NOTE to prospective students: This syllabus is intended to provide students who are considering taking this course an idea of what they will be learning. A more detailed syllabus will be available on the course site for enrolled students and may be more current than this sample syllabus.

Oregon State University  
College of Earth, Oceanographic and Atmospheric Science  
Geo 444/544, Remote Sensing of the Environment  
4 Credits

Instructor: Dr. A. Jon Kimerling  
Contact info: kimerlia@geo.oregonstate.edu

OSU Catalog Course Description: Fundamentals of satellite remote sensing and image analysis. Topics include physical principles of remote sensing from the ultraviolet to the microwave, sensors and sensor technology, and environmental applications of remote sensing through image analysis. Lec/lab.

Recommended Prerequisite: OSU GEO 301 (Introduction to Map Interpretation), or equivalent course/work experience.

For more information, contact: MELINDA JENSEN, 104 WLKN, 541-737-1238

Additional Helpful Background: You should have basic skills in trigonometry and algebra. A basic understanding of physics can also be helpful. Some lab assignments will require use of Excel spreadsheets.

This course combines approximately 120 hours of instruction, online activities, and assignments for 4 credits.

Course Website: Canvas


NOTE: For textbook accuracy, please always check the textbook list at the OSU Bookstore website. Sample syllabi may not have the most up-to-date information.

Additional Supplies: Anaglyph stereo viewing glasses for Lab 8 (http://www.3dglassesdirect.com/3D_Glasses-Plastic_3D_Anaglyph_Glasses_Pro_View_3D_Glasses.html), or any glasses suitable for viewing images in 3D (there are accompanying 2-D images for Lab 8 if you cannot purchase the stereo viewing glasses).

This course is offered through Oregon State University Extended Campus. For more information, contact:  
Web: ecampus.oregonstate.edu  
Email: ecampus@oregonstate.edu  
Telephone: 800-667-1465
Canvas: This course will be delivered via Canvas, your online learning community, where you will interact with me. Within the course Canvas site you will access the learning materials and syllabus; submit assignments; take quizzes; email the instructor. To preview how an online course works, visit the Ecampus Course Demo. For technical assistance, Canvas and otherwise, see http://ecampus.oregonstate.edu/services/technical-help.htm.

- GETTING STARTED

COURSE SITE LOGIN INFORMATION
Information on how to login to your course site can be found HERE.

REFUND POLICY INFORMATION
Please see the Ecampus website for policy information on refunds and late fees.

Course Learning Outcomes: All students completing GEO 444 or GEO 544 should be able to:

(1) Describe the basic physics and principles of remote sensing
(2) Summarize the differences and basic workings of various sensors that are currently in utilized
(3) Perform image analysis (using image processing software) and understand basic image analysis techniques for environmental applications of remote sensing
(4) Assess the synergies and limitations of remote sensing for environmental analysis

Additionally, graduate students completing GEO 544 should be able to:
I. Formulate a research hypothesis related to remote sensing and image analysis
II. Design and perform an image analysis research project using satellite imagery
III. Analyze the imagery and draw a conclusion with respect to the hypothesis
IV. Communicate the research in a professional and effective manner

Graduate students: It is Oregon State University policy that when a graduate course is dual-listed with an undergraduate course (e.g., GEO 444/544), students taking the graduate course should receive additional education and training and must be held to higher standards of performance than students taking the undergraduate course.

In order to comply with this policy, graduate students taking GEO 544 will complete the term project individually. In addition, when grading and assigning points to student work (lab assignments, quizzes and exams), the instructor will hold graduate students to higher standards of originality, accuracy, completeness, justification, and presentation than undergraduate students.
The project is assessed in two parts. Part I is assessed as check, check-minus, check-plus and is mostly to assure that you are making good progress; Part II, the completed poster project, is assigned a grade for the whole. You will also write a short 2-page critique of another student’s poster.

