NRM F338 Introduction to Geographic Information Systems  
Course information and Syllabus  
Fall 2020  
3 credits CRN: 74812, 74813

General Information:  
- **Time:** Lecture: TR 9:45 – 11:15 am  
  Lab: T 2 – 5 pm (F01); W 11:15 am – 2:15 pm (F02)  
- **Place:** Online  
- **Instructor:** Santosh Panda, Geophysical Institute, UAF  
  Ph: 474-7539; [skpanda@alaska.edu](mailto:skpanda@alaska.edu)  
  Office: West Ridge Research Building 108D  
  (office hours: TR: 11:15 am – 12:15 pm /by appointment)  
- **Teaching Asst.:** Anushree Badola  
  Email: [abadola@alaska.edu](mailto:abadola@alaska.edu)  
  Office: West Ridge Research Building 104.A  
  (office hours: Thu.: 2:30 pm – 4:30 pm /by appointment)

**Course type:** Combined Lecture/Lab (online)

**Course Description:** Geographic data concepts including mapping systems, data sources, editing data, GIS analysis and computer mapping. Introduction to global positioning systems. GIS applications in natural resources management.

**Instructional Methods:** Lecture, discussion, and lab exercises  
- Quiz (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 quiz.  
- All lectures will be recorded and shared with only enrolled students

**Course Goals:** This class covers introduction to various geographic data and science concepts and application of geospatial methods including 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.

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

- Be proficient in handling geospatial data in ESRI ArcGIS Pro program  
- Be proficient in the application of Geoprocessing tools in ESRI ArcGIS Pro program  
- Use GIS analysis to solve geospatial problem in the field of natural resources  
- 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

**Evaluation:**

Grades are based on the points (and point percentage) that are attributed as follows:

Weekly quizzes, 20 points each  
One mid-term exam, 100 points  
One final exam, 100 points  
Weekly lab completion, 20 points each

**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 lectures and labs.
- Participation and Preparation: Students are expected to come to class with assigned reading and other assignments completed as noted in the syllabus.
- Late quiz will be accepted with a 5% penalty per day late.

**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).

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.

**Technology requirements:** ESRI ArcGIS Pro software. Students will get access to this software from 3 sources: 1) have it on their personal computer, 2) through OIT virtual lab space, and 3) scheduled access to a computer lab in O’Neil 338.

**Course Calendar:**

The course will proceed by weekly topics:

<table>
<thead>
<tr>
<th>Week 1</th>
<th>What is GIS? Introduction to ArcGIS Pro</th>
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<tbody>
<tr>
<td>Week 2</td>
<td>Basic geodesy, GPS, and measuring distance, area, depth, time</td>
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<tr>
<td>Week 3</td>
<td>Coordinate system and projection</td>
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<td>Week 4</td>
<td>Data and file formats for feature collections</td>
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<td>Week 5</td>
<td>Analyzing attribute data</td>
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<td>Week 6</td>
<td>Creating and editing vector GIS data</td>
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<td>Week 7</td>
<td>Containers and database for vectors and rasters</td>
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<td>Week 8</td>
<td>Mid-term</td>
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<td>Week 9</td>
<td>Digital elevation models</td>
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<td>Week 10</td>
<td>Georeferencing rasters</td>
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<td>Week 11</td>
<td>Supervised classification</td>
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<td>Week 12</td>
<td>Geospatial analysis and spatial joins</td>
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<td>Week 13</td>
<td>Map layout and cartography</td>
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<td>Week 14</td>
<td>Wrap up</td>
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<tr>
<td>Week 15</td>
<td>Final exam</td>
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