K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May – June 2025

PhD Program: Academic Year 2024-25

Course Work Examination

Course Code: **PhD102** and Course Name: **Remote Sensing Essentials**

Date: 21-05-2025 Duration: 2.00 PM to 4.30 PM Max. Marks: 70

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

	Question	Max. Marks	CO	BT Level
Qu-1	Solve any **Six** questions out of **Eight.**	**30**		
i)	Explain law of radiation and their relevance in remote sensing.	5	CO1	U
ii)	Explain different techniques of image acquisition	5	CO2	U
iii)	Explain basic image enhancement techniques	5	CO3	U
iv)	What are the atmospheric and geometric corrections techniques in RS	5	CO4	U
v)	What is band rationing?	5	CO5	U
vi)	Explain about Multi-spectral scanners and imaging devices,	5	CO6	U
vii)	Which are False Topographic Phenomena and correction techniques	5	CO4	U
viii)	Explain active microwave remote sensing.	5	CO5	U
Qu-2	Solve any **TWO** questions out of **THREE.**	**20**		
i)	Explain mosaicking, subsets, sub-sampling techniques and applications,	10	CO1	U
ii)	Explain all spatial filtering techniques	10	CO5	U
iii)	Explain supervised image classification techniques with examples.	10	CO3	U
Qu-3	Solve any **TWO** questions out of **THREE.**	**20**		
i)	You are given the reflectance values of a pixel in 4 spectral bands (B1 to B4) as follows:	10	CO6	Ap

Band	Reflectance
B1	0.30
B2	0.45
B3	0.60
B4	0.15

	(a) Perform the following **band ratios**: • Ratio1 = B3 / B2 • Ratio2 = B1 / B4 **(b)** Consider the following covariance matrix (in simplified form) for the 4 bands: Cov = [0.0225 0.0180 0.0270 0.0090 0.0180 0.0324 0.0405 0.0135 0.0270 0.0405 0.0625 0.0200 0.0090 0.0135 0.0200 0.0100] Using **PCA**, determine: I. The **principal component** with the **highest variance** (you may approximate by observing diagonal values). II. Suggest which band contributes the most to that component based on covariance values.			
ii)	Explain all Image Compression techniques and different image file formats.	10	CO2	U
iii)	Give applications of Remote Sensing in Earthquake Studies	10	CO4	U

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