NRM F435 GIS Analysis
Course information and Syllabus: Spring 2024, 4 credits
CRN: 33368 (in person/Zoom), 34170 (Asynchronous)

General Information:

Time: Lecture: TR 9:45 – 11:15 am (O'Neil 307 or Zoom)
Lab: T 2 – 5 pm (WRRB 004 or Zoom)

Place: Lecture: O'Neill 307/ Zoom; Lab: WRRB 004/ Zoom

Instructor: Santosh Panda, Dept. of Natural Resources and Environment
Ph: 474-7539; skpanda@alaska.edu
Office: O'Neill Building Room 368
(office hours: TR: 11:15 am – 12:00 pm /by appointment)

Teaching Asst.: Mike Willis **(**Email: mdwillis@alaska.edu)
Office: Zoom (Office hours: TBD)

Course type: Combined Lecture/Lab (In person/ Synchronously online/ Asynchronous)

Course Description: GIS analysis of natural resources including spatial query, attribute query, vector, grid, satellite image, and topographic (DEM) analysis techniques.

Instructional Methods: Lecture, discussion, and lab exercises

- Assignments (along with general course information and handouts) will be posted on Canvas: https://canvas.alaska.edu/courses/13528.
- Lectures and labs will be the primary mode of instruction. Some lectures will be supplemented with demo examples to prepare students for assignments.

It's a NoLo (No Cost or Low Cost) course. There is no required textbook for this class. I'll provide all lecture, lab, assignment and reading materials.

Course Goals: This class covers application of GIS in the field of natural resources. It includes analyses of points, lines, polygons, raster, and 3D data in ESRI ArcGIS Pro software. We will analyze feature data (points, lines, and polygons) during the first-half of the course, and raster and 3D elevation data during the second-half of the course. While the focus of the class is on the geospatial processing, analysis and application of GIS in the field of natural resources, the methods taught are applicable to a wider range of fields, such as geography, biology, fisheries, and geology.

Student Learning Outcomes: Successful completion of the course will allow students to:

- Understand geospatial analysis concepts and applications in various disciplines
- Be proficient in the use of ESRI ArcGIS Pro program
- Identify appropriate geoprocessing tools and data set pertinent to a problem

- Use GIS analysis to solve real-world problem in the field of natural resources, geography, biology, and geology
- Develop a workflow that builds on the concept of the GIS analysis to move from raw data to a quantitative representation of information in map format
- Communicate GIS results through maps and graphs (including ArcGIS Story Maps and Dashboards)

Evaluation:

12 Assignments:	12 x 20 points
12 Labs:	12 x 20 points
Final exam:	60 points

Minimum 80% attendance in lecture and labs: 2% (Bonus)

Grading criteria:
A (A+: > 94%, A-: > 90%)
B (B+: > 80%, B-: > 70%)
C (C+: > 60%, C-: > 50%)
D (D+: > 45%, D-: > 40%)

Course Policies:
1. Attendance: All in person students are expected to attend and participate in all classes. Asynchronous students are not required to attend the class or lab, but can attend via Zoom.
2. Participation and Preparation: Students are expected to come to class with assigned reading and other assignments completed as noted in the syllabus.
3. Late assignments/labs will be accepted with a 5% penalty per day late (if not approved in advance by the instructor).

Special Needs: Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc to find reasonable accommodations. Students with learning or other disabilities who may need classroom accommodations are encouraged to visit the Disabilities website at https://uaf.edu/disabilityservices/ and make an appointment with the Office of Disability Services (474-5655). Please meet with the instructor so that the appropriate accommodations and support to assist in meeting the goals of the course can be made in collaboration with the Office of Disability Services.

UAF Honor Code: As a UAF student, you are subject to the student Code of Conduct. The university assumes that the integrity of each student and of the student body as a whole will be upheld. It is your responsibility to help maintain the integrity of the student community. For additional information, contact the Center for Student Rights and Responsibilities or web https://uaf.edu/csrr/. The UAF Honor Code (Student Code of Conduct) defines academic standards expected at the University of Alaska Fairbanks.

Title IX Information: Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am

informed of certain types of misconduct, then I am required to report it to the appropriate authorities.

If you believe you are experiencing discrimination or any form of harassment including sexual harassment/misconduct/assault, you are encouraged to report that behavior. If you report to a faculty member or any university employee, they must notify the UAF Title IX Coordinator about the basic facts of the incident. Your choices for reporting include:

1. You may access confidential counseling by contacting the Student Health & Counseling Center at 474-7043; https://uaf.edu/chc/
2. You may access support and file a Title IX report by contacting the UAF Title IX Coordinator at 474-7300; https://uaf.edu/titleix/contact.php
3. You may file a criminal complaint by contacting the University Police Department at 474-7721.

