	GIH 452: DIGITAL IMAGE PROCESSING	
Unit 1	**Introduction**: Digital images, Sources of errors; Image Pre-processing- Atmospheric, Geometric and Radiometric corrections, Noise removal, Resampling techniques. Image Enhancement Techniques. Contrast enhancement: Linear and Non-Linear Logarithmic contrast enhancement, Edge enhancement, Density slicing, Principal Component Analysis; IHS Transformation, Spatial filtering, Low and high frequency band ratioing and band combination.	06 hrs
Unit 2	**Image and Digital Images:** types of images and acquisition, simple image model, Sampling and reconstruction, uniform sampling and quantization.	06 hrs
Unit 3	**Digital Image Analysis:** Digital data, Image File formats, Image Rectification and Restoration.	06 hrs
Unit 4	**Image enhancement techniques:** Raw, Processed Images, Contrast Manipulation, Spatial feature Manipulation, Multi-Image Manipulation.	06 hrs
Unit 5	**Contrast Manipulation:** Grey Level Thresholding, Level Slicing, Contrast Stretching- Concept of Digital Number.	06 hrs
Unit 6	**Spatial feature Manipulation:** Convolution, Edge Enhancement, Concept and Use of Fourier Analysis in Digital Image Analysis.	06 hrs
Unit 7	**Multi-Image Manipulation:** Spectral Ratioing, Principle and Canonicle Components, Vegetation Components/Indices - Infrared Index, Simple Ratio, Perpendicular Vegetation Index (PVI), Moisture Stress Index (MSI), EVI, TVI, NDVI and NDWI.	06 hrs
Unit 8	**Digital Image Classification:** Classification scheme; Supervised classification, Training sites selection and statistical information extraction; Discriminant functions; Maximum Likelihood classifier, Euclidian distance, Mahalanobis distance; Unsupervised classification, classification accuracy assessment, Error Matrix.	06 hrs

References

1. Bracewell, R.O. (1978). The Fourier transform and its application 2nd edition Mc Grew-Hill NY
2. Duda, R.o. and Hart P.E. (1973). Pattern Classification and Scene analysis. Wiley
3. Fu, K.S. (1974). Syntactic Method in pattern recognition. Academic.
4. Drury, S. A. (1987). Image Interpretation in Geology, Allan & Unwin - Publ. Ltd, 23-67.
5. Kenneth R, Castle man, (1979). Digital Image Processing, Prentice Hall, 24-98.
6. Lillies and T.M. & Kiefer R.W. (1994). Remote Sensing and Image Interpretation, John Wiley & Sons, New York, 56-78.
7. R .A. (1995). Techniques for Image processing and classification in Remote Sensing, Academic Press. New York.
8. Siegel, B.S. and Gillespie, A.R. (1994). Remote Sensing and Image Interpretations, John Wiley and Sons, New York.
9. Remote Sensing and GIS, B Bhatta Oxford University press.