SECOND-YEAR OF MASTER OF ARTS MAJOR GEOGRAPHY REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: COURSE TITLE: TOOLS AND TECHNIQUES IN SPATIAL ANALYSIS-II

SEMESTER-IV, W.E.F. 2024-2025

RECOMMENDED BY THE BOARD OF STUDIES IN GEOGRAPHY
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: 03

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Master of Arts
Name of the Department	:	Geography
Name of the Class	:	Second Year
Semester	:	Fourth
No. of Credits	:	02
Title of the Course	:	Tools and Techniques in Spatial Analysis - II
Course Code	:	A614GEP
Name of the Vertical in adherence to NEP 2020	:	Major
Eligibility for Admission	:	NA
Passing Marks	:	40%
Mode of Assessment	:	Summative
Level	:	PG
The pattern of Marks Distribution for TE and CIA	:	NA
Status	:	NEP-CBCS
To be implemented from the Academic Year	:	2024-2025
Ordinances/Regulations (if any)		

Syllabus for Second Year of Master of Arts in Geography

(With effect from the academic year 2024-2025)

SEMESTER-IV **Paper No.–V**

Course Title: Tools and Techniques in Spatial Analysis-II **No. of Credits - 02**

Type of Vertical: Major **COURSE CODE:** A614GEP

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Identify key concepts, data sources, and techniques used in land use, forest cover, water resources, and soil analysis through remote sensing.
CLO-02	Understand	Explain the processes of data acquisition, image processing, classification, and accuracy assessment for environmental analysis.
CLO-03	Apply	Utilize remote sensing techniques to classify land cover, detect changes in forest cover, assess water resources, and analyze soil properties.
CLO-04	Analyse	Examine spatial and temporal variations in land use, vegetation cover, water quality, and soil characteristics using remote sensing tools.
CLO-05	Evaluate	Assess the accuracy of remote sensing classifications, compare different vegetation and water indices, and interpret environmental changes.
CLO-06	Create	Develop thematic maps, generate analytical reports, and propose sustainable solutions based on remote sensing-based environmental assessments.

Syllabus for Second Year of Master of Arts in Geography

(With effect from the academic year 2023-2024)

SEMESTER-III **Paper No.–IV**

Course Title: Tools and Techniques in Spatial Analysis-II **No. of Credits - 02**

Type of Vertical: Major **COURSE CODE:** A504GEP

1. **Land Use and Land Cover Analysis**
   - 1.1. Downloading High and Medium-Resolution Data
   - 1.2. Layer Stacking and Imaging
   - 1.3. Applying Classification Techniques
   - 1.4. Ground Truthing and Accuracy Assessment
   - 1.5. Analysing and Interpreting LULC
2. **Forest Cover Change Detection Analysis**
   - 2.1. Downloading Available Remote Sensing Data
   - 2.2. Layer Stacking and Imaging
   - 2.3. Applying Classification Techniques
   - 2.4. Ground Truthing and Accuracy Assessment
   - 2.5. Change Detection Analysis
   - 2.6. Vegetation Indices
3. **Water Resource Analysis**
   - 3.1. Downloading Available Remote Sensing Data
   - 3.2. Layer Stacking and Imaging
   - 3.3. Water Quality Extraction
   - 3.4. Water Resource Distribution Analysis
   - 3.5. Water Indices
4. **Soil Analysis**
   - 4.1. Downloading Available Remote Sensing Data
   - 4.2. Layer Stacking and Imaging
   - 4.3. Classification of Soils
   - 4.4. Soil Texture Analysis

4.5. Soil Indices

Required Previous Knowledge

No previous Knowledge is necessary to learn the course.

Access to the Course

The course is available for all the students admitted for Master of Arts.

Methods of Assessment:

Vocational skill Courses, Skill Enhancement Courses and courses having laboratory sessions shall be assessed at the end of each semester.

Grading Scale

The grading scale used is O to F. Grade O is the highest passing grade on the grading scale, and grade F is a fail. The Board of Examinations of the college reserves the right to change the grading scale.

References:

Books

1. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective*. Pearson.
2. Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). *Remote Sensing and Image Interpretation*. John Wiley & Sons.
3. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing*. Guilford Press.
4. Chuvieco, E. (2016). *Fundamentals of Satellite Remote Sensing: An Environmental Approach*. CRC Press.
5. Richards, J. A., & Jia, X. (2006). *Remote Sensing Digital Image Analysis: An Introduction*. Springer.
6. Gibson, P. J., & Power, C. H. (2000). *Introductory Remote Sensing: Principles and Concepts*. Routledge.
7. Mishra, V. D. (2019). *Remote Sensing and GIS Applications in Agricultural Sciences*. New India Publishing Agency.
8. Congalton, R. G., & Green, K. (2019). *Assessing the Accuracy of Remotely Sensed Data: Principles and Practices*. CRC Press.

Research Papers & Articles

9. Lu, D., & Weng, Q. (2007). *A survey of image classification methods and techniques for improving classification performance*. International Journal of Remote Sensing, 28(5), 823-870.
10. Hansen, M. C., et al. (2013). *High-resolution global maps of 21st-century forest cover change*. Science, 342(6160), 850-853.
11. Ozesmi, S. L., & Bauer, M. E. (2002). *Satellite remote sensing of wetlands*. Wetlands

Ecology and Management, 10(5), 381-402.
12. Tucker, C. J. (1979). *Red and photographic infrared linear combinations for monitoring vegetation*. Remote Sensing of Environment, 8(2), 127-150.

Online Resources & Manuals

13. NASA Earthdata – *Remote Sensing Data Access and Applications* https://earthdata.nasa.gov
14. USGS Earth Explorer – *Satellite Data for Environmental Monitoring* https://earthexplorer.usgs.gov
15. ESA Sentinel Hub – *Sentinel-2 Data for LULC and Vegetation Analysis* https://sentinel.esa.int
16. FAO GeoNetwork – *Land Cover and Soil Analysis Data* https://www.fao.org/geonetwork
17. Google Earth Engine – *Cloud-Based Remote Sensing and GIS Analysis* https://earthengine.google.com