Course Name: Forest Photogrammetry and Introduction into Remote Sensing  
Course Number: FOR 520  
Credits: 3  
Instructor name: Thomas Hilker  
Link to instructor bio or website: remotesensing.forestry.oregonstate.edu

This course is intended to provide students interested in the management and conservation of natural resources with the fundamentals of spatial processing using Matlab, a higher level programming language. The course will provide hands on experience with airborne Laserscanning (LiDAR), and satellite observations from MODIS and Landsat. It will also discuss measurement principles, data acquisition and data formats.

Course Format:  
One 3-hour lecture/lab

Suggested Online material:

There is a number of good Matlab tutorials for self-learning repetition under http://www.mathworks.com/academia/student_center/tutorials/launchpad.html

Materials:

Provided:
Matlab (teaching license pre-installed).
Full matlab licenses
Online material

Course Objectives:

Some basic understanding of computer programming is recommended but not required. The objective of this course is to provide an introduction into analysis of spatial and other data using Matlab. The course will provide a general introduction to Matlab as an example of a higher level programming language, but will also provide students with the opportunity to apply the acquired skills to start solving their own data analysis problems and research questions. The course will provide a practical introduction and is designed as a hands-on learning experience

Upon completion of the course program students should have a good understanding of the following:

- Be able to handle the Matlab work environment, and discuss benefits and limitations of using tools like Matlab
- Be able to access resources for help functions available
- Be comfortable debugging functions and scripts
• Be able to break a scientific problem down into programmable steps, i.e. structure a research question in a way that it can be dealt with using programming

• Be able to work with:
  o Variables/matrices/arrays and array indexing
  o 2 and 3D plots
  o For/while loops and if-then-else statements.
  o Strings and characters
  o Handling files in Matlab and data i/o
  o Functions.
  o Debugging
  o Error handling

Measurable Learning outcomes
• Students completing this course will be able to conceptualize scientific problems and break them into programmable steps (flow chart)
• Students completing this course will be able to import and export different data formats and files into Matlab and be comfortable with handling matrices
• Students completing this course will be able to load remotely sensed images or different formats, and perform simple image processing steps (spectral indices, masking, area of interest etc)
• Students completing this course will be able to handle point and raster data and co-locate these observations.

Course Policies

1. Assignments are due by 5:00 p.m. on the date assigned unless specifically stated as otherwise or previously arranged.

2. To receive credit, assignments must be turned in on time. Grades for late assignments will be reduced by 20% for each day late.

3. All work must be neat, legible, and complete. All steps should be shown. Repetitive calculations may be illustrated by sample calculations and a summary table. Use words to explain the computations where necessary. All assumptions should be stated and justified. Use sketches where required. Incomplete, undocumented work is unacceptable.

4. When work is completed as a group, each page of calculations should indicate who completed them and who checked them.

5. All figures, drawings, and tables should be titled.

6. Work which does not conform to the above requirements and the designated format may not be graded.

7. There will be no make-up exams or quizzes unless previously arranged.

8. Any requests for deviations in the course policies, schedule, or deadlines must be made in writing to the instructor (by email or otherwise).
Technical Assistance
If you experience computer difficulties, need help downloading a browser or plug-in, assistance
logging into the course, or if you experience any errors or problems while in your online course,
contact the OSU Help Desk for assistance. You can call (541) 737-3474, email
osuhelpdesk@oregonstate.edu or visit the OSU Computer Helpdesk online.

Grades:
Final grades for the course will be based on performance in the following areas: Note that the total points and assignments may be modified as the course progresses.

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<thead>
<tr>
<th>Item</th>
<th>Total Points</th>
<th>% of Total</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Final assignment</td>
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<td>Totals</td>
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<table>
<thead>
<tr>
<th>Grade</th>
<th>%</th>
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<tr>
<td>A</td>
<td>≥ 92.5</td>
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<td>A-</td>
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<td>B+</td>
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<td>D+</td>
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<td>62.5-67.5</td>
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<td>60-62.5</td>
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<td>F</td>
<td>&lt;60</td>
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Statement Regarding Students with Disabilities "Accommodations are collaborative efforts
between students, faculty and Disability Access Services (DAS). Students with accommodations
approved through DAS are responsible for contacting the faculty member in charge of the course
prior to or during the first week of the term to discuss accommodations. Students who believe they
are eligible for accommodations but who have not yet obtained approval through DAS should contact
DAS immediately at 737-4098."

