GISC 5351, GISC 5051
Introduction to Geographic Information System (GIS) and Geospatial Analysis
Fall 2023

Instructor: Dr. I-Kuai Hung
Office Hours: Monday 10AM-12PM
Department: Forestry
Wednesday 10AM-12PM
Office: Forestry 106
Thursday 9AM-11AM
Phone: 468-2464
Email: hungi@sfasu.edu
Website: www.faculty.sfasu.edu/hungikua

Lectures:
Thursday 4:30-6:20PM, Forestry 225/108
Asynchronous instruction in D2L

Laboratories:
Session 020 Thursday 6:30-9:00PM, Forestry 108

Course Description:
3 semester hours, 2 hours lecture and 3 hours lab per week. Expanded examination of
GIS theory, concepts, technology, and application.
Course corequisite required GISC 5051.

Program Learning Outcomes:
Geographic Information System (GIS) is a computer system for the management,
analysis, and display of geographic information. GIS includes a set of comprehensive
tools for working with the geographic data. This class outlines the principles of GIS. It is
designed to look into GIS from different views including Geodatabase, Geovisualization,
and Geoprocessing.

GISC 5351 is one of the core courses required of all Spatial Science and most
Environmental Science majors as well as Geospatial Analyst Certificate, and thus
competency is required. The course is designed to address the Program Learning Outcomes
in demonstrating proficiency in basic statistical analysis in spatial science at advanced level,
as well as preparation to pursue a professional career and/or Ph.D. degree and competency in
oral and written communication skills at mastery level.

Student Learning Outcomes:
Students will demonstrate competency in the fundamentals of GIS and geospatial
analysis. They will learn not only the skills on the most common GIS software but also the
necessary backgrounds to understand how the software package works. As the semester
develops, students will apply spatial analytical tools to model real-world problems. They
will demonstrate competency in oral and written communication skills through project
preparation and presentation where the professional ethics is emphasized.
Textbooks:
Recommended:

Software:
Esri ArcGIS Pro, MS Excel and Access.
There are options for accessing the software applications.
1) Go to the GIS Lab during the course lab hours, or any labs in Forestry building where the software is installed when there is no class in session.
2) Go to https://view.sfasu.edu/ and login with your mySFA credential to access VMware Horizon virtual machine. Select the Forestry machine that has the same configuration as a GIS Lab computer. This service might not be available due to campus network maintenance.
3) Request a single-use license from the GIS Administrator. It allows to download ArcGIS Pro and have it installed on your own computer running on Windows operating system.

Lecture Topics:
Course Overview: General descriptions on the course structure, content, schedule, and requirement. Introduction to the online learning management system, Desire2Learn.
Introduction to GIS: Brief history and components of GIS, different types of GIS data and applications.
ArcGIS Overview: The architecture of ArcGIS including desktop, mobile, server, and online platforms and their extensions.
Map Projection and Coordinate System: The concepts of datum and spheroid, the different methods of map projection, the difference between geographic coordinate system and projected coordinate system, and commonly used projected coordinate systems.
Data Display and Cartography: The different types of maps, essential elements of a complete map, symbolization on qualitative data and classification on quantitative data, and cartography conventions.
Vector Data Model and Analysis: The different types of vector data with both georelational data model and object based data model, geoprocessing with vector data including map overlay.
Attribute Data Management: Relational database management for spatial and non-spatial attribute data.
Geodatabase: The object based data model for both vector and raster data including feature class, feature dataset, raster dataset, raster catalog, domain, subtype, relationship, etc.
Raster Data Model and Analysis: The different raster data formats for continuous data, raster based analysis including local, neighborhood, and zonal operations.
**Terrain Mapping and Analysis:** Digital elevation model and triangulated irregular network for depicting terrain surfaces and their derivatives such as slope, aspect, and hillshade, etc.

**Spatial Interpolation:** Using data collected at sampled location to estimate for the entire surface area, assessing the accuracy of interpolation.

**GIS Modeling:** Building models in GIS to streamline complex geoprocessing, different types of model including binary and index models.

**Brightsapce/Desire2Learn Online System:**

The electronic communication of this course will primarily be done through the Desire2Learn online system at [https://d2l.sfasu.edu](https://d2l.sfasu.edu). It includes email, course materials delivery, and assignment submission, etc. It is the student’s responsibility to check for email announcements, data availability, and deadlines in Desire2Learn. For D2L technical support, contact student support in the Office of Instructional Technology (OIT) at d2l@sfasu.edu or 936-468-1919. If you call after regular business hours or on a weekend, please leave a voicemail.

**Lab and Assignments:**

Ten lab assignments will be given throughout the semester. During the first half of the semester, step-by-step guidance on ArcGIS will be offered. As the semester develops, students are supposed to work on the assignments with limited assistance.

