University of North Carolina at Charlotte **GEOG 5-14-08**

Changes in Major Requirements for the BA and BS in Geography and Changes in Curriculum in Geographic Information Science & Technologies

I.A. Title

Changes in Major Requirements for the BA and BS in Geography and Changes in Curriculum in Geographic Information Science & Technologies

II.A. Proposal Summary and Catalog Copy

Summary

The Department of Geography and Earth Sciences proposes to restructure elements of the current Geographic Information Science and Technologies (GI S&T, hereafter) curriculum and change degree requirements with the BA and BS in Geography to reflect more emphasis in GI S&T. When this process is completed the Department will have created a new option within Geography that will include new undergraduate and graduate courses in GI S&T, and changed existing geography curriculum by renumbering existing courses, modifying the content of existing courses and cross-listing some existing 4000-level courses with 5000-level equivalents. (See Table 1)

Proposed Changes in Catalog Copy

1. Changes in Requirements for Majors in the BA and BS in Geography

Delete the requirement of Geog 2100 Maps and Graphs and 2101 Maps and Graphs Lab for the majors in the BA and BS in Geography.

Add the requirement of Geog 2103, Elements of GIScience and Technologies as a requirement for the BA and BS in Geography.

Add the requirement of Geog 4120, Fundamentals of GIS, as a requirement for the BS in Geography.

2. Changes in Existing Courses in Geography -- Content To Be Modified and Course description to be modified)

Geog 2103 Elements of GIScience and Technologies (proposal is attached).
Change course from 3 credit hour elective to 4 credit hour, lab based course.

New course description:
GEOG 2103. Elements of GIScience and Technologies (4). This course covers the fundamentals of Geographic Information Science (GIS), related technologies used in GIS, and how GIScience is being applied in such diverse fields as

planning, marketing, criminal justice, health, natural resources, information technology and engineering. Students will learn the processes to collect, organize, analyze and display geographic data using GIS and will be introduced to related technologies including GPS, Air Photo-Interpretation and basics of Remote Sensing. Students will also cover mapping basics including scale, projections, coordinate systems, data classification, and cartographic design. (Fall and Spring)

Geog 4103/5103 Computer Programming for GIS Applications (proposal is attached) Change in catalog description.

New course description:
GEOG 4103. Computer Programming for GIS Applications. (3) Prerequisite: GEOG 2103 or consent of instructor. Software program development for GIS and mapping applications using high level programming languages such as Visual Basic. Emphasis on the design and implementation of geographic data structures and algorithms. (Fall)

Geog 4120/5120 Fundamentals of GIS. Proposed change in course prerequisite and change in catalog description to make Geog 2103 the prerequisite for this course.

New Catalog Copy

GEOG 4120. Fundamentals of Geographic Information Systems. (4) Prerequisite: GEOG 2103 or consent of instructor. Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Three lecture hours, one two-hour lab per week. (Fall, Spring)

GEOG 5120. Fundamentals of Geographic Information Systems. (4) Prerequisite: Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Three lecture hours, one two-hour lab per week. (Fall, Spring)

3. New Courses To Be Added to the Geography Undergraduate and Graduate Curriculum (syllabi and consultations are attached)

Geog 4131/5131 Environmental Modeling with GIS (4 credits). Prerequisite: Geog 4120/5120 or consent of the instructor. Theories and practices of modeling the environment with GIS. Topics include types of spatial modeling frameworks; GIS data sources and measurement technologies for environmental modeling; development, calibration, and validation of environmental models; 3-dimensional

modeling and visualization of physical processes; and spatial analysis of human-environment interactions. (Fall or Spring).

Geog 4132/5132 Spatial Modeling for Social and Economic Applications (4 credits). Prerequisite: Geog 4120/5120, or consent of the instructor. Theories and practices of spatial modeling with social and economic applications. Topics include (1) simulation models for land use change, smart growth, object movement, and homeland security planning; (2) integrated models – spatial – non-spatial, topological – ontological, deterministic – stochastic; (3) agent-based models. Lab exercises employ various spatial modeling tools (Fall or Spring).

Geog 4150/5150 Spatial Database Development with GPS and GIS (4 credits). Prerequisites: Geog 4120/5120, or permission of instructor. This course consists of tutorials, readings, projects, and discussions of how geo-technologies can be used to create digital geographic databases: designing conceptual databases using entity-relationship approach, transforming GPS data, geo-registering scanned base maps, digitizing vector features, entering attribute data, and developing Mobile GIS applications (Fall or Spring).

II.B. Justification

The Need

The proposed restructuring of the requirements of the BA and BS in Geography and the addition of new courses as well as changes to, and renumbering of, existing courses reflects a need to respond to substantive changes in discipline. These proposed changes requirements and curriculum are part of a substantive effort to revamp and update existing GIScience curriculum in Geography and Earth Sciences. The changes are necessary in order for the department to keep pace with GIS & T programs around the nation. As can be seen in the attached diagram (GIScience & Technology Course Plan), seven more new courses will be proposed for graduate courses at the 6000/8000 level.

Eventually, the Department would like to develop a comprehensive GI S&T (GI S&T) curriculum at the undergraduate and graduate levels to help students develop sound and balanced knowledge and abilities in new technologies and be competitive in professional and academic job markets. At a later date the department will also request permission to add a GIS Certificate program at a graduate level.

The Course Numbers

The 2100 and 4100 level numbers signify undergraduate students only and the 5100 level signifies graduate students. The last two digits designate particular courses.

II.C. Impacts

Groups of Students Served By These New and Revised Courses

The courses specified in this proposal will be a part of the curriculum for the BA, BS and MA in Geography, and the BS and MS in Meteorology, Earth Sciences and Geology. These courses are designed primarily for students in these two programs. However, the courses will be open to students from other programs on campus as long as they have instructor approval.

Frequency, Enrollment, and Effects of the Proposed Class

These classes will be taught as regular course offerings. Geog 2103 and 4120/5120 will be offered every semester. We anticipate an enrollment of 15-24 in Geog 2103 and 4120/5120, and 5-15 students in Geog 4103/5103, 4131/5131, 4132/5132 and 4150/5150 courses. It is possible that 2-3 students from other programs may wish to include selected courses in their plans of study.

II.D. Resources Required to Support Proposal

Personnel

No additional faculty is needed.

Physical Facility

None. These classes can be taught in existing seminar rooms and GIScience labs on campus.

Equipment and Supplies

None. Standard presentation equipment and existing computer labs are in place.

Computers

None.

Audio-Visual

None. Equipment is currently available in the department.

Other Resources

None.

II.E. Consultation with the Library and Other Departments or Units

Library Consultation

Consultations with the Library Reference staff were initiated by faculty members for their respective courses. Memoranda certifying that the library holdings are adequate follow the syllabi for each course.

Consultation with Other Departments or Units

Software and Information Systems/Computer Science
Criminal Justice
Political Science
Sociology
Biology
Engineering

II.F. Initiation and Consideration of the Proposal

Originating Unit:
Geography and Earth Sciences

Other Considering Units:

Software and Information Systems/Computer Science
Criminal Justice
Political Science
Sociology
Biology
Engineering

II.G. Attachments

Attached in the following pages are the proposed changes courses and/or course proposal for new courses including the proposed catalog description, course syllabus, departmental consultations, and library consultations (page numbers are listed to the right).

Course Number	Title	Page
GEOG 2103	Changes in Elements of GI S&T	6
GEOG 4103.	Computer Programming for GIS Applications	16
GEOG 4120/5120	Fundamentals of Geographic Information Systems	24
GEOG 4131/5131	Environmental Modeling with GIS	26
GEOG 4132/5132	Spatial Modeling for Social and Economic Applications	31
GEOG 4150/5150	Spatial Database Development with GPS/GIS	36

Proposed Changes in GEOG 2103 – Elements of GIScience and Technologies

I. TITLE: Proposed Changes in Course: GEOG 2103 Elements of GIScience and Technologies

II.A. Proposal Summary and Catalog Copy

1. Summary
The Department of Geography and Earth Sciences proposes to substantially revise an existing course within its undergraduate curriculum: GEOG 2103 Elements of GIScience and Technologies. This course is currently designed as an elective primarily for students in the GIScience and Technology program within Geography and for those in the B.A. and B.S. programs in Geography. This proposal would add other GI S&T curriculum components, a hands-on lab and make the course a requirement for BA and BS in Geography. It may serve as an elective for Earth Science students, and those from outside departments.