Link to Statement of Expectations for Student Conduct, i.e., cheating policies
http://oregonstate.edu/studentconduct/code/index.php#acdis
# FOR 520 Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture:</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>• Course introduction</td>
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<td></td>
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<td>• The Matlab user interface</td>
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<td>• Resources and help</td>
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<td>• Project discussions</td>
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<td>2</td>
<td></td>
<td>• File input/output</td>
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<td>• point data</td>
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<td>• Raster data</td>
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<td>• CSV files</td>
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<td>• Point clouds</td>
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<td>• Data visualization and data plotting</td>
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<tr>
<td>3</td>
<td></td>
<td>• Processing LiDAR data in Matlab</td>
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<td></td>
<td></td>
<td>• Introduction into LiDAR</td>
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<td>• Using Matlab to process LiDAR</td>
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<td>• Reading LAS files</td>
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<td>• Relating point data to raster files</td>
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<td>4</td>
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<td>• Rasterizing LiDAR point data</td>
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<td>• Generating Height Models: DEM, CSM</td>
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<td>5</td>
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<td>• Comparing field data with raster data</td>
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<td>6</td>
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<td>• Processing MODIS data in Matlab:</td>
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<td></td>
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<td>• Intro into MODIS</td>
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<td>• Obtaining Modis images</td>
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<td>• Loading MODIS images</td>
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<td>• Quality flags</td>
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<td>• Simple processing of raster data</td>
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<td>• Standard MODIS product</td>
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<td>7</td>
<td></td>
<td>• Time series analysis using Modis</td>
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<td>• Image stacking</td>
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<td>• Trends in vegetation indices</td>
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Week 8

Lecture:
• Processing Landsat data
• Intro into Landsat
• Obtaining Landsat data
• Loading data
• Spatial orientation
• Image stacking

Week 9

Lecture:
• Processing point data of different spatial orientations
• Coordinate transformations/spatial reference systems

Week 10

Student presentations

Discussion Participation
Students are expected to participate in all graded discussions. While there is great flexibility in online courses, this is not a self-paced course. You will need to participate in our discussions on at least two different days each week, with your first post due no later than Wednesday evening, and your second and third posts due by the end of each week.

Makeup Exams
Makeup exams will be given only for missed exams excused in advance by the instructor. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances.

Exam Time Limits
Exams in this class are timed; if you exceed the time limit on an exam, you will be assessed a penalty of 10% for every five minute interval beyond the time limit.

Incompletes
Incomplete (I) grades will be granted 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 80% of the points possible (in other words, usually everything but the final paper). 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.

Guidelines for a Productive and Effective Online Classroom
Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university’s regulations regarding civility.

Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.
Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

**Statement Regarding Students with Disabilities**

Accommodations are collaborative efforts between students, faculty, and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. 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.

**Accessibility of Course Materials**

All materials used in this course are accessible [with the exception of two videos]. If you require accommodations please contact Disability Access Services (DAS).

Additionally, Canvas, the learning management system through which this course is offered, provides a vendor statement certifying how the platform is accessible to students with disabilities.

**Expectations for Student Conduct**

Student conduct is governed by the university's policies, as explained in the Office of Student Conduct and Community Standards.

**Academic Integrity**

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Avoiding Academic Dishonesty, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.

b) It includes:

   (i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or
collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) TAMPERING - altering or interfering with evaluation instruments or documents.

(v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Conduct in this Online Classroom
Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Tutoring
NetTutor is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing lab where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Canvas class by clicking on the NetTutor button in your course menu.

OSU Student Evaluation of Teaching
Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the 19 multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and you will be sent instructions via ONID by the Office of Academic Programs, Assessment, and Accreditation. You will log in to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.