Grading:

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<th>Labs</th>
<th>Quizzes</th>
<th>Project</th>
<th>Final Exam</th>
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<tbody>
<tr>
<td>Undergrads</td>
<td>40%</td>
<td>35%</td>
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<td>25%</td>
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<tr>
<td>Graduate Students</td>
<td>40%</td>
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Grading Scale: Grades are based on the percentage of maximum points accumulated and assigned according to the following table:

- A 92-100%
- A- 90-91%
- B+ 88-89%
- B 82-87%
- C+ 78-79%
- C 72-77%
- D+ 68-69%
- D 62-67%
- F <60%
- B- 80-81%
- C- 70-71%
- D- 60-61%

Reading Assignments: It is the responsibility of each student to complete the assigned reading for each week. The readings are directly related to lecture topics and lab work. Associated page numbers are supplied for your convenience.

Quizzes: All students are expected to take the weekly quizzes within the designated timeline (see schedule). If a student is unable to attend a quiz due to verifiable unforeseeable reasons (e.g. illness, accident, etc.), the instructor will, at their discretion, decide a make-up date for the quiz. Missing the make-up quiz will result in a score of zero for that quiz. Eight 15-minute quizzes are worth 10 points each and, in essence, make up a midterm. Doing well on the quizzes is essential to the course and are an excellent study tool for the final exam. Quizzes normally will cover the material covered in the previous week as shown on the Course Schedule. For example, Quiz 1, given in week 2, covers the material in Lectures 1 and 2 given in week 1 of the course.

Final Exam: Geo 444 only. Undergraduate students are expected to take the final exam within a 2-hour time period. The final exam will be comprehensive and will cover all of the material presented in the lectures. The exam will be placed in the Blackboard Assignments folder for the course on the designated date. Completed exams will be returned to the instructor via Canvas or as an email attachment. Late exams will not be accepted and will result in a score of zero.

Labs: Labs are designed to give students hands on experience viewing and manipulating remote sensing imagery. ENVI software is utilized for the majority of assignments and is probably new to most students.

It is essential that students begin working on their lab assignments early in the week as they can be time consuming, and getting to know ENVI can be a slow process.
Lab Assignments: Lab assignments are due on Tuesday of the following week by 11:59pm Pacific Standard Time (PST or PDT). Questions submitted to the instructor by 12pm (noon) on Mondays will be answered before the assignment due time. Questions submitted after noon on Monday are not guaranteed to be answered in a timely manner (i.e. before the lab is due).

Assignments are to be submitted electronically via Canvas. Efforts will be made to return them graded within one week after they are turned in. Late assignments are highly frowned upon as one week is plenty of time to complete each assignment. However, as life is often unpredictable, contact the instructor immediately if issues arise.

Graduate Student Projects: Graduate students have an additional requirement to complete a project on the subject of their choosing. The subject should relate to the use of remote sensing techniques to solve problems in their field of study. You should discuss your proposed project with me within the first two weeks of the course. The project will be graded in two parts.

Part I: You will need to provide me with a digital version of your single-spaced, 2-page write-up that includes your problem statement and hypothesis, a description of the study site (with a map or a labeled image), a description of the remote sensing dataset(s), and an example of the data (showing me that you have downloaded the data and have worked with it). There will be a template available on the course website.

Part II: The final portion of the project will be a poster presentation. In your poster, you will need to include an overview of the project (problem statement or hypothesis, significance and motivation, specific objectives, methodology, data sources, study area including a map), analysis of the results, discussion of their meaning, careful and clear presentation of figures, and discussion of sources of errors.

Part III: You will also write a 2-page critique of another student’s paper of your choice. Critique guidelines will be posted on Canvas in the Assignments section.

Students with Disabilities: Students with accommodations approved through Disability Access Services (DAS) are responsible for contacting the instructor prior to or during the first week of the term to discuss accommodations. This information is private and will not be shared or communicated to anyone else. Accommodations are collaborative efforts between students; faculty and DAS. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

Special Notes: If you have a conflict between religious observances and class lectures or labs please let me know in advance so these can be made up.

Incompletes: Incomplete (I) grades are assigned only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student
has turned in 75% of the points possible. If you are having any difficulty that might prevent you completing the coursework, please don’t wait until the end of the term; let me know right away.

**Expectations for Student Conduct:** Student conduct is governed by the university’s policies, as explained in the [Office of Student Conduct: information and regulations](http://oregonstate.edu/admin/stucon/achon.htm). Please review the OSU policies on classroom conduct and academic honesty at [http://oregonstate.edu/admin/stucon/achon.htm](http://oregonstate.edu/admin/stucon/achon.htm).