



**TITLE: Remote Sensing Applications in Natural Resources Using ArcGIS**

**NUMBER: NRM641**

**CREDITS: 3**

**PREREQUISITES: Basic ArcGIS experience**

**LOCATION: Distance Delivery from Fairbanks campus**

**MEETING TIME: Spring Semester 2016**

**INSTRUCTOR: Dr. David Verbyla (email: [d1verbyla@alaska.edu](mailto:d1verbyla@alaska.edu))**

**OFFICE LOCATION: ONEILL 368**

**OFFICE HOURS: TuW 1-2pm face to face, or phone/email  
or email any time (I try to return emails within 24 hours of receiving them)**

**TELEPHONE: 907-474-5553**

**EMAIL ADDRESS: [d1verbyla@alaska.edu](mailto:d1verbyla@alaska.edu)**

### **COURSE DESCRIPTION**

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This course is primarily for graduate students and GIS professionals who want to learn remote sensing applications in natural resource management using a variety of remotely sensed Alaska data ranging from high resolution LIDAR to statewide AVHRR data. The class will be taught using a sequence of weekly video sessions and weekly hands-on ArcGIS problems.

### **COURSE GOALS**

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- 1) To learn basic image processing methods using ArcGIS including panchromatic and color image display, image fusion, image georeferencing, change detection methods, supervised and unsupervised classification, and accuracy assessment methods.
- 2) To learn about sensors especially applicable to vegetation applications in Alaska including color infrared aerial photography, LIDAR, IFSAR, Landsat, MODIS, and AVHRR sensors and data products.
- 3) To use ArcGIS to explore changes associated with climate warming in Alaska including greening of the arctic, browning of the boreal forest, mapping wildfire severity and hotspots, mapping shrinking lakes and coastal erosion, etc.



Apply your skills learned in this course to:

Map glacier recession based on historic remotely sensed imagery.

Visualize coastal erosion and reduced sea ice extent based on historic remotely sensed imagery.

Map projected flooding associated with projected sea level rise using LIDAR elevation estimates.

Map shrinking lakes based on historic remotely sensed imagery.

### **COURSE READINGS/MATERIALS**

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Online references including ArcGIS help for image processing tools, websites specific to sensors.

### **TECHNICAL REQUIREMENTS**

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This course uses ArcGIS software which is available for free to all UA students through <http://www.alaska.edu/oit/restricted/> . ArcGIS is a MS windows based GIS and requires windows XP or higher.

The course also requires internet access for blackboard video sessions and quizzes (<https://www.uaf.edu/bblearn/prod/> ). If you have slow internet access, I can send you the video sessions and data on a DVD.

### **INSTRUCTIONAL METHODS**

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Each week will be a series of video sessions with each session leading the student in a hands-on arcgis exercise. There will be a blackboard quiz at the end of each weekly session for the first ten weeks of the course. The final four weeks of the course will be four remote sensing applications where the student solves an Alaska landscape change problem associated with climate warming.

Blackboard Quiz Due Dates:

25-Jan-2016 5pm Week1 Image Display  
01-Feb-2016 5pm Week2 Using Elevation With Image Displays  
08-Feb-2016 5pm Week3 Spectral Regions  
15-Feb-2016 5pm Week4 Image Georeferencing  
22-Feb-2016 5pm Week5 Supervised Classification  
29-Feb-2016 5pm Week6 Unsupervised Classification  
08-Mar-2016 5pm Week7 AVHRR Sensor  
Spring Break  
22-Mar-2016 5pm Week8 MODIDS Sensor  
29-Mar-2016 5pm Week9 Landsat Sensor  
05-Apr-2016 5pm Week10 LIDAR Applications  
12-Apr-2016 5pm Week11 Point Sensor Applications

Four Climate Warming Mini-Projects due by 5pm Friday 6-May-2016



## **COURSE POLICIES**

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### **Participation**

You will use ArcGIS and follow along as I teach you new concepts in each video session. After each video session, I will assess your understanding using a question posted through the class blackboard website. Your understanding will also be assessed most weeks using a quiz posted through the class blackboard website.

You should post any sources of confusion and solutions through the class Google+ site to share learning among class participants.

### **Late Work Policy**

Late work will not be accepted, since some weekly sessions assume you have mastered previous weekly sessions.

### **Academic Integrity**

As described by UAF, scholastic dishonesty constitutes a violation of the university rules and regulations and is punishable according to the procedures outlined by UAF. Scholastic dishonesty includes, but is not limited to, cheating on an exam, plagiarism,

Course grade will be based on total points earned based on ten highest of 11 blackboard quizzes (@10 points each) and four application projects (@25 points each). Late submissions will not be accepted.

**Total Points Grade:**

>180	A
160 180	B
150 160	C
140 150	D
< 140 points	F

**EFFORT AND STUDENT INVOLVEMENT**

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**Instruction:**45% primarily via weekly video sessions

**Assignments:**45% weekly ArcGIS work and four project-based assignments

**Pacing Expectations**

Although actual hours spent each week will vary between individuals, students should expect to spend an average of 9 hours per week on this course.

**EXPLANATION OF W, NB, I GRADES**

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**Withdrawals**

Successful, Timely Completion of this Course Starting and establishing your progress through this course early can help to encourage your successful completion of the course. Toward this end, this course adheres to the following UAF eLearning & Distance Education procedures:

1. The first contact assignment is due one week after the first day of instruction. *Failure to submit this assignment within the first two weeks of the course could result in withdrawal from the course.*
2. The first content assignment is due one week after the first day of instruction. *Failure to submit this assignment within the first two weeks of the course could result in withdrawal from the course.*
3. *Failure to submit the first three content assignments by the deadline for faculty-initiated withdrawals (the ninth Friday after the first day of classes) could result in **instructor initiated withdrawal from the course (W)**.*

**No Basis Grades**

This course adheres to the UAF eLearning Procedure regarding the granting of NB Grades The NB grade is for use only in situations in which the instructor has No Basis upon which to assign a grade. In general, the NB grade will not be granted.

**Incompletes**

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy.

completed (C or better) the majority of work in a course but for personal reasons beyond the

## **SUPPORT SERVICES**

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**UAF eLearning Student Services** helps students with registration and course schedules, provides information about lessons and student records, assists with the examination process, and answers general questions. Our Academic Advisor can help students communicate with instructors, locate helpful resources, and maximize their distance learning experience. Contact the UAF eLearning Student Services staff at 907- 479-3444 or toll free 1-800-277-8060 or contact staff directly for directory listing see: <http://distance.uaf.edu/staff/> .

### **UAF Help Desk**

Click here (<http://www.alaska.edu/oit/>) to see about current network outages and news.

Reach the Help Desk at:

· e-mail at [helpdesk@alaska.edu](mailto:helpdesk@alaska.edu)

· fax at (907)-450-8312

phone in the Fairbanks area is 450-8300 and outside of Fairbanks is 1-800-478-8226

## **DISABILITIES SERVICES**

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The **UAF Office of Disability Services** operates in conjunction with CDE. Disability Services, a part of UAF's Center for Health and Counseling, provides academic accommodations to enrolled students who are identified as being eligible for these services.

If you believe you are eligible, please visit their web site (<http://www.uaf.edu/apache/disability/>) or contact a student affairs staff person at your nearest local campus. You can also contact Disability Services on the Fairbanks Campus by phone, 907-474-7043, or by e-mail ([fydso@uaf.edu](mailto:fydso@uaf.edu)).