Syllabus

GSE-GEOG-766-SO1  Advanced Remote Sensing Applications: Fire and Other Disturbances

Meeting Times: Mondays @ 5:00 – 7:50 PM
Meeting Location: Wecota 100
Instructors: Professor Mark A. Cochrane, 115H Wecota, 688-5353, mark.cochrane@sdstate.edu
Professor David Roy, 115G Wecota, 688-5352 david.roy@sdstate.edu

Office Hours for Spring 2008: Cochrane -Tuesdays & Thursdays 2:00-3:30 PM; or by appointment. Roy – by appointment.

"Advanced Remote Sensing Applications: Fire and Other Disturbances", Cochrane, M. and Roy, D., (GSE/GEOG-766-S01). This course describes the state of the practice algorithms and sensors for remote sensing of drought stress, forest degradation and biomass burning, including the location and timing of these disturbances, the area affected, and the post-disturbance effects on the environment. The need for these information, in the context of ecological and climatological applications, is emphasized. Materials are presented in lectures and experienced in lab applications. Understanding of the fundamental principles of remote sensing, physics, ecology, and computer literacy is required.

Course Objectives: The specific objectives of the course are to provide the student with:
1. Detailed information on the capabilities of multiple remote sensing sensors for detection and monitoring of ecosystem disturbance.
2. A comprehensive understanding of a variety of applied remote sensing methods for assessing the potential for wildfire, detecting the incidence of fire, and mapping of burned area extent and characteristics.
3. Experience applying several remote sensing methods for monitoring, detecting and quantifying forest disturbance.
4. Knowledge of remote sensing land cover products and their application for fire spread modeling simulation and experience using the FARSITE Fire Area Simulator.

Required Text: None.

Course Grade: Class participation (40%), Labs (60%).

This class will be team taught. Class periods will be roughly 1/3 lecture and 2/3 lab. Lectures and class discussions will be integral to the course and support the subsequent lab exercises. Required readings and moderated discussion will augment the lecture and lab components.
Students are expected to apply class materials in several lab exercises. Labs will be graded on successful completion of subcomponents discussion questions.

**Supplemental Readings:**


<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Lab Topic</th>
<th>Supplemental Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2/4/08</td>
<td>Fire Vulnerability I</td>
<td>Fire Vulnerability 1: Moisture Stress</td>
<td>Verbesselt et al. 2002</td>
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<td>3</td>
<td>2/11/08</td>
<td>Fire Vulnerability II</td>
<td>Fire Vulnerability 2: Fire Danger</td>
<td>Sandholt et al. 2002; Chuvieco et al. 2004</td>
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<td></td>
<td>2/18/08</td>
<td>Presidents Day</td>
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<tr>
<td>4</td>
<td>2/25/08</td>
<td>Active Fire Detection</td>
<td>Satellite data ordering</td>
<td>Giglio et al 2003; Giglio 2007</td>
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<tr>
<td>5</td>
<td>3/3/08</td>
<td>Active Fire Detection II</td>
<td>Active Fire Detection Lab</td>
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<tr>
<td>6</td>
<td>3/10/08</td>
<td>Fire Risk</td>
<td>Fire Risk</td>
<td>Radeloff et al. 2005; Stewart et al. 2007</td>
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<td>**</td>
<td>3/17/08</td>
<td>No Class – Spring Break</td>
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<td>7</td>
<td>3/24/08</td>
<td>Spectral Mixture Analysis I</td>
<td>Forest Degradation 1</td>
<td>Adams et al. 1995; Cochrane and Souza 1998</td>
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<tr>
<td>8</td>
<td>3/31/08</td>
<td>Spectral Mixture Analysis II/Decision Trees</td>
<td>Forest Degradation 2</td>
<td>Friedl and Brodley 1997; Hansen et al. 2003; Souza et al. 2005</td>
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<tr>
<td>9</td>
<td>4/7/08</td>
<td>MODIS Burned Area</td>
<td>No lab</td>
<td>Roy and Landmann 2005; Roy et al. 2005</td>
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<td>IALE Conference (FYI – I’m traveling)</td>
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<tr>
<td>10</td>
<td>4/14/08</td>
<td>Landsat Burned Area</td>
<td>Burn Area mapping Lab</td>
<td>Roy et al. 2006; Lentile et al. 2006</td>
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<td>11</td>
<td>4/21/08</td>
<td>Landsat Burn severity characterization</td>
<td>Burn Severity characterization</td>
<td>Miller and Thode 2007</td>
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<tr>
<td>12</td>
<td>4/28/08</td>
<td>Fire Spread Modeling I</td>
<td>Introduction to FARSITE &amp; LANDFIRE</td>
<td>Keane et al. 2001; McHugh 2006</td>
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<td>NASA Meeting (FYI – I’m traveling)</td>
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<tr>
<td>13</td>
<td>5/5/08</td>
<td>Fire Spread Modeling II</td>
<td>Fire spread modeling and calibration</td>
<td>Stratton 2006</td>
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ADA STATEMENT:
South Dakota State University is committed to providing equal access to University programs and services for all students. Under University policy and federal and state laws, students with documented disabilities are entitled to reasonable accommodations to ensure the student has an equal opportunity to perform in class. If any member of the class has such a disability and needs special academic accommodations, please notify me and make the appropriate arrangements with the Office of Disabilities Services. The ODS is located in Room 145 of Binnewies Hall. To schedule an appointment call (605) 688-4504 and request to speak with Nancy Hartenhoff-Crooks, the Coordinator of Disability Services. Reasonable accommodations may be arranged after the Office of Disabilities Services has verified your situation. Do not hesitate to contact me if any assistance is needed in this process.

ACADEMIC FREEDOM AND RESPONSIBILITY STATEMENT:
Freedom in learning. Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should first contact the instructor of the course. If the student remains unsatisfied, the student may contact the department head and/or dean of the college which offers the class to initiate a review of the evaluation.

CHEATING AND DISHONESTY POLICY:
The consequences of academic cheating and dishonesty range from any and all plagiarized or compromised assignments, tests, and other forms of evaluations being given zero credit as per offense to a student being given a failing grade for the class in which the offense took place. There is also the possibility that any student who has committed a cheating offense may face disciplinary probation or expulsion from the University. The full policies are found in Chapter 1 of the Student Code (01: 10:23:01-1: 10:23:04) of the SDSU Student Policies Manual.

Freedom in learning. Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should first contact the instructor of the course to initiate a review of the evaluation. If the student remains unsatisfied, the student may contact the department head and/or dean of the college which offers the class to initiate a review of the evaluation.