

SATELLITE REMOTE SENSING – SIO 135/SIO 236

(<http://topex.ucsd.edu/rs>)

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4 Units

Lecture TuTh 12:30p - 1:50p, IGPP 4301

Lab Th 3:30p - 5:00p or F 12:30-3:30p, IGPP 1102

Office Hours: by appointment, send e-mail

Grades: undergrad HW/Labs (50%), Midterm (20%), Final (30%)

grad HW/Labs (50%), Midterm (20%), Final (1%), [Term Paper \(29%\)](#)

SYLLABUS

Date	Topic	Reading	Homework	Lecture
LAB 0	get matlab or octave running	installing Octave		
01APR	Introduction to course, labs, term papers Overview of remote sensing	Rees 1.1-1.4 Appendix		Sandwell
03APR	Platforms and orbits Use of color in RS	Rees 10.1-10.4 notes on orbits	HW1	Sandwell
LAB 1	Matlab basics, plotting			Tymofyeyeva
08APR	Electromagnetic radiation, polarization Ionosphere	Rees 2.1-2.2		Fricker
10APR	Fourier transform introduction	Rees 2.3 notes on fourier	HW2	Sandwell
LAB 2	1-D and 2-D Fourier transforms			Tymofyeyeva
15APR	Spectra and fourier transforms Diffraction	Rees. 2.3-2.7 notes on diffraction		Sandwell
17APR	Thermal radiation	Rees. 2.5-2.6 notes on radiation	HW3	Fricker
LAB 3	Data Types			Tymofyeyeva
22APR	Propagation, dispersion, and scattering	Rees 3.1-3.3 Ocean scattering web site		Fricker
24APR	Image processing	Rees 11.1-11.2 notes	HW4	Sandwell
LAB 4	Google Earth			Tymofyeyeva
29APR	Review and go over HW 1-4		Term Paper - Part 1 Due (grad students)	Fricker

01MAY	Midterm			Sandwell/Fricker
LAB 5	Image Processing			Tymofyeyeva
06MAY	Optics, stereo and electro-optical systems	Rees 5.1-5.3		Sandwell
08MAY	MODIS, image classification	Rees 11.3-11.4	HW5	Sandwell
LAB 6	Image Classification			Tymofyeyeva
13MAY	Passive microwave systems and applications	Rees 7.1-7.4 notes		Sandwell
15MAY	Scattering systems and remote sensing of the oceans	Rees 8.1 - 8.3	HW6	Gille
LAB 7	Laser and Radar Altimetry			Tymofyeyeva
20MAY	Radar and laser altimetry	Rees 9.1-9.3	Term Paper - Part 2 Due (grad students)	Fricker
22MAY	Synthetic Aperture Radar	Rees 9.4-9.5 SAR Summary SAR Image Interpretation	HW7 KMZ-helper	Sandwell
LAB 8	Radar Interferometry			Tymofyeyeva
27MAY	Remote sensing of the solid earth			Tymofyeyeva
29MAY	Remote sensing of the cryosphere		HW8	Fricker
03JUN	Grad. Student Presentations			
05JUN	Grad. Student Presentations			
JUN	Final Exam (will include questions from grad. student presentations)			Sandwell
13 JUN	All three components of grad. student term paper due		Term Paper - Part 3 Due (grad students)	

SIO 236 REQUIRED TEXT:

Rees, W. G. TITLE **Physical principles of remote sensing SECOND OR THIRD EDITION**, Cambridge University Press, 2013., 440 p., ISBN 978-0-521-18116-7 (Paperback)

WEB MATERIAL:

[Textbook web site](#)

[NASA Missions](#)

[NASA Science](#)

OTHER TEXT BOOKS:

Massom, R., D. Lubin, Polar Remote Sensing, V II: Ice Sheets, Springer Verlag, 426 pp., 2006.

[King, M. D., C. L. Parkinson, K. C. Partington, and R. G. Williams, TITLE Our Changing Planet: The View From Space, PUBLISHED Cambridge, UK, Cambridge University Press, 390 pp. ISBN 9780521828703. 2007.](#)

[Figures from Changing Planet: The View From Space.](#)

Elachi, Charles TITLE **Introduction to the physics and techniques of remote sensing** /Charles Elachi. PUBLISHED New York : Wiley, c1987. DESCRIPTION xvii, 413 p., [16] p. of plates : ill. (some col.) ; 26 cm. SERIES Wiley series in remote sensing. NOTE "A Wiley-Interscience publication." Includes bibliographies and index. ISBN 0471848107.

Stewart, Robert H. TITLE **Methods of satellite oceanography** / Robert H. Stewart. PUBLISHED Berkeley : University of California Press, c1985. DESCRIPTION viii, 360 p., [16] p. of plates : ill. (some col.) ; 27 cm. SERIES Scripps studies in earth and ocean sciences. 1. NOTE

Includes index. Bibliography: p. [329]-351. ISBN 0520042263. SUBJECT Astronautics in oceanography.

Gonzalez, Rafael C. TITLE **Digital Image processing using MATLAB** / Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins. Upper Saddle River, N. J. : Pearson Prentice Hall, c2004. UCB Engin TA1632 .G66 2004

Gonzalez, Rafael C. TITLE **Digital image processing** / Rafael C. Gonzalez, Richard C. Woods. PUBLISHED Reading, Mass. : Addison-Wesley, c1992. DESCRIPTION xvi, 716 p.. [8] p. of plates : ill. (some col.) ; 24 cm. NOTE Includes bibliographical references (p. 683-703) and index. ISBN 0201508036. SUBJECT Image processing --Digital techniques. AUTHOR Woods, Richard C.

Richards, J. A. (John Alan), 1945- TITLE **Remote sensing digital image analysis : an introduction** / John A. Richards. EDITION 2nd rev. and enlarged ed. PUBLISHED Berlin ; New York : Springer-Verlag, c1993. DESCRIPTION xx, 340 p. : ill. (some col.) ; 25 cm. NOTE Includes bibliographical references and index. ISBN 3540548408 (Berlin : acid-free paper) 0387548408 (New York : acid-free paper) SUBJECT Remote sensing.
