Eastern Illinois University
New Course Proposal
GEG 3860, Geographic Information Systems 2

Please check one:  ☒ New course  ☐ Revised course

PART I: CATALOG DESCRIPTION

1. Course prefix and number: GEG 3860
2. Title: Geographic Info Systems 2
3. Long title: Geographic Information Systems 2
4. Class hours per week, lab hours per week, and credit: 2-2-3
5. Term(s) to be offered:  ☐ Fall  ☒ Spring  ☐ Summer  ☐ On demand
6. Initial term of offering:  ☐ Fall  ☒ Spring  ☐ Summer  ☐ Year: 2009
7. Course description: Using geographic information systems (GIS) software, students will analyze and solve problems by applying advanced spatial analysis, automation of spatial and attribute data, advanced editing, and advanced options for cartographic display and thematic mapping. Supplemental to this course, students may work towards and obtain the ESRI Introduction to ArcGIS II Certificate.

8. Registration restrictions:
   a. Identify any equivalent courses: None
   b. Prerequisite: GEG 3810 Geographic Information Systems 1
   c. Who can waive the prerequisite(s)?
      ☒ No one  ☐ Chair  ☐ Instructor  ☐ Advisor  ☐ Other (Please specify)
   d. Co-requisites (course(s) which MUST be taken concurrently with this one): None
   e. Repeat status:  ☒ Course may not be repeated.
   f. Degree, college, major(s), level, or class to which registration in the course is restricted, if any: None
   g. Degree, college, major(s), level, or class to be excluded from the course, if any: None

9. Special course attributes [cultural diversity, general education (indicate component), honors, remedial, writing centered or writing intensive] None

10. Grading methods (check all that apply):  ☒ Standard letter  ☐ C/NC  ☐ Audit  ☐ ABC/NC
    (“Standard letter”—i.e., ABCDF--is assumed to be the default grading method unless the course description indicates otherwise.)

11. Instructional delivery method: lecture  lab combined
PART TWO: ASSURANCE OF STUDENT LEARNING

1. List the student learning objectives of this course:

   Upon successful completion of this course, students will be able to:

   - Apply advanced spatial analysis techniques;
   - Collect and manage spatial / tabular data;
   - Examine geocoded data using a locator service;
   - Employ data automation and conversion techniques;
   - Apply advanced editing techniques to GIS data;
   - Create and edit geospatial metadata files; and
   - Synthesize information to produce advanced maps and reports.

2. Assignments/activities the instructor will use to determine how well students attained the learning objectives:

   - Mid term Examination  30%
   - Laboratory Exercises  40%
   - Final Examination  30%

3. Explain how the instructor will determine students’ grades for the course:

   Undergraduate students will demonstrate proficiency in GIS theory and application through completion and submittal of laboratory assignments and written reports. Students are expected to produce and use maps, graphs, charts, and reports providing support to a number of proposed problems, scenarios, and theoretical events thereby exemplifying their cartographic skills and ability to use GIS as a problem-solving tool through often complex spatial analyses. Their ability to evaluate spatial data concepts, analyze the spatial relationships and synthesize the information into an integrated visualization of the information at an advanced level will be stressed. Laboratory exercises 40%, Mid-term examination 30%, Final examination 30%

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>30% Mid-Term Exam</th>
<th>30% Final Exam</th>
<th>40% Lab Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply advanced spatial analysis techniques</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Collect and manage spatial / tabular data</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Examine geocoded data using a locator service</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Employ data automation and conversion techniques</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Apply advanced editing techniques to GIS data</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Comprehend advanced editing techniques of GIS data</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Describe the structure of geo-spatial data sets by creating and editing metadata files</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Synthesize information to produce advanced maps and reports</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

5. For courses numbered 4750-4999, specify additional or more stringent requirements for students enrolling for graduate credit. Not Applicable

6. If applicable, indicate whether this course is writing-active, writing-intensive, or writing-centered, and describe how the course satisfies the criteria for the type of writing course identified. (See Appendix *.)

