

LONG SIGNATURE SHEET



Proposal Number: GES 11-30-09
 Proposal Title: Addition of a Geographic Information Science & Technologies (GIS&T) track to existing M.A. in Geography
 Originating Department: Geography

TYPE OF PROPOSAL: UNDERGRADUATE _____ GRADUATE X UNDERGRADUATE & GRADUATE _____
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
	2, 26, 2010 9, 8, 2010	May 7, 2010 9, 8, 2010	Approved	DEPARTMENT CHAIR <i>Craig Allen</i>
11/08/2010	11/19/2010	11/23/2010	Approved	COLLEGE CURRICULUM COMMITTEE CHAIR <i>Richard L. ...</i>
11/24/10	12/3/10	12/3/10	Approved	COLLEGE FACULTY CHAIR <i>Joseph B. ...</i>
	12/3/10	12/3/10	Approved	COLLEGE DEAN <i>Charles ...</i>
			Approved	UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR (for undergraduate courses)
1-26-11	2-1-11	4-5-11	Approved	GRADUATE COUNCIL CHAIR (for graduate courses) <i>Rob Roy McGregor</i>
			Approved	FACULTY GOVERNANCE SECRETARY (noting Faculty Council approval on Consent Calendar)
				FACULTY EXECUTIVE COMMITTEE (if decision is appealed)

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 Grad School ap
 4-5-11

Proposal for adding a track in Geographical Information Science and Technologies (GIS&T) to an existing Master of Arts in Geography

Original document : May 10 2010

Version modified : November 8 2010, November 22 2010 and February 21 2011

Contact : Dr. Eric Delmelle (eric.delmelle@uncc.edu, 704-687-5991) and Dr. Jean-Claude Thill (jfthill@uncc.edu), Department of Geography and Earth Sciences, UNC-Charlotte

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University of North Carolina at Charlotte

Revised; Graduate

Department of Geography and Earth Sciences

TITLE: Addition of a Geographic Information Science & Technologies (GIS&T) track to existing M.A. in Geography

A. PROPOSAL SUMMARY AND CATALOG COPY

1. SUMMARY

The Geography and Earth Sciences department proposes to add to the graduate catalog a track in Geographic Information Science & Technologies (GIS&T) to its current M.A. in Geography.

2. PROPOSED CATALOG COPY

Overview: Given the increasingly diverse uses of geospatial technology in government, industry, and academia, this track will prepare students for jobs with public agencies and private companies, such as GIS systems designers, geospatial analysts, geospatial project coordinators, geospatial information technologists, cartographers, spatial planners, and remote sensing analysts.

The Geographic Information Science & Technologies (GIS&T) track will offer course work giving each student the opportunity to acquire *and* apply GIS&T tools and techniques, specifically digital image processing, environmental, transportation and urban applications of GIS, GPS, GIS programming and customization, geocomputation, geovisualization, location modeling, network analysis, planning applications of GIS, remote sensing, spatial database design, spatial decision support systems, spatial optimization spatial statistics and geostatistics.

Course Work:

The following courses (12 credits total) are required for a track in GIS&T:

GEOG 6100 Quantitative Analysis in Geography	(3)
GEOG 6131 Research Design Fundamentals	(3)
GEOG 7900 (Individual Research Project)	(6)

A total of 24 credits originating from the following lists of GIS&T electives are recommended for a track in GIS&T (*). In customizing their programs, students should endeavor to take at least 3 to 6 elective hours of geography courses in the areas of community planning, transportation, locational analysis or urban regional analysis.

A. GIS&T tools and techniques

GEOG 5120 Introduction to Geographic Information Systems (**)	(4)
GEOG 5102 Cartographic Design and Map Construction	(3)
GEOG 5150 Spatial Database Development with GPS/GIS	(4)
GEOG 5000 GIS Programming and Spatial Database	(3)
ESCI 5170 Fundamentals of Remote Sensing	(4)
ESCI 5180 Digital Image Processing in Remote Sensing	(4)
GEOG 6120 Spatial Statistics	(3)
GEOG 6130 Geovisualization	(3)

B. GIS&T applications

GEOG 5101 Applied Cartographic Design	(3)
GEOG 5131 Environmental Modeling with GIS	(4)
GEOG 5132 Spatial Modeling for Social and Economical Applications	(4)
GEOG 5140 GIS and Planning	(4)
GEOG 6030 Topics in Geographic Techniques	(3)
GEOG 6121 Advanced Seminar on Spatial Modeling	(3)
GEOG 6122 GIS&T and Urban Regional Analysis	(3)
GEOG 6400 Advanced Seminar in Spatial Decision Support Systems	(4)
GEOG 6402 Multi-Attribute Assessment/Evaluation for Planning & Decision-Making	(3)
GEOG 6404 Spatial Data Analysis in GIS	(3)

