image Classification Using Supervised Methods and Preparation of Land Use/Land Cover Map Using Bhuvan or Landsat Data

Practical 3 : Satellite Image Classification using unsupervised classification methods

UNIT V (20 Hours)

Syllabus

Application of Remote Sensing:
> *• Land Use/Land Cover,*
> *• Urban Sprawl,*
> *• Vegetation Monitoring*

Guidelines

Practical 1: Urban Sprawl mapping using NDBI or LULC

Practical 2: Vegetation Monitoring using NDVI or LULC

GUIDELINES FOR END- SEMESTER EXAMINATION

Total Marks: 160 (80+40+40)

Continuous Assessment 40: 15 marks assignment /test etc + 25 marks Record file

End Semester Exam: 80 + 40(viva)

80: practical content 40 marks + theory content 40 marks

Duration for Examination: 5 Hours including Viva

Unit wise Marks allocation for Examination

1. Unit 1 (10 marks): Two short notes

2. Unit 2 (20 marks): 5+15(Theory + Practical, respectively) choose any two practical exercises.

3. Unit 3 (15 marks): 10+5(Theory + Practical) Choose one practical exercises.

4. Unit 4 (25 marks): Theory 10 + Practical*

5. Unit 5 (10 marks): Theory 5+ Practical *

   *Choice may be given in unit 4 and 5 for practical exercise of 20 marks and theory of 15 marks.

   Internal choices may be given in other questions too.

Format of Practical Record File: Student will submit a record file containing at least 5 exercises.