    Not applicable

PART III: OUTLINE OF THE COURSE

The course will meet 30 times during the semester (two 100 minute periods per week)

   **Week 1**  
   Advanced Map Symbology I

   Quantitative displays and map classification

   **Week 2**  
   Advanced Map Symbology II

   Using and creating Stylesheets

   **Week 3**  
   Advanced Labels & Annotation

   Using the Maplex Extension, Creating Expressions for Labeling

   **Week 4**  
   Advanced Geocoding

   Creating Address Locators, Using ESRI Geocoding Services

   **Week 5**  
   Modifying the ArcGIS Interface

   Customizing the ArcGIS Interface, Creating custom toolbars, saving customizations

   **Week 6**  
   Designing a GIS Database I

   Introduction to Geodatabase Design Concepts, Creating and Editing Geodatabase Schema

   **Week 7**  
   Designing a GIS Database II
Introduction to Geodatabase Design Concepts, Creating and Editing Geodatabase Schema

**Week 8**
**Geodatabase Population**

Importing and Exporting GIS data into the Geodatabase, Spatial Reference and Coordinate Domains

**MIDTERM EXAM**

**Week 9**
**Validating the Geodatabase I**

Creating and Using Geodatabase Subtypes and Domains

**Week 10**
**Validating the Geodatabase II**

Creating and Using Topologies, Spatial Integrity

**Week 11**
**Advanced Editing I**

Editing Spatial and Attribute Data

**Week 12**
**Advanced Editing II**

Editing Topologies

**Week 13**
**Spatial Adjustment**

Spatially Adjusting GIS and CAD data

**Week 14**
**Advanced Geoprocessing I**

Geoprocessing Techniques in ArcGIS

**Week 15**
**Advanced Geoprocessing II**

Geoprocessing Techniques using ModelBuilder

**FINAL EXAM**

**PART IV: PURPOSE AND NEED**
1. Explain the department’s rationale for developing and proposing the course.

This course will directly address goals 1 through 5 in the Geography Program Student Learning Assessment Plan. Geographic Information Systems allow us to see spatial patterns, relationships and trends in physical, cultural and economic variables in ways that charts, graphs, and tabular datasets cannot present. This course provides the framework upon which students will develop advanced ArcView, ArcEditor, and ArcInfo skills necessary to perform complex spatial analyses and advanced cartographic design. Whether mapping how, when, where or why, GIS is important over a wide range of disciplines. GIS is both tool and science and imparts the framework with which geographic data is organized, analyzed and disseminated.

2. Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.

The prerequisite for the course is GEG 3810 Geographic Information Systems 1. The course is set up to accommodate juniors, seniors who have experience in using basic drafting programs and introductory GIS functionality. It will expand what the students have learned in GEG 3810 and related courses in their discipline.

3. If the course is similar to an existing course or courses, justify its development and offering.

The course, along with GEG 3810, will replace GEG 4890 Geographic Information Systems. As mapping software becomes more sophisticated and complex, it takes additional class time to introduce the basics and then move on to higher order functionality of the software. We are setting up the proposed GEG 3810 and GEG 3860 courses to extend the instruction time spent on the GIS software and replace the one semester long GEG 4890 course.

4. Impact on Program(s):

The course will be an elective in the Geographic Techniques/Spatial Analysis Concentration in the Geography BS Major and in the Geography Minor. It will be a required course in the Interdisciplinary Geographic Information Sciences Minor

PART V: IMPLEMENTATION

1. Faculty member(s) to whom the course may be assigned:

This course will initially be delivered by Mr. Steven Di Naso, FA, under the guidance, direction, and supervision of Dr. Vincent P. Gutowski, Professor of Geography. Later, any qualified Geography faculty may teach this course.

2. Additional costs to students:

$30 course fee for use of the Geology/Geography Department computer lab.

3. Text and supplementary materials to be used (Include publication dates):

PART VI: COMMUNITY COLLEGE TRANSFER

A community college course will not be judged equivalent to this course.

PART VII: APPROVALS

Date approved by the Department of Geology/Geography: **29 October 2007**

Date approved by the College of Sciences Curriculum Committee: **30 November 2007**

Date approved by CAA: **24 January 2008**