GEOG 6406 Spatial Information and Mobility Systems	(3)
GEOG 6407 Geocomputation	(3)
GEOG 6408 Spatial Optimization	(3)

*In addition, selected course work offered by the Civil and Environmental Engineering Department and the College of Computing and Informatics is available to students with the approval of their academic advisor, provided that course prerequisites are satisfied. Students can also elect to complete an internship with a private company or a public agency for credit to acquire practical experiences in GIS&T.

** Unless students have had a substantial introductory GIS course prior to entering the MA program, GEOG 5120 is strongly recommended as this course serves as a foundation for the other GIS&T courses.

B. JUSTIFICATION

See section A

C. IMPACT

1. STUDENTS

What group(s) of students will be served by this proposal? (Undergraduate and/or graduate; majors and/or non-majors, others? Explain). Describe how you determine which students will be served.

The track proposed in this document is aimed at graduate students, particularly those students who have previously majored in geography. Due to the interdisciplinary of geographical information systems, the program would also expect to have students from other academic fields such as:

- Earth sciences
- Meteorology
- Criminal justice
- Sociology
- Forestry and natural resources
- Conservation biology
- Urban planning

- Architecture
- Software and Information Systems
- Civil and Environmental Engineering
- Systems Engineering and Engineering Management
- Computer Science

2. EFFECT ON EXISTING COURSES AND CURRICULA

a. *When and how often will added course(s) be taught?*

The proposed courses (GEOG 6130 Geovisualization, GEOG 6408 Spatial Optimization, GEOG 6407 Geocomputation, GEOG 6406 Spatial Information and Mobility Systems and GEOG 5150 Spatial Database Development with GPS/GIS) will be taught every other year. All other courses in the proposed track are taught every year, with the exception of GEOG 5120 (Introduction to Geographic Information Systems), which is offered every semester.

b. *How will the content and/or frequency of offering of other courses be affected?*

Contents of existing courses will not be altered and it is unlikely that offering of other courses will be affected because the proposed track within the Master of Arts in Geography will attract new students.

c. *What is the anticipated enrollment in course(s) added (for credit and auditors)?*

The proposed courses have already been offered as special topics. Anticipated enrollment in the following courses is as follows:

GEOG 5150 Spatial Database Development with GPS/GIS: 5-10 master students

GEOG 6407 Geocomputation: 9 students

GEOG 6408 Spatial Optimization: 5 master students

GEOG 6406 Spatial Information and Mobility Systems: 5 to 10 master students

d. *How will enrollment in other courses be affected? How did you determine this?*

Contents of existing courses will not be affected. We anticipate a slight increase in enrollment for Introduction to Geographic Information Systems (GEOG5120) without affecting its frequency as well as a slight increase of students in GIS&T-related courses at the master level (see above course work).

e. *If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.*

Geog 6130 Geovisualization was taught for the first time in the Fall of 2009 with an enrollment of 11 students (6 master and 5 PhD students, respectively), while Spatial Optimization which was taught in the Fall 2008 under Special Topics had 3 master and 12 PhD students. Geocomputation was taught in the Fall 2009 (9 students), while Spatial Information and Mobility Systems had 6 students.

- f. *Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.*

Not applicable.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL

No additional resources are required

3. PERSONNEL

None

4. PHYSICAL FACILITY

None

5. EQUIPMENT AND SUPPLIES

None

6. COMPUTER

None

7. AUDIO-VISUAL

None

8. OTHER RESOURCES

None

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS or UNITS

1. LIBRARY CONSULTATION

Indicate written consultation with the Library Reference Staff at the departmental level to insure that library holdings are adequate to support the proposal prior to its leaving the department. (Attach copy of Consultation on Library Holdings).

We consulted with the library (Dawn Hubbs) and holdings were judged adequate for both course proposals and our proposed track. Consultations can be found at the end of this document.

2. CONSULTATION WITH OTHER DEPARTMENT OR UNITS

Consultation with other departments or units. List departments/units consulted in writing and dates consulted. Summarize results of consultation and attach correspondence.

