

## Syllabus GEPL 4500/5500 Digital Image Analysis

**Class:** M W 4-5:40 pm

**Office hours:** M 3-4, W 3-4 pm

**Place:** 4440 M or GEPL computer lab, 4380 W, University Hall

**James Coss Office:** 5300 University Hall

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Course web site: [www.remotesensing.utoledo.edu/edu/DIclass.html](http://www.remotesensing.utoledo.edu/edu/DIclass.html)

Other web sites of interest:

OhioLINK Landsat 7: <http://dmc.ohiolink.edu/GEO/LS7>

OhioView: <http://www.ohioview.org>

UTView: <http://www.remotesensing.edu>

**Objective:** There are three main objectives for this class. The first is to expose students to the procedures involved in digital remote sensing. The second is to provide students some very basic experience in the handling/processing of digital remotely sensed data. You will not learn everything about image processing, however, experience, practice, technical understanding and artistry all contribute to being a good image processor/analyst. What I hope you will learn over this semester is an introduction to critical components of image processing/handling, so that you can overcome the obstacles to remote sensing and learn how to teach yourselves given the building blocks learned in the class. Finally, I want you to walk away from class with an understanding of why remote sensing is a valuable tool for studying the earth.

**Required text:** Introductory Digital Image Processing: A Remote Sensing Perspective, 2nd Edition. By J.R. Jensen.

**Grades:** Class grades will be based on lab exercises, the term project paper and the final poster presentation:

Computer labs/Project Updates:	50% of grade
Webpage	25% of grade
Poster Presentation	25% of grade

**Students with Disabilities:** Students with disabilities should talk to me so that appropriate arrangements can be made.

### Possible Labs:

1. Using Excel to Understand Digital Imagery
2. ArcView Image Analyst and NDVI mapping
3. Using Mulispec to prep an image
4. Classification Envi/Imagine
5. Regression IDL or ENVI
6. Hyperspectral Data Processing

<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Homework</b>
1/10 and 1/12	M...Introduction and talk about term project W... Digital Imagery Pros and Cons/Intro	Ch. 1	
1/17 and 1/19	M...No Class (Martin Luther King Day W... Image Statistics	Ch. 2, 24-60	W...Gather 5 web sites that have satellite data
1/24 1/26	M... Collection of Remotely Sensed Data W.. Digital Image Pre-Processing:	Ch. 4 Ch. 6	Lab 1
1/31	M... Radiometric and Geometric Corrections W.. Atmospheric correction		
2/7	M... W.. Channel calibration, NDVI and AV IA	Ch. 7	Lab 2
2/14	M... Project update #1 W..		Project update 1
2/21	M... Classification Conceptual Foundations W.. Classification: Supervised and Unsupervised	Ch.8,p.197-230 Ch.8, p.231-252	
2/28	M... W..		
3/7	M... <b>Spring Break 3/7 and 3/9</b>		
3/14	M... Project update #2 W..		Project update 2 Lab 3
3/21	M..Spatial Statistics, classification evaluation W..		
3/28	M.. W..		Lab 4
4/4	M... W.. Digital Change Detection	Chapter 9	
4/11	M... W.. Project update #3		Lab 5 Project Update 3
4/18	M... W.. Integration into a GIS		
4/25	M... Future Sensors and Digital Image Processing Issues W.. Last day of classes		
5/5	<b>Poster Presentation, May 5, 2:45 – 4:45 pm</b>		

### **Supplemental Reading (Texts)**

- Avery, T.E. and Berlin, G.L., 1992. Fundamentals of remote sensing and air photo interpretation, 5th Edition. Macmillan Publishing Co., NY.
- Baxes, Digital Image Processing, 1994, Wiley, New York, 452 pp.
- Campbell, J. B., 1996. Introduction to Remote Sensing, 2nd Edition. The Guilford Press, New York. 622 pp.
- Gupta, R.P., 1991. Remote Sensing in Geology. Springer-Verlag, NY.
- Hord, M.R., 1982. Digital Image Processing of Remotely Sensed Data. Academic Press, NY. 256 pp.
- Jensen, J.R., 1996. Introductory Digital Image Processing A Remote Sensing Perspective, 2nd Edition. Prentice Hall, Upper Saddle River, NJ. 316 pp.
- Lillesand, T.M., and Kiefer, R.W., 1994. Remote Sensing and Image Interpretation, 3rd Edition. John Wiley and Sons, Inc.
- Mather, P.M., 1987. Computer Processing of Remotely Sensed Images: An Introduction. John Wiley and Sons, NY. (Really helpful for enhancements-contrast)
- Quattrochi, D.A., and Goodchild, M.F., Editors. 1997. Scale in Remote Sensing and GIS. CRC Lewis Publishers, Boca Raton. 406 pp.
- Richards, J.A., 1986. Remote Sensing Digital Image Analysis: An Introduction. Springer Verlag, NY, 281 pp.
- Sabins, F.F., 1997. Remote Sensing. Principles and Interpretation, 3rd Edition. W.H. Freeman and Company, NY, 494 pp.
- Schowengerdt, R.A., 1983. Techniques for Image Processing and Classification in Image Processing. Academic Press, NY. 249 pp.
- Thomas, I.L., Benning, V.M., Ching, N.P., 1987. Classification of Remotely Sensed Images. Adam Hilger, Bristol. 268 pp.
- Townshend, J.R.G., Editor. 1981. Terrain analysis and remote sensing. George Allen and Unwin, Boston. 232 pp.
- Vincent, Fundamentals of Geological and Environmental Remote Sensing, 1997, Prentice Hall, New Jersey, 366 pp.