2. Proposed Catalog Copy
GEOG 2103. Elements of GIScience and Technologies (4). This course covers the fundamentals of Geographic Information Science (GIS), related technologies used in GIS, and how GIScience is being applied in such diverse fields as planning, marketing, criminal justice, health, natural resources, information technology and engineering. Students will learn the processes to collect, organize, analyze and display geographic data using GIS and will be introduced to related technologies including GPS, Air Photo-Interpretation and basics of Remote Sensing. Students will also cover mapping basics including scale, projections, coordinate systems, data classification, and cartographic design. (Fall and Spring)

II.B. Justification

1. Need Addressed
Elements of GIScience and Technologies is the core introductory course for the new GIScience and Technologies concentration within the Department of Geography and Earth Sciences. The current course was initially created to offer an introductory elective GIS class to geography majors who are not interested in pursuing a GIS option, and for non-majors who have little spatial knowledge or experience. The course is now being recommended as a requirement for all geography majors because GIS has become an industry standard for jobs in geography. At the same time, GIS academic programs at universities around the nation and internationally are transitioning from Geographic Information Systems to GI-Sciences so that they approach the subject from a more holistic perspective, incorporating related information technologies, and viewing GIS as a collective of spatial analysis and problem solving thought processes and techniques. There is a high demand by students, for programs that offer a series of courses that prepare students to enter the GIScience workplace. In order for our department to remain at the forefront of GIS, and attractive to the global student market, we must make

significant changes in our program offerings. The changes proposed for the Elements of GIScience and Technologies course will better prepare the students for more advanced coursework in the GI-Sciences and Technologies program.

Note that this change in the existing course (Geog 2103) proposes that it be taught as a 4-credit course. Given the very hands-on, practical nature of the material, a lab component is a pedagogical must for students to grasp the material and become well prepared for intermediate and advanced level work in the GISciences.

2. Prerequisites

None

3. Course Numbering

Elements of GIScience and Technologies is listed at the 2000 level to reflect its introductory undergraduate nature and its role as the foundation for the new GIScience and Technologies program. The 2100 listing is currently used by Maps and Graphs. Elements of GIScience and Technologies will combine elements of GIS – Survey of Applications and Techniques and Maps and Graphs, thus the course number 2103 will be available for this course.

4. Improvement

The current introductory level GIS course (Geog 2120: GIS – Survey of Applications and Techniques) was originally designed as a stand-alone elective that provided students with an overview of Geographic Information Systems. Over time, however, it has evolved into an informal prerequisite to Geog 4120/5120: Introduction to GIS and is now proposed as a formal prerequisite. Geog 4120/5120 demands that students already have the introductory spatial knowledge and experience that Geog 2103 provides. The new Geog 2103: Elements of GIScience and Technologies thus serves as a natural prerequisite to the evolving Geog 4120 Introduction to GIS. The changes in the course structure and content provide the improvements necessary for it to serve as the prerequisite to most of the 4000-level GIScience and Technologies courses.

II.C. Impact

1. Groups of Students Served by the Course

This course is aimed primarily at undergraduates in the BA/BS in Geography, BS degrees in Earth Science, Geology and Meteorology. It is also aimed at those undergraduates enrolled in the Urban Studies minor, and can serve as an elective for related disciplines (e.g., sociology, criminal justice, computer sciences, biology, and engineering), and for students who have not yet declared a major.

2. Effect on Existing Courses and Curricula

GEOG 2103 will be taught year around. The current GEOG 2103 course attracts from 15-24 students per semester. Because it will become a required course in the GIS & T program, it is anticipated that the new course will attract 20-24 students in both the fall

and spring semesters. It is expected that perhaps 10-15 percent of the enrollment each semester will come from outside departments.

II.D. Resources Required to Support Proposal

1. Personnel
   No new personnel are necessary.

2. Physical Facility
   Adequate.

3. Equipment and Supplies
   Current equipment and budgets are sufficient.

4. Computer Needs
   Adequate.

5. Audio-visual Needs
   Adequate

6. Other resources
   None necessary

7. Funding for Additional Resources
   None necessary.

II.E. Consultation with Library and Other Departments/Units

1. Library Consultation:

   a. Consultation with Library staff attached.

2. Consultation with other departments or units (attached).

   a. Computer Science
   b. Sociology
   c. Engineering

II.F. Initiation and Consideration of the Proposal

1. The Department of Geography and Earth Sciences received this proposal and passed it unanimously on October 12, 2007.

2. The proposal was approved by the College of Arts and Sciences Curriculum Committee on _____ and by the College Faculty on _____.

II.G. Attachments

1. Proposed Course Syllabi
2. Library Consultation
3. Sociology Consultation
5. Computer Science Consultation
6. Engineering Consultation

Department of Geography & Earth Sciences
Syllabus
GEOG 2103 – Elements of GI S&T

Introduction:

This course covers the fundamentals of Geographic Information Science (GIS), related technologies used in GIS, and how GIScience is being applied in such diverse fields as planning, marketing, criminal justice, health, natural resources, information technology and engineering. Students will learn the processes to collect, organize, analyze and display geographic data using GIS and will be introduced to related technologies including GPS, Air Photo-Interpretation and basics of Remote Sensing. Students will also cover mapping basics including scale, projections, coordinate systems, data classification, and cartographic design. Students will carry out a series of lab exercises to reinforce theory and improve technique.

The primary objectives of the course are for the student to be able to:

- Define and describe a GIS;
- Identify the components of a GIS;
- Understand the process and elements of a GIS project;
- Become familiar with several applications of GIS;
- Collect spatial data according to project aims;
- Design a spatial database;
- Input and manipulate tabular and spatial data;
- Understand the basics of map scale and map projections;
- Understand the location, measurement and plotting (geocoding) of geographic information in relation to map coordinate systems;
- Use a GPS to collect and plot Latitude and Longitude data;
- Understand the basic principles of aerial and orthophotography and remote sensing;
- Interpret landcover/landuse from air photos and remote sensing imagery;
- Transfer image interpretations to maps and digital data layers;
- Carry out spatial analysis according to project objectives;

- Understand the basic principles of graphic (maps and graphs) design;
- Prepare presentation materials (maps, graphs, tables) of good quality cartographic standards;

Topics to be covered for achieving the above objectives are listed in the course outline below.

Lecturer: Laurie Garo

Office Number/Phone McEniry 428; ph. 687-5981

Email lagaro@email.uncc.edu

Office Hours: Mondays & Wednesdays: 9:00 - 11:00 am,
Tuesdays and Thursdays 11 am to noon or by appointment.

Class Period: Tuesday & Thursday, 9:30 - 10:50 am and
Monday & Wednesday 11 am – 12:15 pm

Venues: Lectures: McEniry 401
Labs: McEniry 420 (lab days specified in outline below)

Assessment:

Class/Lab Exercises	40%
Midterm Examination	15%
Final Examination	25%
GIS Projects	15%
Class Attendance	5%

Late Policy Ten percent will be automatically deducted from all exercises that are handed in after the stated deadline. Any project handed in more than 2 weeks late will **NOT** be accepted.

Course Web Page **http://personal.uncc.edu/lagaro/2103/index.html**

Web Sites:

1. http://www.ncgia.ucsb.edu/giscc/cc_outline.html
2. http://info.er.usgs.gov/research/gis/title.html
3. http://maps.esri.com/
4. http://www.colorado.edu/geography/gcraft/notes/intro/intro_f.html
5. http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html
6. http://carstad.gsfc.nasa.gov/
7. http://rst.gsfc.nasa.gov/
8. http://rst.gsfc.nasa.gov/start.html
9. http://www.cmpd.org/
10. http://cmpd.cicp.org/
11. http://data.geocomm.com/

Textbook Lo, C.P. and A.K.W. Yeung, 2007: Concepts and Techniques of Geographic Information Systems

Course Pack Course Pack for Geography 2103, Spring 2005, by Laurie Garo, available at Grays Bookstore.
Note: All lab exercises and lecture handouts/notes are found in the course pack.

