Course Description: Introduction to the theory, methods, and application of hard and softcopy image analysis using the eye-brain system. Topics will include visual interpretation and measurement from remotely sensed imagery for landscape characterization, mapping, spatial data development, aerial imagery feature recognition, and image scale determination. Techniques for visual enhancement and evaluation with image processing systems and digital data integration will be addressed. Various airborne and space borne imaging platforms and product characteristics will be examined. Prerequisite: Geog 380, and recommend prior experience with GIS applications.

Class Participation: Classes will consist of lecture, student presentations, and lab exercises. Reading should be completed by the class date listed and students are expected be prepared for participation in discussions. Students are required to have a PSU Odin account to access course materials and assignments provided via the D2L system (d2l.pdx.edu) and to access and use the CH 469 computer lab.

Lab Exercises: The exercises listed in the course schedule are approximations—there may be additions and deletions. Exercises will consist of photo interpretation and visual image analysis scenarios in both manual and digital environments. Prior experience with ESRI ArcGIS, Erdas Imagine, and graphics manipulation software will be beneficial.

Note: Some lab exercises may require additional time outside of class to complete. To gain access to the CH 469 lab outside of class, you must do the following:
1) get an Access Badge (or “Student Proximity Card”) at the ID Services window in the Neuberger Hall Lobby (cost approximately $15). Note that this is different from the PSU “OneCard”;
2) in the first week of the term, provide Karin Waller in the Geography department office (CH424) your 5-digit badge number and your PSU ID#.
I will attempt to gather the needed information on the first day of class to provide each of you access to the lab, but ultimately it is your responsibility to obtain access.

Case Study Presentations (graduate students only): All graduate students are required to select from a list of “visual image analysis” topics provided by the instructor and give a 15-20 minute presentation to the class describing one or more real-world applications related to the topic. There will be one presentation each week, so students will work together in groups. Groups are expected to meet with me and discuss their presentations beforehand. The list of topics will be available on the first day of class. The deadline to sign-up is Tuesday, October 2nd.

Quizzes: Eight weekly quizzes will be given throughout the quarter, starting the first week. They will not be given in class but will be available on D2L on Friday morning and due before class on the following Tuesday. Quizzes will be a combination of true/false and multiple choice questions. They will draw from the readings, in-class lecture, and labs.

Class Project/Poster Session: All students will be required to select a class project demonstrating some aspect of aerial image interpretation. Graduate students can work individually or in pairs; undergraduates will work in groups of 2-4 depending on registration. The project will consist of, at a minimum, 1) acquiring imagery, 2) enhancing, transforming, and/or interpreting the imagery, and 3) presenting the results in a poster format to be shared with the class on the final class meeting at 5:30 PM on Tuesday, November 27th. Class project proposals are due on Tuesday October 30th in class. More information about the project, the poster requirements, and poster printing will be distributed in the second week of the quarter.

Grading: Grades will be determined as follows:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Undergraduates</th>
<th>Graduate students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Presentation</td>
<td>--</td>
<td>10%</td>
</tr>
<tr>
<td>Lab Exercises</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>Class Project</td>
<td>20%</td>
<td>30%</td>
</tr>
</tbody>
</table>
The following is a tentative course schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics/Housekeeping</th>
<th>Reading</th>
<th>Exercise</th>
</tr>
</thead>
</table>
| 1: September 25 | • Course Intro  
• Eye-Brain System  
• Electromagnetic Radiation and Spectrum  
• Remote Sensing Process  
Grad Student Sign-up for Case Study Presentations  
Quiz #1 available 9/28 | Ch 1 | 1: Elements of Image Interpretation Due 10/2 |
| 2: October 2 | • Aerial Photography Systems  
• Flight Planning  
Quiz #1 due by 5:30pm | Ch 2, 181-188 | 2a: Stereo Photo Viewing Due in class  
2b: Visual Imagery Interpretation Due 10/9 |
| 3: October 9 | • Photogrammetry  
• Basic Image Enhancement  
Grad Student Case Study Presentation 1  
Quiz #2 due by 5:30pm | Ch 3 | 3: Air Photo Scale Calculation and Measurement Due 10/16 |
| 4: October 16 | • Visual Image Analysis – Elements and Strategies  
• Visual Image Analysis Equipment  
Grad Student Case Study Presentation 2  
Quiz #3 due by 5:30pm | Ch 4, 189-212 | 4: Georeferencing Scanned Hardcopy Aerial Photos Due 10/30 |
| 5: October 23 | Set-aside time for Lab Exercises, Project Proposals, and Questions  
Quiz #4 due by 5:30pm | Ch 4, 212-324 | |
| 6: October 30 | • Visual Image Interpretation  
• Landuse/Landcover Typologies and Keys  
• Satellites in the Optical Spectrum  
Class Project/Poster Proposals Due  
Grad Student Case Study Presentation 3  
Quiz #5 available 11/2 | Ch 6 | 5: Rectifying Georeferenced Aerial Imagery Due 11/6 |
| 7: November 6 | • Multispectral Imaging  
• Thermal Infrared Imaging  
• Hyperspectral Imaging  
Grad Student Case Study Presentation 4  
Quiz #5 due by 5:30pm | Ch 5 | 6: Integrating Aerial Imagery into a GIS for Interpretation, Delineation, and Measurement Due 11/20 |
| 8: November 13 | • Digital Image Processing  
• Classification and Accuracy Assessment  
• Data Merging and GIS Integration  
Grad Student Case Study Presentation 5  
Quiz #6 due by 5:30pm | Ch 7, 482-549 and 585-609 | |
| 9: November 20 | • Microwave Imaging: Radar and Lidar  
• Non-airborne sensors  
Set-aside time for finishing up Student Posters  
Quiz #7 due by 5:30pm | Ch 8 | |
| 10: November 27 | Student Final Poster Presentation Session  
Quiz #8 due by 5:30pm | | |
| 11: December 6 | SCHEDULED FINAL EXAM DAY | | |

**STUDENT RESPONSIBILITIES:** Students are expected to attend all class meetings and complete all assignments. Students are expected to complete all weekly readings and to participate in class discussions and lab activities. There is no separately-scheduled lab time for this course; we will conduct lab exercises during the normal class meeting time. Students will be expected to present their projects and case studies using MS PowerPoint. Students who have a learning disability that may affect their performance should contact the Disability Resource Center, Suite 435 Smith Memorial Student Union, and meet with me as soon as possible so that accommodations can be made. There is no extra credit offered in this course. Late assignments will be penalized 10% if turned in within one week of the due date and will not be accepted after that.