Definition of Geographical Information Systems

A geographic information system (GIS) uses computers and software to organize, develop, and communicate geographic knowledge. In simple terms, GIS takes the numbers and words from the rows and columns in databases and spreadsheets and puts them on a map. GIS is about visualizing information.

Course Overview

This course carries an option for dual-enrollment through James Madison University, Department of Geology and Geography. Students who elect to participate in the dual-enrollment will be enrolled in GEOG 161: Geospatial Tools and Techniques. Upon successful completion of the course, students will earn 6 credits and will be able to print a transcript from James Madison University. Tuition for the dual-enrollment course is offered at the drastically reduced rate of $90 per credit hour, with a one-time registration fee of $20. The total tuition for the dual-enrollment course will be $560. Besides the application fee (which is due at the time of registration), all tuition is paid directly through James Madison University, with students receiving a bill from the university very soon after registration occurs. Please note, Tuition must be paid by the due date in October or the student will be dropped from the JMU course.

Registration for the dual-enrollment option will occur in early September. Students who may require tuition assistance (and who could demonstrate need) should speak with me as soon as possible.

**PLEASE NOTE: There is no difference in course work between Geospatial Science credit through LCPS and the GEOG 161 credit through JMU. It is strongly urged that students register for the JMU credit, as the JMU credit has been able to transfer to any Virginia state college or university, and to date has not been declined at a non-Virginia college or university.**

In the first semester, students will learn all the essential skills and tools necessary to use GIS software effectively. These skills form the foundation of the course and will be necessary to carry out independent research later in the course. Teacher-directed activities will gradually lead to more student-directed activities throughout the semester, culminating in a performance-based independently produced midterm exam.

The second semester will begin with a series of mini projects, designed to give the students a sample of GIS applications, as well as serve to fine-tune their skills. Students will also begin working on their final project for the course. This final project will require students to apply all skills acquired during the first semester, identify a suitable independent research topic, and demonstrate their ability to carry-out the project and present to Loudoun County Public School and James Madison University staff members.

Expectations

To be successful in this course, students must:

- Exhibit an interest in technology
- Demonstrate the ability to initiate and complete independent, long-term projects
- Require minimal teacher prompting and supervision
- Have a sincere interest in technology as a college study or career field
- Accept the challenge and rigor of a college-level course
- Demonstrate the ability to problem solve within a team setting

Grading Policy

For high school and JMU credit:

Because of the independent, project-based nature of this course, grading will be facilitated by the use of rubrics. You are expected to use the rubrics to self-assess your performance before teacher grading occurs. Teachers will use the same rubrics to grade the work. Therefore, the intent is that all students should use the rubrics to strive for performance at the A or B level. Assignments will initially emphasize individual skill building and will increasingly become team evaluated. Therefore, the success and failure of a student will depend largely upon their ability to work collaboratively as a team with all team members contributing equally.
LCPS Geospatial Science Standards

Technical Skills

1. Making and interpreting thematic maps
2. Selecting and querying data
3. Tabular and spatial joins
4. Defining, changing, and working with map projections
5. Adding and mapping X-Y coordinate data
6. Overlay operations
7. Create and use metadata
8. Creating summary tables, graphs and layouts
9. Georeferencing unregistered images
10. Address geocoding
11. Collecting and analyzing authentic data
12. Using ArcGIS Online to publish maps and storymaps
13. Designing Web Apps through ArcGIS Online
14. Acquire and interpret Remote Sensing and LiDAR images

Spatial Thinking Skills

1. Describing features present in a map or other geospatial display
2. Identifying patterns in maps or other geospatial displays
3. Grouping features that are proximate/adjacent to one another into regions or areas
4. Investigating correlation and causation with multiple data layers
5. Describing and Interpreting geospatial displays that change over time
6. Posing a problem that can be investigated using maps or geospatial displays
7. Identifying data required to address this problem

Workplace Readiness

1. Teamwork skills
2. Conflict-resolution skills
3. Creativity and resourcefulness skills
4. Effective speaking and listening skills
5. Effective writing and reading skills
6. Effective critical-thinking and problem-solving skills
7. Time-, task-, and resource-management skills
8. Use of Geospatial Technology in Industry