



## Syllabus

Instructor: Leonhard Blesius  
 Office: 283 HSS Dept. of Geography  
 Phone: 415-405-2144  
 Email: lblesius@sfsu.edu

### Course objective:

In its most basic definition, remote sensing means obtaining information about objects without physical contact. Environmental remote sensing is the art and science of analyzing remotely sensed images. This course will concentrate on digital image processing of optical, or passive, satellites. The outline follows a typical analysis path: from displaying an image for initial evaluation, applying radiometric and geometric corrections, to feature extraction using image transformations and image classification. Exercises in ERDAS Imagine are designed to reinforce the topic currently covered in the lecture.

Upon completion of the course, students should be able to understand the fundamental principles of remote sensing theory and become sufficiently proficient in using ERDAS Imagine in order to independently analyze digital satellite images or scanned aerial photographs.

### Course outline:

Day	Time	Topic	Activities
<b>Fr</b>	8:30 - 9:00	Introduction	Demonstration
	9:00 - 10:30	Fundamental physics of remote sensing Image display.	Lecture
	10:30 - 12:00	Image Display	<b>Exercise 1</b>
	12:00 - 1:00		Lunch
	1:00 – 2:00	Satellite remote sensing systems	Lecture
	2:00 – 4:30	Image Display Image corrections	<b>Exercise 1</b> Lecture
	4:30 – 5:30	Image corrections	<b>Exercise 2</b>
<b>Sat</b>	8:30 – 9:30	Indices and filters	Lecture
	9:30 – 11:00	Indices and filters	<b>Exercise 3</b>
	11:00 – 12:00	Classification	Lecture
	12:00 – 1:00		Lunch
	1:00 – 2:30	Unsupervised classification	<b>Exercise 4</b>
	2:30 – 4:30	Supervised classification	<b>Exercise 5</b>
	4:30 – 5:30	Accuracy assessment	Lecture & <b>Exercise 6</b>

### Recommended book:

[ITC. \(eds.\) 2009: Principles of remote sensing: an introductory textbook](http://www.itc.nl/library/papers_2009/general/PrinciplesRemoteSensing.pdf)  
[http://www.itc.nl/library/papers\\_2009/general/PrinciplesRemoteSensing.pdf](http://www.itc.nl/library/papers_2009/general/PrinciplesRemoteSensing.pdf)

**Additional literature:**Textbooks (general)

- Mather, P.M. & M. Koch (2011): Computer Processing of Remotely-Sensed Images. John Wiley and Sons. 4<sup>th</sup> ed.
- Chuvieco, E. & A. Huete (2010): Fundamentals of Satellite Remote Sensing. CRC Press, Boca Raton et al.
- Gao, J. (2009): Digital Analysis of Remotely Sensed Imagery. McGraw-Hill, New York et al.
- Lillesand, Kiefer, and Chapman (2008): Remote Sensing and Image Interpretation. John Wiley & Sons. 6<sup>th</sup> edition. Older version available in map library.
- Jensen, J.R. (2007): Remote Sensing of the Environment. Prentice Hall. 2<sup>nd</sup> edition.
- Schowengerdt, R.A. (2007): Models and Methods for Image Processing. Elsevier Academic Press, Amsterdam et al., 3<sup>rd</sup> edition.
- Richards, J. A. & X. Jia (2006): Remote Sensing Digital Image Analysis. Springer. 4<sup>th</sup> edition.
- Jensen (2005): Introductory Digital Image Processing. Pearson, Prentice Hall. 3<sup>rd</sup> ed.
- Paine, D.P. & J.D. Kiser (2003): Aerial photography and image interpretation. John Wiley & Sons. 2<sup>nd</sup> edition.
- Campbell, J.B. (2002) Introduction to Remote Sensing. Guilford Press. 3<sup>rd</sup> edition.
- Gibson, P.J. (2000): Introductory remote sensing: principles and concepts. Routledge.
- Barrett, E.C. & L.F. Curtis (1999): Introduction to environmental remote sensing. Stanley Thornes Pubs. 4<sup>th</sup> edition.
- Sabins, F.F. (1997): Remote sensing: principles and interpretation. W. H. Freeman. 3<sup>rd</sup> edition.

Textbooks (specialized)

- Rees, W.G. (2001): Physical Principles of Remote Sensing. Cambridge University Press. 2<sup>nd</sup> edition.
- Elachi, C. & J. van Zyl (2006): Introduction to the Physics and Techniques of Remote Sensing. Wiley Interscience. 2<sup>nd</sup> edition.
- Gupta, R.P. (2003): Remote sensing geology. Springer. 2<sup>nd</sup> edition.
- Vincent, R.K. (1997): Fundamentals of geological and environmental remote sensing. Prentice Hall.
- Congalton, R.G. (1999): Assessing the accuracy of remotely sensed data: principles and practices. Lewis Pubs.
- Foody G.M. & P.M. Atkinson (eds.) (2002): Uncertainty in remote sensing and GIS. Wiley.

Journals

- Annual Review of Earth and Planetary Science
- Canadian Remote Sensing Journal
- Computers and Geosciences
- Computers and Geotechnics
- Geoinformatica
- International Journal of Geographical Information Systems
- International Journal of Remote Sensing
- ISPRS Journal of Photogrammetry and Remote Sensing
- Physics and Chemistry of the Earth, Part C, Terrestrial and Planetary Science
- Photogrammetric Engineering & Remote Sensing
- Remote Sensing of Environment