

NRM F435 GIS Analysis
Course information and Syllabus
Spring 2021 4 credits CRN: 33725

General Information:

- **Time:** TR: 9:45 – 11:15 am (Lecture) and T: 2 – 5 pm (Lab);
- **Place:** Web (Synchronously online)
- **Instructor:** Santosh Panda, Dept. of NRE, UAF
Ph: 474-7539; skpanda@alaska.edu
Office: West Ridge Research Building 108D
(office hours: TR: 11:15 am – 12:15 pm /by appointment)

Course type: Combined Lecture/Lab (Synchronously online)

Course Description:

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

Instructional Methods: Lecture, discussion, and lab exercises

- Assignments (along with general course information and handouts) will be posted on Blackboard: classes.uaf.edu.
- Lectures and labs will be the primary mode of instruction. Some lectures will be supplemented with computational examples to prepare students for assignments.

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, and geology.

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

- Be proficient in the application of Geoprocessing tools in ArcGIS Pro program
- Identify appropriate geoprocessing tools and data set pertinent to a problem
- Use GIS analysis to solve geospatial 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)

Evaluation:

Assignments/Labs:	60 %
Class participation (lectures and labs):	10 %
Mid-term exam:	10%
Final exam:	20%

Grading criteria:

A (A+: > 94%, A-: > 90%)

B (B+: > 80%, B-: > 70%)

C (C+: > 60%, C-: > 50%)

D (D+: > 45%, D-: > 40%)

Course Policies:

- Attendance: All students are expected to attend and participate in all classes.
- Participation and Preparation: Students are expected to come to class with assigned reading and other assignments completed as noted in the syllabus.
- 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 supports 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).

Technology requirements: ESRI ArcGIS Pro software. All students will be provided with an ArcGIS Pro account. Students will have three different options to access the software (installation on their personal computers, access through OIT virtual lab space, and access to computers in O'Neil computer lab fitted with Plexiglas [a computer will be assigned to a student for the whole semester]).

Course Calendar (1/11/2021 – 5/1/2021):

Week 1	Spatial analysis of point data
Week 2	Spatial analysis of line data
Week 3	Spatial analysis of measured lines
Week 4	Network analysis
Week 5	Spatial analysis of polygon data
Week 6	Overlap and adjacency analysis
Week 7	Extension and movement analysis
Week 8	Visualization: Creating elegant map figures and ArcGIS Story Maps
Week 9	Spring break
Week 10	Raster and grid analysis
Week 11	Image and map geo-referencing
Week 12	Path analysis (raster representing cost surface)
Week 13	Analysis of LiDAR elevation data
Week 14	Watershed analysis
Week 15	Advanced 3D analysis