PART I: CATALOG DESCRIPTION

1. Course prefix and number: GEG 3810
2. Title: Geographic Information Systems 1
3. Long title: Geographic Information Systems 1
4. Class hours per week, lab hours per week, and credit: 2-2-3
5. Term(s) to be offered: X Fall □ Spring □ Summer □ On demand
6. Initial term of offering: X Fall □ Spring □ Summer □ Year 2008
7. Course description: An introduction to geographic information systems (GIS) using ESRI ArcGIS. Students will create, georeference, and edit a spatial geodatabase, query and analyze data and produce informative, functional cartographic output. Supplemental to this course, students may optionally work towards and obtain the ESRI Introduction to ArcGIS 1 Certificate.
8. Registration restrictions:
   a. Identify any equivalent courses: None
   b. Prerequisite(s): none
   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):
   e. Repeat status: X Course may not be repeated.
      □ Course may be repeated to a maximum of ______ hours or ______ times.
   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): X 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 use GIS theory and software to explore, analyze and synthesize spatial data including:

   - Create and edit a spatial geodatabase;
   - Identify, use, query, and display spatial and temporal data;
   - Query Tables using Expressions;
   - Analyze features using simple Spatial Relationships;
   - Edit Spatial and Attribute Data; and
   - Synthesize information to produce maps, reports, and graphs using GIS software.

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 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>
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<tbody>
<tr>
<td>Display Geographic and Tabular data</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Identify, use, query, display spatial / temporal data</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Query Tables using Expressions</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Analyze features using simple Spatial Relationships and</td>
<td>X</td>
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<td>Tables using Expressions</td>
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<tr>
<td>Edit Spatial and Attribute Data</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Synthesize information to produce maps, reports, and</td>
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<td>X</td>
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<td>graphs using GIS software</td>
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<tr>
<td>Produce Maps, Reports, and Graphs</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
4. Not technology delivered.

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**  
**INTRODUCTION, EXPLORING GIS CONCEPTS**


**Week 2**  
**DISPLAYING MAP DATA**

Introduction to the ArcGIS Interface. ESRI Object Data, Adding & Displaying Map Data. Layer symbology in ArcMap, Managing the Table of Contents, the Layer Properties Dialog. Working with Shapefiles, tables and Raster Data.

**Week 3**  
**QUERYING A DATABASE, WORKING WITH SPATIAL DATA**


**Week 4**  
**THE ESRI GEODATABASE, EDITING TABULAR DATA**

Introduction to the Personal Geodatabase; Working with Feature Classes and Tables in the Geodatabase. Adding Tabular Data, Creating Tables, Adding Fields & Records, Field Calculations, Querying Tables, Joins and Relates, Charts. .TXT, .XLS, .DBF, .INFO, .CSV, .MDF files, importing. Joins and Relates; One to One, One to Many & Many to Many Tabular Relationships in GIS.

**Week 5**  
**PRESENTING MAP DATA**


**Week 6**
WORKING WITH ANNOTATION AND LABELS

Annotation and Labeling in ArcMap, Label Visibility & Placement, Setting a Reference Scale, Creating Annotation, Working with the Labels Overflow Window.

Week 7
ADVANCED LABELS & ANNOTATION

Adding New Annotation Groups, Labels Toolbar, Draw Tool Bar; Advanced Annotation Editing

Week 8
GEOPROCESSING


MIDTERM EXAM

Week 9
GEOCODING

An introduction to Geocoding and the Geocoding Process including Geocoding Tables, Finding an, and using the Find Tool.

Week 10
SPATIAL ADJUSTMENT & ANALYSIS FUNCTIONS, GEOREFERENCING

Overview of Spatial Adjustment; Transformation, Displacement Links, RMS error, Rubber-Sheeting, Aggregating Spatial Data, Spatial Analysis techniques

Week 11
ELLIPSIODS, DATUMS, GEOGRAPHIC COORDINATE SYSTEMS, AND PROJECTIONS


Week 12
PROJECTED COORDINATE SYSTEMS


Week 13
EDITING GIS SPATIAL AND TABULAR DATA

Simple Editing Functions; Working with Sketches, Edit Tasks, Editing Tools & the Editor Toolbar

Week 14
SETTING GEODATABASE VALIDATION RULES

Introduction to Subtypes and Domains, Topologies: Concept & Design. Three States of a Topology

Week 15
CUSTOMIZING THE ARCGIS INTERFACE

Data View Options, Layout View Options, Table of Contents Options, Quantitative Displays, Choosing a Classification Method, Stylesheets, Advanced Drawing Options, Exporting Maps, Symbol Selector (more symbols), Saving Symbols
PART IV: PURPOSE AND NEED

1. Explain the department’s rationale for developing and proposing the course.

   Geography Matters: Students in any discipline will benefit by taking this course. For Geography Majors, the course will directly address Goals 1 through 5 in the Geography Program Student Learning Assessment Plan. Geographic Information Systems allow us to see 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 basic ArcView, ArcEditor, and ArcInfo skills and is designed for those who are new to ESRI ArcGIS and new to Geographic Information Systems in general. The course offers the basic ArcGIS knowledge and experience needed to enroll in Geographic Information Systems 2. Whether mapping how, when, where or why, GIS has become mainstream practice. GIS is both tool and science and imparts the framework with which geographic data are organized, analyzed and disseminated.

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

   The course has no prerequisites. However, the level of the course is set quite high to allow juniors, seniors and graduate students, those who have learned the systematic of their disciplines, to apply analytical mapping techniques to assist in queries and displays of data that has a spatial component.

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

   The course 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.
If this is a graduate course and the department does not currently offer a graduate program, it must document that it employs faculty qualified to teach graduate courses.

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):

   ISBN: 158948083X

**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**