Student Academic Integrity

All UNC Charlotte students have the responsibility to be familiar with and to observe the requirements of The UNC Charlotte Code of Student Academic Integrity (see the Catalog). This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at www.uncc.edu/unccatty/policystate/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Course Outline:	**Lectures/Exercises**	**Web Sites(W) ; Notes (N)**
Week 1	Introduction; Overview of Syllabus; Overview of Lab Sessions; General description of GIS & its Applications Video: "GIS - Behind The District 2000-2001"	**W: 1**
	McEniry 134 - Introduction to GIS: Fundamentals of GIS; Elements of a GIS Project;	**W: 2, 4,** **N: 1**
	Exercise 1: Review of a GIS Application	**W: 3**
Week 2	McEniry 437a – Introduction to ArcGIS Basics	
	Exercise 2: ArcGIS Basics	
	McEniry 134 - Characteristics of Spatial Data;	

	Data Structures; Metadata; GIS Database Design	**N: 2**
	Exercise 2, continued (go to lab following lecture)	
Week 3	McEniry 437a - Attribute Data Input and Management	
	Exercise 3: Attribute Data Input/Joins	
Week 4	McEniry 437a - Queries using Attribute Data	
	Exercise 4a: Attribute Data Queries	
	McEniry 437a – Introduction to Graphical Data Presentation in ArcGIS	**N: 3**
	Exercise 4b: Graphical presentation of data queries	
Week 5	McEniry 437a - Understanding Map Scale: Large vs Small Scale Scale calculations and conversions	
	Exercise 5: Map Scale	
Week 6	McEniry 437a – Introduction to Map Projections; Types and Uses of Map Projections; Projection Conversions	
	Exercise 6: Map Projections	
Week 7	McEniry 437a – Aerial Photography Principles of Air and Ortho Photos	**W: 6**
	Exercise 7: Air Photo Interpretation & Mapping	
Week 8	McEniry 437a - Introduction Remote Sensing and Image Interpretation	**W: 7, 8**
	Exercise 8: Remote Sensing Interpretation & Mapping; **Exam Review**	
Week 9	**S P R I N G B R E A K**	
Week 10	McEniry 134 - **MIDTERM EXAMINATION**	

	McEniry 437a: Graphical Data Input; Preprocessing; Digitizing & Scanning; Geocoding; Introduction to GPS	**W: 5; N: 4**
	Exercise 9a: GPS surveying (field)	
Week 11	McEniry 437a - Exercise 9b: Plot GPS Data	**N: 5**
Week 12	McEniry 437a - Spatial Analysis using Census Data; Data Classification using GIS Exercise 10: Choropleth Mapping for Comparison of Data Classifications	
Week 13-15	McEniry 437a - Application of Spatial Analysis: Crime Analysis & Mapping	
	Exercise 9: Crime Analysis & Mapping	
Last Day of Classes	McEniry 437a - **Exam Review**; Complete Lab Exercises	
Exam Date:	**FINAL EXAMINATION -- 8:00 to 11:00 am** **McEniry 134**	

GEOG2103 Departmental Consultations

31 March 2005

Dear Laurie,

The ECE department approves your new course.

Lee

Laurie,
Sociology and Anthropology supports the development of this new course, GEOG 2103: Elements of GIScience and Technology. The applications of GIS in areas of interest to our majors, especially in sociology, are increasing and I envision that the course could become a popular elective with some of our majors.

Charles J. Brody, Professor & Chair
Dept. of Sociology & Anthropology

Laurie
The course proposal for Geog 2103, GIS Survey of Applications and Techniques, has been reviewed and approved by our Undergraduate Committee in the Department of Computer Science. Good luck with this new course.
Larry

GEOG 2103 Library Consultations

Course/Program:__ GEOG2103 Elements of GI S&T _____

Evaluator: Dawn Hubbs_____ Date: __March 22, 2005__

Please Check One:

Holdings are superior	_____
Holdings are adequate	___**x**_
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

GEOG2103, Elements of GI S&T, is not a library-intensive course, and does not require much library support. That said, ArcGIS software is available on many of the public computers in the library's Information Commons for students to work on projects/assignments.

If students needed background or supporting material, however, several relevant databases are available. Compendex, GEOBASE, and Web of Science are electronic databases with some full-text links. Some representative journal titles include *GeoInformatica, Journal of Geographical Systems, Geographical Analysis, Computers, Environment and Urban Systems, Computers and Geosciences, and Environmental Modelling and Software*

Dawn Hubbs
Head of Reference and Research Data Services
Atkins Library
UNC Charlotte
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Charlotte, NC 28223-0001
704-687-2325
dhubbs@email.uncc.edu

Proposed Changes in Catalog Description for GEOG 4103/5103 Computer Programming for GIS Applications

Proposed Catalog Copy and Syllabus

GEOG 4103. Computer Programming for GIS Applications. (3) Prerequisite: GEOG 2103 or consent of instructor. Software program development for GIS and mapping applications using high level programming languages such as Visual Basic. Emphasis on the design and implementation of geographic data structures and algorithms. (Fall)

GEOG 5103. Computer Programming for GIS Applications. (3) Prerequisite: GEOG 2103 or consent of instructor. Software program development for GIS and mapping applications using high level programming languages such as Visual Basic. Emphasis on the design and implementation of geographic data structures and algorithms. (Fall)

GEOG 4103/5103 Syllabus

GEOG 4103/5103: Computer Programming for GIS Applications

Provisional Syllabus
Fall 2004
Tuesday 3:30 – 4:50pm, McEniry 437A
Thursday 3:30 – 4:50pm, McEniry 462
Instructor: Paul Smith
Office: 414A McEniry
Phone: (704) 687-4261
Email: psmith@uncc.edu
Office hours: Tuesday, Thursday 2:30 – 3:30pm and by appointment

The goal of this course is to teach you the fundamentals of computer programming for geographic and cartographic applications. At the end of this course you should have an understanding of data structures used for geographic data, specialized sorting and searching techniques used for geographic data and algorithms used to generalize, analyze and display geographic data. We will be using the Visual Basic 6 language along with an extension called MapObjects from Environmental Systems Research Institute, Inc. MapObjects provides capabilities to input, display, query and manipulate geographic data in commonly available GIS formats. The resulting stand-alone programs can then be distributed without requiring users to have any particular GIS or pay any additional licensing fees. The techniques learned in this class will also be helpful in customizing GIS packages that use Visual Basic as their scripting language.

No prior knowledge of Visual Basic is required for this course. We will begin by learning the fundamentals of computer programming in Visual Basic and then explore the capabilities of MapObjects. Emphasis throughout will be placed on cartographic and GIS applications, geographic data structures, spatial sorting and searching, visualization techniques and cartographic principles.

Assignments & Grading

Approximately eight graded assignments will be given during the semester. These are either programming assignments, online exercises, or writing assignments. Taken together, these account for 48% of your total grade. Two written exams count for 24% each. The final 4% comes from class attendance and participation. Undergraduate grades are determined as follows: A: 90-100, B: 80-90, C: 70-80, D: 60-70, F: <60.

Graduate Credit

In addition to the requirements above, students taking this course for graduate credit are expected to demonstrate higher levels of analytical ability and must submit a research paper on a topic agreed upon between the instructor and the student. This research paper counts for 8% of the final grade and the two tests are reduced by 4% each. Therefore, for graduate credit, assignments count for 48%, two tests 20% each, a research paper 8% and class attendance and participation 4%. Graduate grades are determined as follows: A: 90-100, B: 80-90, C: 70-80, U: <70.

Cell phones, pagers and other noise making devices are not allowed to be on during class meetings.

