COURSE TITLE: Geospatial Science

PREREQUISITE: None

DESCRIPTION: Geospatial science involves the use of geographic information systems (GIS) which integrate hardware, software, and data for capturing, managing, analyzing and displaying all forms of geographically referenced information. In this course, GIS is used to organize, analyze, and communicate spatial-data relationships. In the first semester, students learn about GIS tools and acquire the essential skills necessary to use (GIS) software and hardware effectively. These computer/software skills form the foundation of the course and are used extensively as students carry out independent research later in the course. Teacher-directed activities will gradually lead to more student-directed research.

All students are expected to complete an in-depth research project as a required part of their course work during the second semester. Students may also choose a dual enrollment option offered through a partnership with James Madison University (JMU), Department of Geology and Geography. Students have the opportunity to earn 3 college credits from JMU while completing the in-depth research project. The project (mandatory for all students regardless of whether they choose the dual enrollment option) requires students to apply all skills acquired during the first semester, identify a suitable independent research topic, and demonstrate their ability to complete and present their project to school faculty, members of the GIS community, and James Madison University faculty and staff. To earn the 3 credit hours, students must meet or exceed the project expectations established by JMU.

MAIN TOPICS:
- Introduction to GIS
- Map Projections
- Building and displaying maps in GIS
- GIS data types (vector, raster and tabular data, introduction to Geodatabases)
- Varying data display and introduction to spatial analysis of relationships in GIS
- Manipulating tables in GIS (building queries and joining tables)
- Introduction to GPS and adding GPS-based data to a GIS
- Acquiring and integrating GIS data from different sources (incl. Internet sources)
- GIS-based research project (including data collection and data creation in GIS)
- Presenting results from a GIS-based project
- Use GIS to make decisions in a particular application problem
- Integrate data from different sources to build a GIS to explore an issue of interest

ArcGIS Skills
- Classify and display themes
- Use distance and scale to analyze spatial data
- Create, edit and query databases in ArcView
- Analyze spatial relationships using points, lines, and polygons
- Create and manipulate shape files and themes
- Collect, analyze, and describe data in an independent project using GIS

CREDIT INFO: 1 credit, Dual Enrollment. This course cannot be used to satisfy one of the science requirements for the Standard or Advanced Studies Diploma.