FNR 55800: Remote Sensing Analysis and Applications

2018

Instructor:
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Class Goals:

♦ Learn and practice remote sensing technologies and their applications in terrestrial resources, including land use pattern and change, vegetation responses to climate, urban heat island effects, and ecosystem/habitat conservation.
♦ Learn and practice operational procedures of Erdas Imagine for handling image data and using geospatial data products.

Class Strategies:

♦ Encourage learning by doing: critical theories are explained in lectures; step-by-step instructions are provided for each lab exercise; independent projects are designed for comprehensive practice of learned kills; grading without using closed-book exams/quizzes.
♦ Focus on real-world problems: specific remote sensing data, from the local and around the world, are prepared and introduced to class, with which students learn how to solve real-world problems.
♦ Learn from each other: homework answers and project reports are uploaded to the shared class website; entire class attendees participate in project evaluations.

Schedule:

♦ Two lecture meetings per week
  ♦ Lectures 11:30 pm - 12:20 pm TR PFEN 203
♦ One lab per week
  ♦ Labs 11:30 pm - 2:20 pm W PFEN 202

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 instructor’s office any time, and the instructor will see students as long as he is neither with someone nor rushing to finish something.

Grading:

♦ Three projects and five homework assignments: 75 + 75 + 100 + 150 = 400 points
♦ Class participations and lab exercises are required. There will be a 10/20 point deduction for a class/lab absence.

Grading Scale:
Total number of points for each student will be converted into a 100 scale. Grades will be given according to the following table:

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<thead>
<tr>
<th>Grade</th>
<th>GPA Value</th>
<th>Range</th>
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<td>90.0-92.9</td>
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<td>3.3</td>
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<td>83.0-86.9</td>
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<td>&lt; 60.0</td>
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**Policies:**
- Class discussion is encouraged.
- If you a student find it necessary to miss a class, it is his/her responsibility to arrange for obtaining the information covered;
- Students are required to perform individual exercises and projects.

**Outline** (and major lecture references):

Week 1 (01/08 – 01/12)
- An overview of remote sensing (Jesen 2015, Lillesand et al. 2015, Shao 2012a)
- Lab – Dealing with image data with Erdas Imagine

Week 2 (01/15 – 01/19)
- Electromagnetic Radiation Principles (Jesen 2015, Lillesand et al. 2015, Shao 2016)

Week 3 (01/22 – 02/26) (Labor Day: 09/05)
- Elements of Image Interpretation (Lillesand et al. 2015), Image Data Classification (Supervised) (Jesen 2015)
- Lab – Supervised classification, Starting Project 1 (75 points)

Week 4 (01/29 – 02/02)
- Image Data Classification (Unsupervised) (Jesen 2015), Accuracy Assessment (Congalton and Green 1999)
- Lab – Unsupervised classification, accuracy assessment

Week 5 (02/05 – 02/09)
- Hybrid Classification (Lang et al. 2008), Sample-Based Classification (Landgrebe 2003, Wu et al. 2002)
- Lab – Starting Project 1

Week 6 (02/12 – 02/16)
Week 7 (02/19 – 02/23)
- Project 1 Presentations, Band Transformation (Jesen 2015, Shao and Duncan. 2007),
- Starting Project 2 (75 points)
- Lab – Learning to Use MultiSpec (Instructed by Larry Biehl)

Week 8 (02/26 – 03/02)
- Geometric Correction (Jesen 2015), Change Detection (Jesen 2015)
- Lab – Working on Project 2

Week 9 (03/05 – 03/09)
- Remote Sensing Data Collection (Shao 2012b), Thermal Remote Sensing (Lillesand et al. 2015)
- Lab – Project 2 Presentations, Band Transformation

Week 10 (03/12 – 03/16) (Spring Vacation)

Week 11 (03/19 – 03/23)
- LIDAR (Shao and Reynolds 2006), Drone Remote Sensing (Tang and Shao 2015)
- Lab – Change Detection

Week 12 (03/26 – 03/30)
- Raster GIS Methods
- Lab – GIS Applications

Week 13 (04/02 – 04/06)
- Vegetation Remote Sensing (Shao 2011, Shao et al. 2003), Error Propagations (Shao et al. 2001, Shao and Wu 2008),
- Starting Final Project (100 points)
- Lab – Land Surface Temperature Detection (with modeler tools)

Week 14 (04/09 – 04/13)
- Final Project Continues (no class meeting)
- Lab – Work on Final Project

Week 15 (04/16 – 04/20)
- Object-Based Image Analysis (OBIA) (Li and Shao 2014)
- Lab – Work on Final Project

Week 16 (04/23 – 04/27)
- Class Project Presentations

Week 17 (04/30 – 05/04)
- No Final Exam

References:


