



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)

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)**

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COURSE DESCRIPTION

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

- 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

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

TECHNICAL REQUIREMENTS

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

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

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

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

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

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

· fax at (907)-450-8312

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

DISABILITIES SERVICES

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).