Students with documented disabilities are eligible to receive assistance from the Office of Disability Services in Fretwell 230 (ext. 74355). For detailed information please see the current UNC Charlotte catalog.

All UNC Charlotte students have the responsibility to be familiar with and to observe the requirements of The UNC Charlotte Code of Student Academic Integrity (see the Catalog). This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at www.uncc.edu/unccatty/policystate/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Texts

There are two texts for this class.

1. Visual Basic 6: How to Program, H. M. Deitel, P. J. Deitel, Tem Nieto; Prentice Hall, 1999, ISBN 0-13-456955-5. (REQUIRED)
2. Developing GIS Solutions with MapObjects and Visual Basic, 1st Edition, Bruce Ralston, OnWord Press, ISBN/ISSN: 0-7668-5438-8. (RECOMMENDED)

Required materials

CD-ROM RW(to back up data), printing fees added to your 49er card.

Semester Schedule

(DDN=Deitel, Deitel & Nieto, MO= Developing GIS Solutions with MapObjects and Visual Basic)

Week of:	**Topics**
August 24, 26	Introduction, Ch. 1-2 DDN.
August 31, Sep 2	BASIC basics, Ch. 3 DDN.
Sept. 7, 9	If/Then, Repetition, Algorithms, Ch. 4 DDN.
Sept.14, 16	More repetition, more data types, Ch. 5 DDN.
Sept. 21, 23	Subroutines & Functions, Ch. 6 DDN.
Sept. 28, 30	Arrays, sorting, **spatial sorting**, Ch. 7 DDN.
Oct. 5,7	Strings, graphics, Ch. 8 DDN.
Oct. 12, 14	**Mid-term Exam**.
Oct. 19, 21	Strings, graphics, **GPS input**, **GeoIDs**, Ch. 9 DDN.
Oct. 26, 28	GUI's, **MapObjects** (MO)intro, Ch. 10 DDN.
Nov. 2, 4	MO: map control, panning, zooming. VB: GUI's, Ch. 11,12 DDN.
Nov. 9, 11	MO: resizing, scale dependent drawing. VB: Debugging, Ch. 13 DDN.
Nov. 16, 18	MO: spatial queries, map renderers. VB: Files, Ch. 14-15 DDN.
Nov. 23	MO: projections, address geocoding. VB: OOP, Ch. 16 DDN.
Nov. 30, Dec 2	MO: event tracking, image layers. VB: Data structures, Ch. 20 DDN. ArcObject data model.
Dec. 7	Review for final exam
Dec. 16	Final Exam, 3:30 pm

Programming Assignments

1. Latitude-Longitude conversions
2. UTM zone calculations
3. Calculating polygon areas
4. String Processing (GPS data input)
5. Sorting and Searching (Nearest Neighbors)
6. Arrays (Spatial Statistics)
7. MapObjects: Modification of text example

GEOG 4103/5103 Departmental Consultations

Email requesting consultation:

We are proposing revisions to the existing course, GEOG 4103/5103: Computer Mapping. Would you please review the attached proposals and send me any comments or questions?

Thank you,
Paul Smith
Geography and Earth Sciences
704 687-4261
<psmith@uncc.edu

Responses:

Criminal Justice
Paul,
Criminal Justice faculty has reviewed the revisions to GEOG 4103/5103 Computer Mapping. We do not have any comments or questions. We look forward to some of our majors considering taking the course, since it would enhance their education without duplicating any of our courses.

Thank you, Vivian Lord

Vivian B. Lord, Ph.D.
Chair
Department of Criminal Justice
9201 University City Blvd.
Charlotte, NC 28223-0001
(704) 687-2009
fax: (704) 687-3349
vblord@email.uncc.edu

Sociology and Anthropology
Paul - Thank you for the opportunity to review this curriculum proposal for revisions to GEOG 4103/5103. I believe that the changes are appropriate and useful. I will also forward this proposal to Dr. Lisa Rashotte, the director of the Sociology M.A. program and ask her to contact you directly. Janet Levy
---
Janet E. Levy
Sociology and Anthropology
UNC-Charlotte
Charlotte, NC 28223

704-687-4282 (office)
704-687-3091 (fax)

Paul -

Janet asked me to review the proposal, as it most likely could affect our graduate students. I have no problem with the changes and support the proposal entirely.

--Lisa Rashotte

Political Science
The department of Political Science has no objections to the proposed changes. Please print out and use this email as proof that you consulted with us.

On 9/23/05 4:07 PM, "Paul Smith" <psmith@uncc.edu wrote:

We are proposing revisions to the existing course, GEOG 4103/5103: Computer Mapping. Would you please review the attached proposals and send me any comments or questions?

Thank you,
Paul Smith
Geography and Earth Sciences
704 687-4261
<psmith@uncc.edu

-- Theodore S. Arrington, Ph.D.
Professor and Chair
Department of Political Science
University of North Carolina at Charlotte
9201 University-City Blvd
Charlotte, North Carolina 28223-0001
Voice: (704)687-2574
Fax: (704)687-3497
Email: tarrngtn@uncc.edu
http://www.politicalscience.uncc.edu/tarrington/index.html

Software and Information Systems
Hi Paul,

We believe it is a very good course and fully support your efforts. Some of our students may very well take this course as part of their studies. We have some questions with respect to pre-requisites for such students. Can you please discuss with Dave to make sure that we can address these issues through proper advising? Thanks!

--Bill
(Bill Chu)

Exchange with David Wilson, SIS:
Paul,

If that is the case, then it might make sense to use 5120 (or something like "2103 or 5120") in the graduate version of the course. I am thinking ahead to when the banner system comes to rigidly enforce prereqs, particularly for students taking this as an outside concentration, it would provide help to define graduate track options, so that students wouldn't have to worry about getting graduate credit for their prereq work in the undergrad case or wouldn't have to hassle about consent of instructor in the case of having taken that equivalent, but not having it defined as a prereq.

I think it is fine in any case, and I don't have a worry about it as it stands. I am just looking at it from the perspective of outside graduate students that might want to take this as part of a minor/concentration, and wondering about how they might deal with the undergraduate prereq, which they might not have, for the graduate course.

Cheers,

Dave
-----Original Message-----
From: Paul Smith [mailto:psmith@uncc.edu]
Sent: Thu 9/29/2005 9:36 AM
To: Wilson, David
Subject: Re: GEOG 4103/5103 Course Revision

Dave,
We don't have a graduate level equivalent to 2103 but if students have taken GEOG 4120/5120 (Intro to GIS) that would more than fulfill the prerequisite. Most students from other departments come into the course through the consent of instructor option. We are primarily concerned that students have an understanding of geographic concepts of scale, projections, feature types, etc. either through previous course work or extra readings.

Paul

Wilson, David wrote:

Hi!

I just wanted to check whether the undergrad course should be the prereq for the graduate version of the course. Would the graduate level Intro.

to GIS suffice for that? I am just thinking that if a student is interested in doing a grad minor or whatnot that they might run into schedule trouble having to take an undergraduate course, which might not count toward their graduate degree hours. Consent of instructor could handle it, of course, but if there is a grad level prereq equivalent, it would be good to use that in the graduate version.

Cheers,

Dave

-----Original Message-----
From: Paul Smith [mailto:psmith@uncc.edu]
Sent: Wed 9/28/2005 5:29 PM
To: fwd-Chu, Bill
Cc: Wilson, David
Subject: Re: GEOG 4103/5103 Course Revision

Bill,

Thanks for your comments. I'll include them in the proposal and I'll also check with Dave regarding prerequisites.

-Paul

bill chu wrote:

> Hi Paul,
>
> We believe it is a very good course and fully support your efforts. Some of our students may very well take this course as part of their studies. We have some questions with respect to pre-requisites for such students. Can you please discuss with Dave to make sure that we can address these issues through proper advising? Thanks!
>
> --Bill
>
> Paul Smith wrote:
>
> We are proposing revisions to the existing course, GEOG 4103/5103: Computer Mapping. Would you please review the attached proposals and send me any comments or questions?
>
> Thank you,
> Paul Smith

GEOG 4103/5103 Library Consultation

UNCCHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Paul Smith

From: Dawn Hubbs, Atkins Library

Date: September 23, 2005

Subject: GEOG4103/5103 Computer Programming for GIS Applications

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Course/Program:__GEOG4103/5103 Computer Programming for GIS Applications

Summary of Librarian's Evaluation of Holdings:

Evaluator: _Dawn Hubbs _____ Date: __September 23, 2005

Please Check One:

Holdings are superior	_____
Holdings are adequate	**___x_**
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

The library has several recent monographs on Visual Basic programming; many are e-books and are therefore available from off-campus. Several of the library's databases, including Compendex, GeoRef, and Web of Science, cover the subject field, and provide links to full-text resources. The library is working with the Department's Library Representative, Walt Martin, and the Department Chair, Jerry Ingalls, to cancel some existing serial titles to free up some funds to purchase one of the leading journals in the field, International Journal of Geographical Information Science, as well as increase monographic holdings in GIS.

Dawn Hubbs_____
Evaluator's Signature
September 23, 2005_____

Proposed Changes in Catalog Description of GEOG 4120/5120. Fundamentals of Geographic Information Systems To Add a Prerequisite.

Proposed Catalog Copy and Syllabus

GEOG 4120. Fundamentals of Geographic Information Systems. (4) Prerequisite: GEOG 2103 or consent of instructor. Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Three lecture hours, one two-hour lab per week. (Fall, Spring)

GEOG 5120. Fundamentals of Geographic Information Systems. (4) Prerequisite: GEOG 2103 or consent of instructor. Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Additional requirements for graduate credit. Three lecture hours, one two-hour lab per week. (Fall, Spring)

GEOG 4120/5120 Library Consultation

UNCCHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Paul Smith

From: Dawn Hubbs, Atkins Library

Date: September 23, 2005

Subject: GEOG4120/5120 Fundamentals of Geographic Information Systems

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Summary of Librarian's Evaluation of Holdings:

Course/Program:__GEOG4120/5120 Fundamentals of Geographic Information Systems

Summary of Librarian's Evaluation of Holdings:

Evaluator: _Dawn Hubbs _____ Date: __September 23, 2005

Please Check One:

Holdings are superior	_____
Holdings are adequate	___**x**_
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

Adding the prerequisite of GEOG 2120, Elements of GI S&T, does not impact the library's support of the course, Introduction to Geographic Information Systems. The library is working with the Department's Library Representative, Walt Martin, and the Department Chair, Jerry Ingalls, to cancel some existing serial titles to free up some funds to purchase one of the leading journals in the field, International Journal of Geographical Information Science, as well as increase monographic holdings in GIS.

Dawn Hubbs_____
Evaluator's Signature_ September 23, 2005_____

GEOG 4131/5131 Environmental Modeling with GIS

Proposed Catalog Copy and Syllabus

PROPOSED GEOG 4131. ENVIRONMENTAL MODELING WITH GIS (4 credits). Prerequisite: GEOG 4120 or consent of the instructor. Theories and practices of modeling the environment with GIS. Topics include types of spatial modeling frameworks; GIS data sources and measurement technologies for environmental modeling; development, calibration, and validation of environmental models; 3-dimenional modeling and visualization of physical processes; and spatial analysis of human-environment interactions. Fall or Spring.

PROPOSED GEOG 5131. ENVIRONMENTAL MODELING WITH GIS (4 credits). Prerequisite: GEOG 4120/5120 or consent of the instructor. Theories and practices of modeling the environment with GIS. Topics include types of spatial modeling frameworks; GIS data sources and measurement technologies for environmental modeling; development, calibration, and validation of environmental models; 3-dimenional modeling and visualization of physical processes; and spatial analysis of human-environment interactions. Fall or Spring.

The Course Syllabus

GEOG4131/5131. ENVIRONMENTAL MODELING WITH GIS

GEOG4131/5131. ENVIRONMENTAL MODELING WITH GIS (4 credits). Prerequisite: GEOG 4120/5120 or consent of the instructor. Theories and practices of modeling the environment with GIS. Topics include types of spatial modeling frameworks; GIS data sources and measurement technologies for environmental modeling; development, calibration, and validation of environmental models; 3-dimenional modeling and visualization of physical processes; and spatial analysis of human-environment interactions. Fall or Spring.

Objectives of the course

A. Focus on development of four learning elements in spatial modeling: knowledge, skills, experience, and abilities (problem identification, diagnosis and solving; project planning, management, and implementation; creativity);

B. Study four spatial modeling methodologies: rule-based modeling, statistical-based modeling, and physical models and cellular automata modeling.

C. Transform analytical models into spatial decision support systems (SDSS) through programming in GIS (time permits);

D. Expose to some cutting-edge innovations in spatial modeling technology and applications;

E. An intensive working experience, through class projects and student individual project, with GIS, both vector and raster.

Instructional Method

A combination of lecture, lab, assignment, seminar, and field visit (schedule permits)

Expectations

F. Knowledge, skills, experience, and ability balanced

G. Problems-Solving Driven, Not Command Driven

H. Information system oriented, not communication system oriented

I. Integration with Other Areas (Projects, Not Computers Oriented)

J. TEAM—Together each achieves more

K. Be creative, and diligent

Means of student evaluation[1]

L. About five to six class assignments (25%), active team participation expected;
M. Site-of-the-day presentation (5%);
N. A midterm and a final close-book written test (30% in total);
O. An individual project— PowerPoint presentation (40%).

Graduate Student projects will be expected to include more rigorous data collection and analyses than undergraduate students', along with an additional written report and literature review accompanying their individual project.

Probable textbooks or resources

Chrisman N, 1997, Exploring Geographic Information Systems (John Wiley & Sons, New York, 298 pp.)

Environmental Systems Research Institute, 1994, *Cell-based modeling with GRID* (Redlands, CA: Environmental Systems Research Institute).[2]

[1] Undergraduate students will be given the same assignments as graduate students, and expected to take same tests, but the evaluation criteria will be stricter for graduate students than for undergraduate students.

[2] This book is out of print. We will make copies as handouts for the class.

Lo C P, Yeung A K W, 2002 *Concepts and Techniques of Geographic Information Systems* (Upper Saddle River, NJ: Prentice Hall)

Price, MH, Price, M, 2003 *Mastering ArcGIS with Video Clips CD-ROM* (McGraw Hill, NY)

Copies of journal articles that are essential to the modeling lectures/exercises will be made available to the class in the due course.

Teaching Assistant

One MA or PhD level graduate student in Geography and Urban-Regional Analysis program.

Topical outline of course content

1. Systems and Systems Theories;
2. Models for Spatial Analysis;
3. Models for Spatial Simulation;
4. Modeling and the Life-Cycle for a Sound Modeling Exercises;
5. Verification, Validation, and Accreditation (VV&A) of Models;
6. Spatial Modeling Method I—Rule-based modeling
7. Spatial Modeling Method II—Statistically-based modeling;
8. Spatial Modeling Method III—Physical models;
9. Spatial Modeling Method IV—Cellular automata models;
10. Evolution from a Modeling System to a Decision Support System;

GEOG 4131/5131 Departmental consultations

Wei-Ning,

The Department of Criminal Justice supports the development of the courses GEOG 4131/5131 Spatial Modeling I and GEOG 4132/5132 Spatial Modeling II. We do not have course conflicts or duplications. Vivian Lord

Vivian B. Lord, Ph.D.
Chair
Department of Criminal Justice
9201 University City Blvd.
Charlotte, NC 28223-0001
(704) 687-2009
Fax: (704) 687-3349

Department of Software and Information Systems
College of Information Technology
704-687-4770

April 15, 2005

Dear Dr. Ingles,

The Department of Software and Information Systems supports the following course proposals from your department:

- GEOG 3-8-05(4150) GEOG 4150/5150 Spatial Database Development
- GEOG3-8-05 (4123) GEOG 4123/5123 Programming and Customization
- GEOG 4132/5132 Spatial Modeling 2
- GEOG 4131/5131 Spatial Modeling 1.