University of Alaska is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: alaska.edu/nondiscrimination.

Effective communication: Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor).

COVID-19: Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website: https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students. Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/.

Student Academic Support:
- Speaking Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uafmathstatlab@gmail.com, Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, https://www.ctc.uaf.edu/student-services/student-success-center/)

- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf)

Student Resources:
- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling **[6 free counseling sessions]** (907-474-7043, https://www.uaf.edu/chc/appointments.php, Whitaker 203)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

Nondiscrimination statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination.

For more information, contact:
UAF Department of Equity and Compliance
1760 Tanana Loop, 355 Duckering Building, Fairbanks, AK 99775
907-474-7300
uaf-deo@alaska.edu

Additional syllabi statement for courses including off-campus programs and research activities:
University Sponsored Off-Campus Programs and Research Activities
We want you to know that:

1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.
2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.
3. There are supportive measures available to individuals that may have experienced discrimination.
4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: http://alaska.edu/bor/policy-regulations/.
5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources click here.

Technology requirements: The course uses ESRI ArcGIS Pro software which is a Windows-only software. All students will be provided with an ArcGIS Pro account and installation file. Students will have three different options to access the software (1: installation on their personal computers, 2: access through OIT virtual lab space, and 3: access to computers in WRRB 004 computer lab.

Check the computer system requirements for ArcGIS Pro 3.1

Technology requirements for Remote and Asynchronous sections: The course uses ESRI ArcGIS Pro software which is a Windows-only software. All students will be provided with an ArcGIS Pro account and installation file. Students with Mac computers will need to use a Virtual Windows environment to access ArcGIS Pro on their computer (Run ArcGIS Pro on a Mac computer). Alternatively, students may access ArcGIS Pro software through OIT virtual lab space which requires stable internet connection and familiarity working on a remote Windows computer.

Confirm that your computer can run ArcGIS Pro: You will run a test to confirm that your computer can support ArcGIS Pro. Even if you have ArcGIS Pro installed, you should confirm that it can support ArcGIS Pro 3.1.

In a web browser, go to Can You Run It?

Click the Run Tech Check button.

Follow the steps to open and run the test.

The site generates a report that lists the minimum requirements and identifies whether your machine meets these requirements.

If your computer does not meet the requirements, check the Common Questions to find links to complete the recommended updates, and then run the test again.

Note: If your computer does not meet the requirements, you may need to use a different computer or update your graphics card. For more information, go to ArcGIS Pro Help: Graphics adapter resources.

Course Calendar (1/15/2024 – 5/4/2024):

Week 1	- Course overview - Introduction to GIS - ArcGIS online account and ArcGIS Pro software access - Lab 0: Introduction to ArcGIS Pro software
Week 2	- Point distance analysis - Point pattern analysis - Assignment: Challenge 1
Week 3	- Spatial Join vs Intersect - Basemaps - Creating and editing point, line, and polygon features - Coordinate System and Map Projection - Assignment: Challenge 2
Week 4	- Line Analysis - Assignment: Challenge 3
Week 5	- Measured Lines/Linear Referencing - Dynamic Segmentation - Assignment: Challenge 4
Week 6	- Polygon analysis - Overlap and adjacency analysis - Assignment: Challenge 5
Week 7	- Network analysis - Assignment: Challenge 6
Week 8	- Animal Movement Analysis - Event Animation - Assignment: Challenge 7
Week 9	Spring break (Mar. 11 – 15)
Week 10	- Introduction to Raster data - Raster analysis - Assignment: Challenge 8
Week 11	- Least-cost or optimal path analysis - Assignment: Challenge 9
Week 12	- LiDAR elevation data analysis - Mapping tall canopy patches of certain size - Mapping canopy closure percent - Assignment: Challenge 10
Week 13	- Digital Elevation Model: Processing and Visualization - Watershed Delineation - Assignment: Challenge 11
Week 14	3D Raster Surface and Visualization 3D Feature Analysis and Visualization - Assignment: Challenge 12
Week 15	- ArcGIS Map Layout - ArcGIS StoryMaps

	● No Assignment
Week 16	Final exam: Take home (due: 5/2/2024 12 Noon)

Weekly Lab and Assignment will be posted on Canvas on Sunday morning. Lab and Assignment will be due the following Friday and Saturday, respectively.

SYLLABUS ADDENDUM: The syllabus addendum contains non-academic information all students must be aware of. You can find the most recent version here:

https://www.uaf.edu/uafgov/faculty-senate/curriculum/syllabus-addendum.php