FNR 35700: Fundamental Remote Sensing
Fall of 2016

Instructor: Guofan Shao, Professor of Geo-eco-informatics
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Learning Goals:

♦ Understanding remote sensing fundamentals and gaining knowledge about the uses of remotely sensed data.
♦ Exercising relevant computer software for handling aerial photographs and satellite imagery.
♦ Applying remote sensing skills in problem solving associated with agriculture, forestry, natural resources, and urban area.

Teaching Strategies:

♦ Providing an easy-learning environment: post lecture slides one before each class; provide step-by-step instructions for each lab exercise; group students to work together on class projects; grade quizzes through open class discussion.
♦ Promoting students’ abilities of remote sensing applications: assign one computer per student for independent lab exercises; use remote sensing data from the local area in class projects; share homework answers and project reports among students.
♦ Emphasizing learning by doing: the three projects are the most important parts of the class, and are performed independently by individual students or by two students the maximum. Extra hours will be assigned for projects. Homework assignments contain problem-solving exercises.

Reference Books:


Internet Materials:

♦ The American Museum of Natural History's Biodiversity Informatics Facility: http://www.amnh.org/our-research/center-for-biodiversity-conservation/biodiversity-informatics
**Lectures:** Two lecture meetings per week:
Monday & Wednesday 12:30 pm – 1:20 pm, PFEN 203

**Labs:** One lab per week:
Tuesday 2:30 pm – 5:20 pm, 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.

**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:**
- Exams: $75+75 = 150$ points
- Quizzes with irregular time intervals: $20 \times 5 = 100$ points
- Projects: $75+50+100 = 225$ points
- Labs: $10 \times 8 = 80$ points
- **Total**: $555$ points

**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:

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<th>GPA Value</th>
<th>Range</th>
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Outline:

Week 1 (08/22 – 08/26)
- 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 (08/29 – 09/02)
- Watch Film (Mon), Cameras, Films, Filters, and Photographs (Wed)
  Lab – Getting to know and use aerial photographs
  Create a stereograph of anything

Week 3 (09/05 – 09/09) (Labor Day: 09/05)
- Electromagnetic Radiation (EMR) and Its Atmospheric Interactions
  Lab – Display and compare satellite remote sensing data

Week 4 (09/12 – 09/16)
- EMR Ground Interactions, Scale and Resolution
  Lab – Handling digital remote sensing data and NDVI comparisons

Week 5 (09/19 – 09/23)
- Class review (Mon) and Exam 1 (Wed) (75 points)
  Lab – Start Project 1 (75 points)

Week 6 (09/26 – 09/30)
- Working on Project 1 (no class meetings)
  Lab – Working on Project 1 (no regular lab)

Week 7 (10/03 – 10/07)
- Color Formation, Displacement, and Acquisition of Aerial Photographs
  Lab – Project 1 presentations, Start Project 2 (50 points)

Week 8 (10/10 – 10/14) (October Break: 10/10 – 11)
- Working on Project 2 (no class meeting on Wed)
  No Lab

Week 9 (10/17 – 10/21)
- Image Statistics and Image Enhancement, Project 2 presentations (Wed)
  Lab – Image statistics and image enhancement

Week 10 (10/24 – 10/28)
- Digital Classification and Accuracy Assessment
  Lab – Examination of NLCD data and imagery data classification
Week 11 (10/31 – 11/04)
  Class Review and Exam 2 (75 points) (Wed)
  Lab – Accuracy assessment

Week 12 (11/07 – 11/11)
  Change Detection and Geometric Correction
  Lab – Change detection

Week 13 (11/14 – 11/18)
  Band Transformation and Vegetation Remote Sensing
  Lab – Starting final project (100 points)

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

Week 15 (11/28 – 12/02)
  Environmental Remote Sensing (Mon), Working on Final Project (Wed)
  Lab – Work on final project

Week 16 (12/05 – 12/09)
  Drone Remote Sensing (Mon), Working on Final Project (Wed)
  Lab – Class project presentations (100 points)

Week 17 (12/12 – 12/16)
  No Final Exam