The assignments will be given online and should be submitted in electronic format onto Desire2Learn. When uploading an assignment, the name of the student’s file should include the student’s mySFA username at the end preceding with an underscore, e.g. `a1_hungikua.zip`. Failure to follow this filename convention will result in penalty on the grade. A corrected version of assignment can be resubmitted by the deadline. However, **no late submission will be accepted.**

- Lab 1: ArcGIS Exploration
- Lab 2: GIS Data Format and Coordinate System/Projection
- Lab 3: GIS Data Acquisition
- Lab 4: Georeferencing and Editing
- Lab 5: Geoprocessing
- Lab 6: Geodatabase
- Lab 7: Database Management
- Lab 8: Terrain Analysis and Spatial Interpolation
- Lab 9: 3D Visualization
- Lab 10: GIS Models

Important information will also be delivered through Desire2Learn including course materials, emails, discussion, etc. It is the student’s responsibility to check for email announcements, data availability, and deadlines in Desire2Learn. For D2L technical support, contact student support in the Office of Instructional Technology (OIT) at d2l@sfasu.edu or 936-468-1919. If you call after regular business hours or on a weekend, please leave a voicemail.
Presentation of Project:
Throughout the semester, students will work as teams on their final projects. Each team consists of two students and will be scheduled to make a presentation of their project to the class. The talk should run about 20 minutes, with a five-minute question and answer time. Students will learn to interact with each other with professional communication skills and ethics. Visual aid such as PowerPoint for the presentation is required. A typed report to the instructor is also required and due at the end of the semester. The report should have a total of 5 to 8 one-sided pages (not counting cover page) with 12 font size and 1.5 line spacing.

The report should emphasize the methodology and the discussion of the results. Below is a list of suggestions for the project. Students choose their topic of interest but should clear topics with the instructor.

1. On-going research that is related to GIS.
2. Review of journal paper(s) or book chapter(s).
3. Exploration of the functionality of specific features (e.g., Tools, Models, and Extensions etc.) in ArcGIS for Desktop.
4. Online GIS applications.

Examination:
One midterm test will be given during the semester and a final exam will be given at the end of the semester. The exams will include both written questions and lab works.

Grading Policy:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>A</td>
</tr>
<tr>
<td>15%</td>
<td>B</td>
</tr>
<tr>
<td>15%</td>
<td>C</td>
</tr>
<tr>
<td>20%</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

A 90+ %  
B 80-89%  
C 70-79%  
D 60-69%  
F < 60%

Attendance Policy:
Regular and punctual attendance is expected at all classes, laboratories, and other activities for which a student is registered. Even though attendance is not a factor for the course grades, accurate attendance will be recorded. When an absence is unavoidable, make sure you catch up on what was missed. If a student has excessive absences, the instructor reserves the right not to give individual tutoring, special consideration regarding make-up work, or other help the student needs because of missing class. Plan your time as best as possible and make the commitment to spend the amount of time needed for you to be successful.

Academic Integrity:
It is the instructor’s hope that academic dishonesty will not be a problem in this class. However, academic integrity is a responsibility of all university faculty and students. The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.
Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

Withheld Grades Course Grades Policy (5.5):
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the coursework because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course to compute the grade point average. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

Students with Disabilities:
To obtain disability-related accommodations, alternate formats, and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004(TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services promptly
may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

**Student Wellness and Well-Being:**

SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**

**The Dean of Students Office** (Rusk Building, 3rd floor lobby)
[www.sfasu.edu/deanofstudents](http://www.sfasu.edu/deanofstudents), 936.468.7249, dos@sfasu.edu

**SFA Human Services Counseling Clinic,** Human Services, Room 202
[www.sfasu.edu/humanservices/139.asp](http://www.sfasu.edu/humanservices/139.asp), 936.468.1041

**The Health and Wellness Hub** “The Hub”
Location: corner of E. College and Raguet St.
[www.sfasu.edu/thehub](http://www.sfasu.edu/thehub), 936.468.4008, thehub@sfasu.edu

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education

**Crisis Resources:**

- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- johCrisis Text Line: Text HELLO to 741-741
### Course Calendar:

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Lecture</th>
<th>Reference (Chang)</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 31</td>
<td>1</td>
<td>Course Overview</td>
<td></td>
<td>Lab Orientation</td>
</tr>
<tr>
<td>September 7</td>
<td>2</td>
<td>Introduction to GIS</td>
<td>Ch. 1</td>
<td>1. ArcGIS Exploration</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>ArcGIS Overview</td>
<td>Ch. 5</td>
<td>2. GIS Data Format and Coordinate System/Projection</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>Map Projection and Coordinate System</td>
<td>Ch. 2</td>
<td>3. GIS Data Acquisition</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>Data Display and Cartography</td>
<td>Ch. 9</td>
<td>4. Georeferencing and Editing</td>
</tr>
<tr>
<td>October 5</td>
<td>6</td>
<td>Vector Data Model and Analysis</td>
<td>Ch. 3 &amp; 11</td>
<td>5. Geoprocessing</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>Attribute Data Management</td>
<td>Ch. 8 &amp; 10</td>
<td>6. Geodatabase</td>
</tr>
<tr>
<td>8</td>
<td>19</td>
<td>Geodatabase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>26</td>
<td><strong>Midterm Test</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 2</td>
<td>10</td>
<td>Raster Data Model and Analysis</td>
<td>Ch. 4, 6 &amp; 12</td>
<td>7. Database Management</td>
</tr>
<tr>
<td>11</td>
<td>9</td>
<td>Terrain Mapping and Analysis</td>
<td>Ch. 13 &amp; 14</td>
<td>8. Terrain Analysis and Spatial Interpolation</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>Spatial Interpolation</td>
<td>Ch. 15</td>
<td>9. 3D Visualization</td>
</tr>
<tr>
<td>13</td>
<td>23</td>
<td><strong>Thanksgiving Holiday</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>30</td>
<td>GIS Modeling</td>
<td>Ch. 18</td>
<td>10. GIS Models</td>
</tr>
<tr>
<td>December 7</td>
<td>15</td>
<td>Student Presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>14</td>
<td><strong>Final Exam (4:30 – 7:30PM)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The instructor reserves the right for the modification of this syllabus.