FNR 357: Fundamental Remote Sensing  
Fall of 2015

**Instructor:** Guofan Shao, Office: PFEN 221B, Phone: 43630, E-mail: shao@purdue.edu

**Learning Goals:**

- Understanding principles and methods of remote sensing technology.
- Gaining new knowledge about digital processing and analyses of remotely sensed data.
- Practicing the uses of relevant computer software to correctly handle aerial photographs and satellite imagery.
- Applying remote sensing knowledge and problem-solving skills in agriculture, forestry, natural resources, and urban area.

**Reference Books:**


**Internet Materials:**


**Lectures:** Two lecture meetings per week:
Monday & Wednesday 12:30 pm – 1:20 pm, PFEN 203

**Labs:** One lab per week:
Tuesday 2:30pm – 5:20pm, PFEN 202
One student per computer for every lab but discussion is allowed among students.

**Under Campus Emergency:**
In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor’s control. Contact instructor to get information about changes in this course.

**Projects:** There are three projects, which are the most important parts of the class. Projects need to be performed without instructor’s step-by-step guidance. It is
encouraged for students to finish projects independently by individual
students or by two students the maximum. Lecture and lab hours will be
assigned for projects but additional time may be needed on the projects.

**Office Hours:** Students may stop by instructors’ offices any time, and instructors will see
students as long as he is neither with someone nor rushing to finish something.
Students are encouraged to send an email for any questions.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>75+75 = 150</td>
</tr>
<tr>
<td>Quizzes with irregular time intervals</td>
<td>20x5 = 100</td>
</tr>
<tr>
<td>Projects</td>
<td>75+50+100 = 225</td>
</tr>
<tr>
<td>Labs</td>
<td>10x8 = 80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>555 points</strong></td>
</tr>
</tbody>
</table>

**Grading Rules:**

1. 10 points deduction for a class absence without a reason*
2. 10 points deduction for a lab absence without a reason*
3. 10 points deduction for not turning in a homework on time
4. 100% deduction for not finishing a class project on time
5. 100% deduction for not taking a quiz or exam without a reason*
   * including reasons beyond student’s control (e.g., illness, family
   emergency, bereavement, etc.).

**Grading Scale:** Total number of points for each student will be converted into a 100 scale.
Grade will be given according to this table:

<table>
<thead>
<tr>
<th>Grade</th>
<th>GPA Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+,A</td>
<td>4.0</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>3.7</td>
<td>90.0 - 92.9</td>
</tr>
<tr>
<td>B+</td>
<td>3.3</td>
<td>87.0 - 89.9</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>83.0 - 86.9</td>
</tr>
<tr>
<td>B-</td>
<td>2.7</td>
<td>80.0 - 82.9</td>
</tr>
<tr>
<td>C+</td>
<td>2.3</td>
<td>77.0 - 79.9</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>73.0 – 76.9</td>
</tr>
<tr>
<td>C-</td>
<td>1.7</td>
<td>70.0 – 72.9</td>
</tr>
<tr>
<td>D+</td>
<td>1.3</td>
<td>67.0 – 69.9</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>63.0 – 66.9</td>
</tr>
<tr>
<td>D-</td>
<td>0.7</td>
<td>60.0 – 62.9</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>&lt; 60.0</td>
</tr>
</tbody>
</table>

**Outline:**

Week 1 (08/24 – 08/28)
Introduction to Remote Sensing and Aerial Photography
Lab – Getting to know remote sensing facilities
   Google 1-2 remote sensing image(s) showing an interesting point of remote
   sensing applications.
Week 2 (08/31 – 09/04)
Watch Film (Mon), Cameras, Films, Filters, and Photographs (Wed)
Lab – Getting to Know and Use Aerial Photographs
Create a stereograph of anything

Week 3 (09/07 – 09/11) (Labor Day: 09/07)
Electromagnetic Radiation (EMR) and Its Atmosphere and Ground Interactions
Lab – Display and Compare Satellite Remote Sensing Data

Week 4 (09/14 – 09/18)
Scale and Resolution
Lab – Start Project 1 (75 points)

Week 5 (09/21 – 09/25)
Color Formation, Displacement, and Acquisition of Aerial Photographs
Lab – Handling Digital Remote Sensing Data and NDVI comparisons

Week 6 (09/28 – 10/02)
Class review (Mon) and Exam 1 (Wed) (75 points)
Lab – Finish up Project 1 in the 1st hour and Present PPTs thereafter

Week 7 (10/05 – 10/09)
Start Project 2 (50 points) (no class meetings)
Lab – Continue Working on Project 2 (no regular lab)

Week 8 (10/12 – 10/16) (October Break: 10/12 – 13)
Continue Working on Project 2 (no class meeting on Wed)
No Lab

Week 9 (10/19 – 10/23)
Image Statistics and Image Enhancement
Lab – Finish up Project 2 in the 1st hour and Present PPTs thereafter

Week 10 (10/26 – 10/30)
Digital Classification and Accuracy Assessment
Lab – Examination of NLCD data and TM Data Classification

Week 11 (11/02 – 11/06)
Class Review and Exam 2 (75 points) (Wed)
Lab – Accuracy Assessment

Week 12 (11/09 – 11/13)
Change Detection and Geometric Correction
Lab – Change Detection

Week 13 (11/16 – 11/20)
Band Transformation and Vegetation Remote Sensing
Lab – Starting Final Project (100 points)

  Working on Project 3 (Mon)
  Lab – Working on Project 3

Week 15 (11/30 – 12/04)
  Environmental Remote Sensing (Mon), Working on Final Project (Wed)
  Lab – Work on Final Project

Week 16 (12/07 – 12/11)
  Drone Remote Sensing (Mon), Working on Final Project (Wed)
  Lab – Class Project Presentations (100 points)

Week 17 (12/14 – 12/18)
  No Final Exam