Sincerely,

Bill Chu
Professor and Chair
Department of Software Information Systems

UNCCHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Wei-Ning Xiang
From: Dawn Hubbs, Atkins Library
Date: March 10, 2005

Subject: GEOG4131/5131, Spatial Modeling 1

Summary of Librarian's Evaluation of Holdings:

Course/Program:__GEOG4131/5131 Spatial Modeling 1_____

Evaluator: Dawn Hubbs_____ Date: __March 10, 2005__

Please Check One:

Holdings are superior	_____
Holdings are adequate	___x_
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:
GEOG 4131/5131, Environmental Modeling with GIS, is not a library-intensive course; however, if students needed to do some library research to support the semester project, the following are relevant resources. Electronic databases available include Compendex, GEOBASE, and Web of Science, with many full-text links. The publisher-based full-text collections Science Direct (Elsevier), Springer-Verlag LINK, Wiley Interscience and Kluwer Online Journals contain a significant amount of research. Some representative journal titles include *GeoInformatica, Journal of Geographical Systems, Geographical Analysis, Computers, Environment and Urban Systems, Computers and Geosciences, and Environmental Modelling and Software*.

The library does not have subscriptions to two major journals—International Journal of Geographical Information Systems and Environment and Planning B: Planning and Design. If the anticipated addition of a PhD program within the Department of Geography and Earth Sciences is realized, funds should be requested to purchase these and other journal titles.

Dawn Hubbs_____
Evaluator's Signature

_March 10, 2005_____

GEOG 4132/5132 Spatial Modeling for Social and Economic Applications

Proposed Catalog Copy and Syllabus

GEOG 4132. Spatial Modeling for Social and Economic Applications. (4 credits). Prerequisite: GEOG4120/5120, or consent of the instructor. Theories and practices of spatial modeling with social and economic applications. Topics include (1) simulation models for land use change, smart growth, object movement, and homeland security planning; (2) integrated models—spatial—non-spatial, topological—ontological, deterministic—stochastic; (3) agent-based models. Lab exercises employ various spatial modeling tools (Fall or Spring).

GEOG 5132. Spatial Modeling for Social and Economic Applications. (4 credits). Prerequisite: GEOG4120/5120, or consent of the instructor. Theories and practices of spatial modeling with social and economic applications. Topics include (1) simulation models for land use change, smart growth, object movement, and homeland security planning; (2) integrated models—spatial—non-spatial, topological—ontological, deterministic—stochastic; (3) agent-based models. Lab exercises employ various spatial modeling tools (Fall or Spring).

The Course Syllabus

GEOG 4132/5132. Spatial Modeling for Social and Economic Applications (4 credits). Prerequisite: GEOG4120/5120, or consent of the instructor. Theories and practices of spatial modeling with social and economic applications. Topics include (1) simulation models for land use change, smart growth, object movement, and homeland security planning; (2) integrated models—spatial—non-spatial, topological—ontological, deterministic—stochastic; (3) agent-based models. Lab exercises employ various spatial modeling tools (Fall or Spring).

Objectives of the course

A. Focus on development of four learning elements in spatial modeling: knowledge, skills, experience, and abilities (problem identification, diagnosis and solving; project planning, management, and implementation; creativity);

B. Study simulation models for land use change, smart growth, pedestrian movement, and critical infrastructure protection;

C. Transform analytical models into spatial decision support systems (SDSS) through programming in GIS (time permits);

D. Expose to some cutting-edge innovations in spatial modeling technology and applications;

E. An intensive working experience, through class projects and student individual project, with GIS (both vector and raster) and other modeling tools.

Instructional Method

A combination of lecture, lab, assignment, seminar, and field visit (schedule permits)

Expectations

F. Knowledge, skills, experience, and ability balanced

G. Problems-Solving Driven, Not Command Driven

H. Information system oriented, not communication system oriented

I. Integration with Other Areas (Projects, Not Computers Oriented)

J. TEAM—Together each achieves more

K. Be creative, and diligent

Means of student evaluation[1]

L. About five to six class assignments (25%), active team participation expected;
M. Site-of-the-day presentation (5%);
N. A midterm and a final close-book written test (30% in total);
O. An individual project—presentation and report (40%).

Graduate Student projects will be expected to include more rigorous data collection and analyses than undergraduate students', along with an additional written report and literature review accompanying their individual project.

Probable textbooks or resources

Chrisman N, 1997, Exploring Geographic Information Systems (John Wiley & Sons, New York, 298 pp.)

Environmental Systems Research Institute, 1994, *Cell-based modeling with GRID* (Redlands, CA: Environmental Systems Research Institute).[3]

[1] Undergraduate students will be given the same assignments as graduate students, and expected to take same tests, but the evaluation criteria will be stricter for graduate students than for undergraduate students.
[3] This book is out of print. We will make copies as handouts for the class.

Law AM and Kelton WD, 2000, Simulation Modeling and Analysis (3rd edition) McGraw Hill, Boston, 760 pp.)

Copies of journal articles that are essential to the modeling lectures/exercises will be made available to the class in the due course.

Teaching Assistant

One MA or PhD level graduate student in Geography and Urban-Regional Analysis program.

Topical outline of course content

1. Systems Simulation;
2. Complexity, Plausibility, Surprise, and Coherence;
3. Land Use Change Simulation;
4. Smart Growth verse Dump Sprawl?
5. Moving object Simulation and Agent-Based Modeling;
6. Ontological Simulation of Cross-Infrastructure Interdependencies;
7. Cyber Securities;
8. Cognitive Aspects of Spatial Simulation;
9. Model Verification and Validation;
10. Scenariology in spatial modeling and simulation.

GEOG4132/5132 Departmental Consultations

Wei-Ning,

The Department of Criminal Justice support the development of the courses GEOG 4131/5131 Spatial Modeling I and GEOG 4132/5132 Spatial Modeling II. We do not have course conflicts or duplications. Vivian Lord

Vivian B. Lord, Ph.D.
Chair
Department of Criminal Justice
9201 University City Blvd.
Charlotte, NC 28223-0001
(704) 687-2009
Fax: (704) 687-3349

Department of Software and Information Systems
College of Information Technology
704-687-4770

April 15, 2005

Dear Dr. Ingles,

The Department of Software and Information Systems supports the following course proposals from your department:

- GEOG 3-8-05(4150) GEOG 4150/5150 Spatial Database Development
- GEOG3-8-05 (4123) GEOG 4123/5123 Programming and Customization
- GEOG 4132/5132 Spatial Modeling 2
- GEOG 4131/5131 Spatial Modeling 1.

Sincerely,

Bill Chu
Professor and Chair
Department of Software Information Systems

GEOG4132/5132 Library Consultations

J. Murrey Atkins Library

Consultation on Library Holdings

To: Wei-Ning Xiang

From: Dawn Hubbs, Atkins Library

Date: March 10, 2005

Subject: GEOG4132/5132, Spatial Modeling 2

Summary of Librarian's Evaluation of Holdings:

Course/Program:__GEOG4132/5132 Spatial Modeling 2_____

Evaluator: Dawn Hubbs_____ Date: __March 10, 2005__

Please Check One:

Holdings are superior	_____
Holdings are adequate	___x_
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

GEOG 4132/5132, Spatial Modeling 2, is not a library-intensive course; however, if students needed to do some library research to support the semester project, the following are relevant resources. Electronic databases available include Compendex, GEOBASE, and Web of Science, with many full-text links. The publisher-based full-text collections Science Direct (Elsevier), Springer-Verlag LINK, Wiley Interscience and Kluwer Online Journals contain a significant amount of research. Some representative journal titles include *GeoInformatica, Journal of Geographical Systems, Geographical Analysis, Computers, Environment and Urban Systems, Computers and Geosciences, Environmental Modelling and Software, Environmetrics, Journal of Regional Science*. Students may have to request some material through Interlibrary Loan.

