COURSE SYLLABUS

Southeast Missouri State University

Department of Physics and Engineering Physics Course No. IU314/GO514

Title of Course: GeoInfo Science Today Revision

New Fall 2012

I. Catalog Description and Credit Hours of Course:

A. Catalog – The history, relevancy, and applications of geotechnology in today's society. Two hours of lecture and one two hour lab. (3)

B. US Handbook – This course provides an overview of geographic information science (GIScience). This includes knowledge-based compu tational modeling of activities and processes in the human and natural environments using geospatial data and geographic information system (GIS) technology. Impacts of GIS technology on individuals and society with respect to past, current and future trends will be examined. Review of discipline-specific applications, along with use of geographic data and GIS software, will be employed for issue analysis and problem solving.

II. Interdisciplinary Nature of the Course:

Geographic Information Science is the field of study which assesses and/or interprets the distribution of natural phenomena and human activities across different scales using geospatial information technologies and methodologies, such as remote sensing and GIS. The complex nature and interrelatedness of said phenomena and activities require multidisciplinary solutions which GIScience addresses. It incorporates recent developments in cognitive and information science into traditional geographic and cartographic approaches of problem solving. Moreover, since GIS methodology is used in dealing with some of society's most pressing issues, such as crime, health, and disaster response, GIScience draws from other specialized fields like computer science, psychology, political science and anthropology.

III. Prerequisite (s):

Completion of core University Study courses in logical systems, physical systems, and social systems.

IV. Purposes or Objectives of the Course:

Numbers in parentheses refer to US program objectives met by each course purpose.

A. To inform students about the variety of geospatial data available for decision making and problem solving and the GIS tools used to obtain, process, and apply these data. (1, 2, and 6)

B. To make students adept at creating maps and other output products used to convey analytical findings and report problem study results. (2 and 3)

C. To demonstrate the importance and value of using geographic information and geotechnology to address societal problems and the means to solve them. (2, 6 and 7)

V. Student Learning Outcomes (Minimum of 3)

A. Identify the differences that exist between computer file structures used to store geographic information and the ways it can be accessed, retrieved, and displayed. (Locate and Gather Information)

B. Use analytical functions that enable the extraction of relevant information from a GIS database to create maps, tables, or charts from it. (Critical Thinking)

C. Describe the role of GIS in the work of various agencies involved in activities that incorporate a spatial component, such as public health, urban planning, and precision agriculture, and its usefulness as a problem-solving tool. (Breadth and Diversity)

VI. Expectations of Students:

A. Attend all meetings and participate in classroom discussion and lab activities.

B. Write a 4-6 page paper reporting the findings of either library research conducted on a course-related topic or the preliminary results obtained from data analyzed using GIS software and evaluation procedures. **Graduate students are required to do the latter.**

C. Give a minimum of a 10 minute powerpoint presentation of the aforementioned findings/results to the class.

D. Perform satisfactorily on examinations, class assignments and lab activities.

VII. Course Content or Outline (Indicate number of class hours per unit or section):

	Hours
Week 1 Lecture: Course Introduction and Overview (4 and 6) What is GIScience? What is a Geographic Information System (GIS)? **No Lab**	**2**
Week 2 Lecture: Representation of Geographic Information (Part 1) Cartography and Maps (1 and 6)	**2**
Lab 1: Display of Maps/Images via Google Earth and other Metadata Sources	**2**
Week 3 Lecture: Representation of Geographic Information (Part 2) Remote Sensing and Imagery (2 and 3)	**2**
Lab 2: Maps, Coordinate Systems and Projections	**2**
Week 4 Lecture: Representation of Geographic Information (Part 3) Digital Databases (1 and 3)	**2**
Lab 3: Utilization of appropriate software functions to display maps, images and attribute data	**2**
Week 5 Lecture: Virtual Modeling of the Real World (Part 1) Vector Data Model and Vector GIS (2 and 6)	**2**
Lab 4: Illustration of Vector Data Types for representing geographic entities and phenomena	**2**

Week 6 Lecture: Virtual Modeling of the Real World (Part 2) Raster Data Model and Raster GIS (2 and 6)	**2**
Lab 5: Illustration of Raster Data Types for representing geographic entities and phenomena	**2**
Week 7 Lecture: Digital Data Entry (1, 2 and 3) Gathering Information and Creating Maps	**2**
Lab 6: Geocaching and GPS data collection	**2**
Week 8 Lecture: Test #1 Mid-Term Exam **No Lab**	
Week 9 Lecture: Spatial Data Query (1 and 2) Geographic and Attribute Searches	**2**
Lab 7: Spatial Query using Vector and Raster GIS methods	**2**
Week 10 Lecture: Spatial Analysis (2 and 6) Data Evaluation and Interpretation	**2**
Lab 8: Demonstration of Map Overlay procedures and Site Suitability analysis	**2**
Week 11 Lecture: Use of GIS for Problem Solving City Planning and Facilities Management (2, 7 and 9)	**2**
Lab 9: Relevant Case Study example	**2**
Week 12 Lecture: Use of GIS for Problem Solving Public Health and Safety (2, 7 and 9)	**2**
Lab 10: Relevant Case Study example	**2**
Week 13 Lecture: Use of GIS for Problem Solving Precision Agriculture (2, 7 and 9)	**2**
Lab 11: Relevant Case Study example	**1 (45)**
Week 14 Lecture: Test #2 **Lab 12:** Assignment of Capstone Projects dealing with topic/issue of interest similar to previously presented case studies.	
Week 15 Lecture: Preparation for Capstone Projects **Lab 13:** Preparation for Capstone Projects (Cont.)	
Week 16 Lecture: Student Presentations of Capstone Projects **Lab 14:** Student Presentations of Capstone Projects (if needed)	
Final Exam: Capstone Project Written Report	

VIII. Textbook(s) and/or Other Required Materials or Equipment:

The textbook used in this course is Getting Started with Geographic Information Systems, 4th ed. (2010), by Keith C. Clarke which is part of the Prentice Hall Series in Geographic Information Science.

IX. Basis for Student Evaluation:

A. Results of two examinations, comprised of objective and short-essay questions, account for 50% of the course grade.

B. Lab activities/exercises constitute 30% of the overall grade.

C. The capstone project paper/presentation is worth 20% of the total grade for this course.

D. It is required that graduate students (unlike undergrads who can opt to undertake the writing and presentation of an approved topical report based on library/internet sources) incorporate more originality in their capstone project by acquiring and analyzing geospatial data using appropriate software to derive their results.