C Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U1403

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

Civil Engineering

21CEV403- SATELLITE IMAGE PROCESSING

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Adjusts for sensor noise and variations in illumination is known as…….. CO1- U

   (a) Geometric correction (b) Radiometric correction

   (c) Atmospheric correction (d) All the above

2. What does IFOV stand for in remote sensing? CO1- U

   (a) Instantaneous Field of View (b) Integrated Field of View

   (c) Instantaneous Field of View (d) Interpolated Field of View

3. What does Principal Component Analysis (PCA) primarily aim to do in image processing? CO1- U

   (a) Enhance spatial resolution (b) Reduce data dimensionality

   (c) Improve colour balance (d) Detect edges

4. What is spectral discrimination used for in remote sensing? CO1- U

   (a) Improving spatial resolution

   (b) Distinguishing between different materials or classes based on their spectral properties

   (c) Reducing noise in images

   (d) Performing geometric corrections

5. Which classification method deals with uncertainty in data by allowing partial membership in multiple classes? CO1- U

(a) Supervised Classification (b) Unsupervised Classification

(c) Fuzzy Set Classification (d) Parallelepiped Classification

PART – B (5 x 3= 15 Marks)

6. Interpret the term "digital image processing" and “satellite image processing”. CO1- U

7. Demonstrate the necessary corrections involved in satellite image processing. CO2 - App

8. What are image histograms, and how are they used in image analysis? CO3 - App

9. What is Bayes' approach to classification, and how does it apply to remote sensing? CO5- Ana

10. What is fuzzy set classification, and how does it differ from traditional classification methods? CO5- App

PART – C (5 x 16= 80 Marks)

11. (a) Organize the various satellite imagery acquisition storage and retrieval. CO2–App (16)

Or

(b) Demonstrate the hardware and software design consideration for satellite image processing, particularly focusing on sensors and digitizers in detail. CO2–App (16)

12. (a) Implement the importance and the purpose of image restoration in satellite image processing in detail. CO3 - App (16)

Or

(b) Construct the workflow for resampling and interpolation in Satellite Image Processing in detail. CO3–App (16)

13. (a) Explain scattergrams in detail. Discuss how they are used to analyse relationships between variables in image data, particularly in multivariate analysis. CO3-App (16)

Or

(b) Describe the various techniques for image enhancement in the spatial domain. Discuss the differences between global and local enhancement techniques, providing suitable examples. CO3-App (16)

14.	(a)	Discuss the fundamental principles of pattern recognition in image processing. Explain how these principles are applied in remote sensing and image classification.	CO6-App	(16)
		Or		
	(b)	Explain the concept of spectral discrimination in remote sensing. How does it help in distinguishing between different land cover types? Provide examples of its applications.	CO6-App	(16)
15.	(a)	Discuss sub-pixel classification in detail. How does this approach improve the accuracy of land cover classification when dealing with mixed pixels in remote sensing images? Provide relevant examples.	CO4-App	(16)
		Or		
	(b)	Discuss the differences between object-based classification and pixel-based classification. How does object-based classification improve the results of remote sensing image analysis, especially in high-resolution imagery?	CO4-App	(16)