The library does not have subscriptions to two major journals—International Journal of Geographical Information Systems and Environment and Planning B: Planning and Design. If the anticipated addition of a PhD program within the Department of Geography and Earth Sciences is realized, funds should be requested to purchase these and other journal titles.

Dawn Hubbs_____
Evaluator's Signature

_March 10, 2005_____
Date

GEOG 4150/5150 Spatial Database Development with GPS/GIS

Proposed Catalog Copy and Syllabus

GEOG 4150. Spatial Database Development with GPS/GIS (4) Prerequisites: GEOG 4120/5120, or permission of instructor. This course consists of tutorials, readings, projects, and discussions of how geo-technologies can be used to create digital geographic database: designing conceptual database using entity-relationship approach, transforming GPS data, geo-registering scanned base maps, digitizing vector features, entering attribute data, and developing Mobile GIS applications. (Fall)

GEOG 5150. Spatial Database Development with GPS/GIS (4) Prerequisites: GEOG 4120/5120, or permission of instructor. This course consists of tutorials, readings, projects, and discussions of how geo-technologies can be used to create digital geographic database: designing conceptual database using entity-relationship approach, transforming GPS data, geo-registering scanned base maps, digitizing vector features, entering attribute data, and developing Mobile GIS applications. (Fall)

Spatial Database Development with GPS/GIS

Geography 4150/5150

Fall Semester, 2005

Department of Geography and Earth Sciences
The University of North Carolina at Charlotte

Course Description:

This course consists of tutorials, readings, projects, and discussions concerned with how GIS software can be used to integrate geographic data compiled from primary and secondary data sources. Students who successfully complete the course are able to specify and perform the tasks involved in creating a digital geographic database, including transforming GPS data, geo-registering scanned base maps, digitizing vector features, entering attribute data, and compiling metadata. Students develop Mobile GIS applications to access the Internet Mapping Server (IMS) to download and edit spatial database accessed through wireless networks in the field. In addition, students will design conceptual GIS data models – such as parcel, water lines, road network, etc. – to generate spatial databases and to implement spatial queries to the databases.
Prerequisite: GEOG 4120/5120.

Course Objectives:

Geography 4150/5150 is a 4-credit class that introduces main concepts and basic principles of global positioning systems and their use in information management. The course introduces basic principles of GPS operations; GPS data collection processes; GPS applications, and Mobile GIS applications. The course includes a computer laboratory portion focusing on learning GPS software/hardware packages and the fundamental methodology of Mobile GIS. Students will use GPS units to learn the skills of field mapping through weekly lab exercises and projects that address "real-world" GPS application problems. Students will develop the Mobile GIS applications to access database and Internet mapping servers to download and edit spatial data using a TCP/IP connection, and then integrate it with GPS collected geographic locations in the

field via hand-held and mobile devices. In addition, they will learn the architecture of Internet/Hand-held GIS systems that provides the foundation of Mobile GIS. At the end of the semester, students should achieve goals of the course as follows:

- familiarize with the GPS and GIS environment;
- understand fundamental GPS and Internet GIS concepts;
- apply GPS techniques to field mapping;
- implement and integrate GPS skills in a GIS environment to develop a spatial database;
- modeling spatial objects and generating spatial databases;
- designing conceptual database using entity-relationship approach;
- implementing spatial queries using geometric algorithms and relational algebra, and
- learn how to integrate PDAs, GPS, Internet GIS and wireless communication with a map server and databases accessed through the campus wireless network.

Instructor: ***Jiyeong Lee***, Ph.D.
Office Hours: 11:30 AM – 2:00 PM (Tuesday and Thursday), or by appointment
Office Location: McEniry 454A
Email: jlee68@uncc.edu
Phone: 704-687-3442

TA: ***N/A***
Office Hours: To be announced (TBA)
Office Location:
Email:

Class Schedule: Tuesday, 9:30 – 11:20 AM at McEniry Room# 401
Thursday, 9:30 – 11:20 AM at GIS Lab Room (#437A)

Instructional methods: Three hours of lecture and two-hour lab per week

Textbook:
1. **Introduction to GPS: The Global Positioning System** by Ahmed El-Rabbany, 2002
2. **Integrating GIS and the GPS** by Karen Steede-Terry, ESRI Press, 2000
3. **Designing Geodatabases: Case Studies in GIS Data Modeling** by D. Arctur and M. Zeiler, ESRI Press, 2004.
4. Other sources will be used in this class (web sites, text books, professional newsletters, etc.)

Class Website: http://www.geoearth.uncc.edu/faculty/jlee68/GPS.htm

Class Sharing Folder: R:\Coas\Geography\GEO4150 for Class notes and Lab assignments

Lecture Schedule*:

Week 1: Introduction to the class. GPS System Overview

Week 2: Basic Principles of GPS Operations

Week 3: GPS Details / User Equipment: GPS Receivers

Week 4: Differential GPS Overview

Week 5: DGPS / GPS Data and Correction Services and GPS Errors and Biases

Week 6: GPS Coordinate Systems and GPS Integrations / Applications

Week 7: Introduction to Internet GIS and Mobile GIS

Week 8: Integrate PDAs, GPS, Internet GIS and wireless communication with a map server and databases accessed through the campus wireless network

Week 9: GPS Data Conversions to GIS Data
Data Flow Diagram (DFD) and Entity-Relation Diagram (ER)

Week 10: GIS Data Models – parcel, water lines and network data models

Week 11: Three Stages of a GPS Project: One: Planning (Modern Structured Analysis Method)

Week 12: One: Planning – Entity-Relation Diagram

Week 13: One: Planning – Data Dictionary and Function Specifications

Week 14: Two: Implementation - spatial queries using geometric algorithms and relational algebra

Week 15: Three: Evaluation and
Contents of the Final Report of the project.

Week 16: Group Project Presentation. Final Project Report due

Graduate students

- More is expected of graduate students. Higher levels of analytical ability, greater ability to review and assess significant literatures, etc.
- should be a leader of the GPS group projects to present the project in class and to write up the final report;
- Final report – more than 15 pages (undergraduate student: 10 pages)
- Submit one critical review paper (at least 3 pages) after reviewing one of the journals regarding GPS or Mobile GIS applications
- Evaluation based on (A = 90-100, B = 80-89, C = 70-79, U < 70)

Student Evaluation* will be based as follows:

		Undergraduate / Graduate
Lab Assignments:	11 * 10 points	= 110 / 110
Quiz:	2 * 10 points	= 20 / 20
Group Project:	80/100 points	= 80 / 100
Midterm :	1 * 80 points	= 80 / 80

Class Participation	20 points	= 20	/	20
Critical Review Paper	/30 points	=	/	30
Total:		= 310	/	360 points

Evaluation of Undergraduate Student Based on:

(A = 90-100, B = 80-89, C= 70-79, D = 60-69, F<60)

Note: 1. Grading and class schedule could be changed due to weather, lab equipment, timing and instructor.
2. Lab assignment is due before the next class or specified date on lab sheets.
3. Lab assignment penalty: 10 % deduction / one day.
4. Quiz schedule may or may not be announced.
5. I strongly urge you to attend class on a regular basis. In-class discussions are critical for successful completion of exams. If you miss a class session, you are still responsible for getting class information and materials covered.

Disabilities Services: Every attempt will be made to accommodate students with documented disabilities. If you are a student with documented disability, please see me as early in the semester as possible to discuss necessary accommodations. Please also contact the Office of Disabilities Services, 230 Fretwell Building, 704) 687-4355.

Academic Integrity: All UNC Charlotte students have the responsibility to be familiar with and to observe the requirements of The UNC Charlotte Code of Student Academic Integrity (see the Catalog). This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at www.uncc.edu/unccatty/policystate/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Course Policies:

1. In accordance with University policy, students who engage in disruptive classroom activities will be dis-enrolled from the class.
2. **Plagiarism**, self-plagiarism, and cheating on exams will result in fail in the course and expulsion from the University is possible.
3. If you miss an exam (including quizzes) for a medical emergency, you will need to present a doctor's excuse to me in order to take a make-up exam. Notification of a missed exam for any other excusable reasons (such as those described in your student handbook) must occur within one week of the scheduled test. Otherwise you will receive a zero for the test score. Make-up examinations are more difficult than class exams.

