

Course title: Digital Image Processing and Information Extraction				
Course code: NRG 172	No. of credits: 4	L-T-P distribution: 20-8-56	Learning hours: 56	
Pre-requisite course code and title (if any): NRG 173 Principles of remote sensing				
Faculty: Dr Chander Kumar Singh	Department: Department of Natural Resources			
Course coordinator (s): Dr Chander Kumar Singh	Course instructor (s): Dr Chander Kumar Singh			
Contact details:				
Course type	Compulsory	Core	Elective	
Course offered in	Semester 1	Semester 2	Semester 3	Other
Course Description This course will introduce fundamental technologies for digital image, compression, analysis, and processing. Students will gain understanding of algorithm, analytical tools, and practical implementations of various digital image applications.				
Course objectives 1. Fundamental technologies for digital image, compression, analysis, and processing 2. Gain understanding of algorithm, analytical tools, and practical implementations of various digital image applications				
3. Course content				
SNo	Topic	L	T	P
1.	Introduction to Digital Image Processing & Information Extraction	2		4
2.	Digital Data Formats	2		4
3.	Image Rectification-I (Radiometric and Atmospheric Correction Techniques)	2	2	4
4.	Image Rectification-I (Geometric Correction Techniques)	2		4
5.	Image enhancement techniques-I (Linear and non-linear contrast stretching)	2	2	12
6.	Image enhancement techniques - II (Image filtering-Low pass, high pass, edge enhancement & detection filters)	2	2	12
7.	Image Transformation (spectral rationing, density slicing, Principal Component analysis etc.)	4		4
8.	Information Extraction-I (Unsupervised/Supervised and Hybrid classification techniques)	2	1	8
9.	Information Extraction-I (Accuracy Assessment and integration with GIS)	2	1	4
	Total	20	8	56
Evaluation criteria				

<ul style="list-style-type: none"> ▪ 2 minor tests: 10% each ▪ Practical: 40% ▪ Major exam: 40%
<p>Learning outcomes</p> <ol style="list-style-type: none"> 1. Gain knowledge and practical experience in digital image processing 2. Learn practical skills and analytical background for building digital image and its application
<p>Pedagogical approach</p>
<p>Materials</p> <p>Required text</p> <ol style="list-style-type: none"> 1. Rafael C.G. and Woods R.E.(1992) <i>Digital Image Processing</i>. 2. Umbaugh S.E (2005) <i>Computer Imaging: Digital Image Analysis and Processing</i>. 3. Wilhelm B. and Burge M.J. (2007) <i>Digital Image Processing: An Algorithmic Approach Using Java</i>, Springer. <p>Suggested readings</p> <ol style="list-style-type: none"> 1. Bart M.R. (2003) <i>Front-End Vision and Multi-Scale Image Analysis</i>. 2. Campbell J.B. (2002) <i>Introduction to Remote Sensing, 3rd ed., The Guilford Press</i>. 3. Damen M.C.J., Smith G.S. and Kerstappen (Ed) () <i>Remote Sensing for Resources Development and Environmental Management 3rd volume Set Netherlands: Balkema</i>. 4. George J. () <i>Fundamentals of Remote Sensing Universities Press India</i>. 5. John R.J. () <i>Introductory Digital Image Processing: Remote Sensing Perspective New Jersey, Prentice Hall</i>. 6. Lillesand T.M.; Kiefer R.W. and Chipman J.W. (2003) <i>Remote Sensing and Image Interpretation, 5th ed., Wiley</i>. 7. Nag P. and Kudrat M. () <i>Digital Remote sensing New Delhi: Concept Publishing</i>. 8. William K.P. (1978) <i>Digital Image Processing</i>. <p>Case studies</p> <p>Websites</p> <p>Journals</p> <ol style="list-style-type: none"> 1. Asian Journal of Geoinformatics 2. Geocarto International 3. International Journal of Geoinformatics 4. International Journal of Remote Sensing 5. ISPRS Journal of Photogrammetry and Remote Sensing 6. Journal of Indian Society of Remote Sensing 7. Remote Sensing of Environment
<p>Additional information (if any)</p> <p>Magazines</p> <ol style="list-style-type: none"> 1. Coordinates 2. GIM International 3. GIS World 4. GIS@development

5. Goespatial today

6. GPS World

Student responsibilities

Attendance, feedback, discipline, guest faculty etc