
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 \(29%\)](#)

Late HW/Labs: 20% reduction first day and 10% second + days. Very late is still worth up to 70%

Special MATLAB/OCTAVE Classes? Saturday sometime between 1 and 5 PM?.

SYLLABUS

| Date | Topic | Reading | Homework |
|-------|-------------------------------------|-----------------------------------|----------|
| LAB 0 | get matlab or octave running | installing Octave | |
| 31MAR | Introduction to course, labs, term | Rees 1.1-1.4 Appendix | |

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| | papers Overview of remote sensing | | |
| 02APR | Platforms and orbits Use of color in RS | Rees 10.1-10.4 notes on orbits | HW1 |
| LAB 1 | Matlab basics, plotting | | |
| 07APR | Electromagnetic radiation, polarization Ionosphere | Rees 2.1-2.2 | |
| 09APR | Fourier transform introduction | Rees 2.3 notes on fourier | HW2 |
| LAB 2 | 1-D and 2-D Fourier transforms | | |
| 14APR | Spectra and fourier transforms Diffraction | Rees. 2.3-2.7 notes on diffraction | |
| 16APR | Thermal radiation | Rees. 2.5-2.6 notes on radiation | HW3 |
| LAB 3 | Data Types | | |
| 21APR | Propagation, dispersion, and scattering | Rees 3.1-3.3 Ocean scattering web site | |
| 23APR | Image processing | Rees 11.1-11.2 notes | HW4 |
| LAB 4 | Google Earth | | |
| 28APR | Review and go over HW 1-4 | | Term Paper - Part 1 Due (grad students) |
| 30APR | Midterm | | |
| LAB 5 | Image Processing | | |

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| 05MAY | Optics, stereo and electro-optical systems | Rees 5.1-5.3 | |
| 07MAY | MODIS , image classification | Rees 11.3-11.4 | HW5 |
| LAB 6 | Image Classification | | |
| 12MAY | Scattering systems and remote sensing of the oceans | Rees 7.1-7.4 | |
| 14MAY | Passive microwave systems and applications | Rees 8.1 - 8.3 notes1 notes2 | HW6 |
| LAB 7 | Laser and Radar Altimetry | | |
| 19MAY | Radar and laser altimetry | Rees 9.1-9.3 | Term Paper - Part 2 Due (grad students) |
| 21MAY | Synthetic Aperture Radar | Rees 9.4-9.5 SAR Summary SAR Image Interpretation | HW7 KMZ-helper |
| LAB 8 | Radar Interferometry | | |
| 26MAY | Remote sensing of the solid earth | | |
| 28MAY | Remote sensing of the cryosphere | | |
| 02JUN | Grad. Student Presentations | | |
| 04JUN | Grad. Student | LAST DAY TO | |

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|--------|---|--------------------------------------|---|
| | Presentations | TURN IN ALL HOMEWORK AND LABS | |
| 08JUN | Final Exam (will include questions from grad. student presentations) 11:30 - 1:30 PM | | |
| 12 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.