GEOG4150/5150 Departmental Consultations

From: Young, David
Sent: Tuesday, April 12, 2005 6:51 PM
To: Lee, Jiyeong
Cc: Young, David
Subject: RE: Reminder: New course proposals

Dr. Lee,

Please accept my apologies for the tradiness of my response. I have been out of town and under other deadline pressures.

The Department of Civil Engineering supports your proposals for three new courses listed below:

GEOG4123/5123 GIS Programming and Customization

GEOG4150/5150 Spatial Database Development

GEOG6130 Three Dimensional Visualization of Geographic Information

Please let us know how we can assist you, and we wish you success with the courses.

Regards,

David Young, Chairman
Department of Civil Engineering

From: Lord, Vivian
Sent: Thursday, March 24, 2005 3:53 PM
To: Lee, Jiyeong
Subject: RE: Reviewing proposals of new courses

Professor Lee,

The Criminal Justice Faculty have reviewed your course curricula. We support the development of GEOG4123/5123 GIS Programming and Customization,

GEOG4150/5150 Spatial Database Development, GEOG6130 Three Dimensional Visualization of Geographic Information and do not see any duplication of the courses we offer. Vivian Lord

Vivian B. Lord, Ph.D.
Chair
Department of Criminal Justice
9201 University City Blvd.
Charlotte, NC 28223-0001
(704) 687-2009
Fax: (704) 687-3349

Department of Software and Information Systems
College of Information Technology
704-687-4770

April 15, 2005

Dear Dr. Ingles,

The Department of Software and Information Systems supports the following course proposals from your department:

- GEOG 3-8-05(4150) GEOG 4150/5150 Spatial Database Development
- GEOG3-8-05 (4123) GEOG 4123/5123 Programming and Customization
- GEOG 4132/5132 Spatial Modeling 2
- GEOG 4131/5131 Spatial Modeling 1.

Sincerely,

Bill Chu
Professor and Chair
Department of Software Information Systems

UNCCHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Jiyeong Lee

From: Dawn Hubbs

Date: March 10, 2005

Subject: GEOG4150 Spatial Database Development

Summary of Librarian's Evaluation of Holdings:
Course: GEOG4150 Spatial Database Development

Evaluator: __Dawn Hubbs_____ Date: _March 10, 2005_____

Please Check One:

Holdings are superior	_____
Holdings are adequate	**__x___**
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

Spatial Database Development (GEOG4150) is not a library-intensive course. Undergraduate students will be working on a group project and lab assignments. However, if students needed background or supporting material, several relevant databases are available. Compendex, GEOBASE, and Web of Science are electronic databases with some full-text links. The publisher-based full-text collections of The ACM Digital Library, IEEE Xplore, Science Direct (Elsevier), Springer-Verlag LINK, Wiley Interscience and Kluwer Online Journals contain a significant amount of research. Some representative journal titles include *GeoInformatica, Journal of Geographical Systems, Geographical Analysis, Computers, Environment and Urban Systems, Computers and Geosciences, and Environmental Modelling and Software.* Students may have to request some material through Interlibrary Loan.

_Dawn Hubbs_____
Evaluator's Signature

_March 10, 2005_____

UNCCHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Jiyeong Lee

From: Dawn Hubbs

Date: March 10, 2005

Subject: GEOG5150 Spatial Database Development

Summary of Librarian's Evaluation of Holdings:
Course: GEOG5150 Spatial Database Development

Evaluator: __Dawn Hubbs_____ Date: _March 10, 2005_____

Please Check One:

Holdings are superior	_____
Holdings are adequate	__x___
Holdings are adequate only if Dept. purchases additional items.	_____
Holdings are inadequate	_____

Comments:

Students in GEOG5150, Spatial Database Development, will be working on a group project and lab assignments, and will be responsible for a critical review paper (minimum 3 pages) of a journal article. Several relevant databases are available to support the critical review paper. Compendex, GEOBASE, and Web of Science are electronic databases with some full-text links. The publisher-based full-text collections of The ACM Digital Library, IEEE Xplore, Science Direct (Elsevier), Springer-Verlag LINK, Wiley Interscience and Kluwer Online Journals contain a significant amount of research. Some representative journal titles include *GeoInformatica, Journal of Geographical Systems, Geographical Analysis, Computers, Environment and Urban Systems, Computers and Geosciences, Journal of Geodesy, Environmental Modelling and Software, and Proceedings of the … annual ACM international workshop on Geographic information systems.* Students may have to request some material through Interlibrary Loan.

_Dawn Hubbs_____
Evaluator's Signature

_March 10, 2005_____
Date

APPENDIX Requests for endorsement letter updates

This appendix contains requests for endorsement letter updates and responses.

From: Bill Chu [mailto:billchu@uncc.edu]
Sent: Fri 10/5/2007 11:07 AM
To: Xiang, Wei-Ning
Subject: Re:

-----BEGIN PGP SIGNED MESSAGE-----
Hash: SHA1

Wei-Ning,

Please update the dates as long as there are only editorial changes to the course proposal.

- --Bill

Xiang, Wei-Ning wrote:

Bill:

About 2 years ago, we received the following endorsement letter from you regarding four GIS related course proposals. We are now finally ready to submit them to the curriculum committee. Although the contents of the letters are still accurate (we only made some editorial adjustments on the proposals we sent you for review) but the date was a bit out of range. I would ask if you would be kind enough to let me know whether we can still use your letter with updated dates (to 10-8-07, for example). I can also send the proposals for your review should that be helpful.

Thanks.

Wei-Ning

Department of Software and Information Systems

College of
Information Technology

704-687-4770

April 15, 2005

Dear Dr. Ingles,

The Department of Software and Information Systems supports the following course proposals from your department:

* GEOG 3-8-05 (4150) GEOG
4150/5150 Spatial Database Development
* GEOG3-8-05 (4123) GEOG
4123/5123 Programming and Customization
* GEOG 4132/5132 Spatial
Modeling 2
* GEOG 4131/5131 Spatial Modeling 1.

Sincerely,

Bill Chu

Professor and Chair
Department of Software Information Systems

Wei-Ning

Wei-Ning Xiang

Professor of Geography and Earth Sciences
University of North Carolina at Charlotte
Charlotte, North Carolina 28223 USA

(704)687-5969
(704)687-5906 (fax)
wxiang@uncc.edu <mailto:wxiang@uncc.edu
http://www.geoearth.uncc.edu/people/wxiang/index.html

From: Lord, Vivian
Sent: Fri 10/5/2007 9:04 AM
To: Xiang, Wei-Ning
Subject: RE:

Wei-Ning,
That's fine. Please consider the email current. Let me know if you need for me to resend them. Vivian

---

From: Xiang, Wei-Ning
Sent: Thu 10/4/2007 11:22 PM
To: Lord, Vivian
Subject:

Dear Vivian:

About 2 years ago, we received the following endorsement letter from you regarding our GIS related course proposals. We are now finally ready to submit them to the curriculum committee. Although the contents of the letters are still accurate (we only made some

editorial adjustments on the proposals we sent you for review) but the date was a bit out of range. I would ask if you would kind enough to let me know whether we can still use your letter with updated dates (to 10-8-07, for example). I can also send the proposals for your review should that be helpful. Dr. Lee has left for good and I am now acting on his behalf.

Thanks.

Wei-Ning

From: Lord, Vivian
Sent: Thursday, March 24, 2005 3:53 PM
To: Lee, Jiyeong
Subject: RE: Reviewing proposals of new courses

Professor Lee,

The Criminal Justice Faculty have reviewed your course curricula. We support the development of GEOG4123/5123 GIS Programming and Customization,

GEOG4150/5150 Spatial Database Development, GEOG6130 Three Dimensional Visualization of Geographic Information and do not see any duplication of the courses we offer. Vivian Lord

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