We consulted with the Civil and Environmental Engineering department, Software and Information Systems department, Systems Engineering and Engineering Management department as well as Computer Science. We received feedback from Prof. Ertunga Ozelkan

(Systems Engineering) regarding the syllabus of the proposed course Spatial Optimization. After consultation, the syllabus was changed accordingly. Consultations can be found at the end of this document.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

1. ORIGINATING UNIT

Briefly summarize action on the proposal in the originating unit including information on voting and dissenting options.

The proposal was put forward by Knight Distinguished Professor Jean-Claude Thill and Assistant Professor Eric Delmelle from the department of Geography and Earth Sciences. The proposal does “package” existing courses into a GIS&T-track which is attractive to applicants interested in pursuing a graduate level education with focus in GIS & Technology. The proposal was presented to the department of Geography and Earth Sciences. We receive feedback and comments which we include in the proposal. The department agreed on the proposal during their last academic meeting in May 2010.

2. CONSULTATION WITH OTHER DEPARTMENT OR UNITS

Briefly summarize action on the proposal by each considering unit including information on voting and dissenting options.

We consulted with the Civil and Environmental Engineering department, Software and Information Systems department, Systems Engineering and Engineering Management department as well as Computer Science. We received feedback from Prof. Ertunga Ozelkan regarding the syllabus of the proposed course Spatial Optimization. After consultation, the syllabus was changed accordingly. Consultations can be found at the end of this document.

G. ATTACHMENTS

1. RELEVANT DOCUMENTATION AND CONSULTATION WITH OTHER UNITS

Attach relevant documentation of consultations with other units.

Consultations with the library as well as other departmental units can be found in the appendix (end of the document), at page 52 and 57, respectively.

2. COURSE SYLLABUS

The following proposed course syllabus are attached:

- a. GEOG 5150 Spatial Database Development with GPS/GIS
- b. GEOG 6407 Geocomputation
- c. GEOG 6408 Spatial Optimization
- d. GEOG 6406 Spatial Information and Mobility Systems
- e. GEOG 6130 Geovisualization (Modification to an existing course)

Proposed Course Syllabus

Proposal # GEOG -5150

University of North Carolina at Charlotte

New Graduate Course

Curriculum Proposal from Department of Geography and Earth Sciences

I. TITLE: Proposed New Course: GEOG 5150 Spatial Database Development with GPS and GIS

II. CONTENT OF PROPOSALS

A. PROPOSAL SUMMARY AND CATALOG COPY.

1. **SUMMARY.** The Department of Geography and Earth Sciences proposes to establish a new course to the graduate curriculum: **GEOG 5150. Spatial Database Development with GPS and GIS**

2. **PROPOSED CATALOG COPY. GEOG 5150. Spatial Database Development with GPS and GIS** (4 credits). Prerequisite: GEOG5120, or consent of the 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).

B. JUSTIFICATION.

1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.

Quantitative techniques as well as Geographic Information Science are important components of both Masters program in Geography and Earth Sciences offered by the Department of Geography and Earth Sciences. In this context, *GEOG 5150 Spatial Database Development with GPS and GIS* (4credits) is at the intersection of these two constituents, and will significantly contribute to both programs. A new track in Geographic Information Science is being proposed for the Masters program. This course will improve GIS strengths in the use and development of GIS, which will better position graduating students to find a professional position. 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.

GEOG 5150 Spatial Database Development with GPS and GIS (4credits) was already offered at the undergraduate level, but there has been an increasing demand to have a graduate component for this course. As can be seen from the proposed syllabus, graduate students will take a leading role in the various projects, and will present papers in class. Additionally, class project report will be more detailed and lengthier for graduate students.

2. The Prerequisite

Students who take this class are expected to master the fundamental knowledge of the theories and techniques in GIS&T, demonstrated skills in operating GIS. The class *GEOG 5120 Introduction to Geographic Information Systems (4 credits)* is offered for that purpose.

3. Course numbering is consistent with the level of academic advancement of students for whom it is intended.

The course number, GEOG 5150, follows the numbering of the undergraduate *Spatial Database Development with GPS and GIS* course.

4. Improvements of this proposal on the scope, quality and/or efficiency of programs and/or instruction

See above elaborations in **1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

C. IMPACT.

1. Group(s) of students will be served by this proposal

The proposed class is expected to primarily serve masters students in Geography and Earth Sciences, as well as to a lesser extent, draw students specializing in transportation in the MSc. in Engineering and Computer science

2. Effect this proposal will have on existing courses and curricula

a. When and how often will added course(s) be taught?

At most once a year, in the Spring semester;

b. How will the content and/or frequency of offering of other courses be affected?

No effect.

c. What is the anticipated enrollment in course(s) added (for credit and auditors)?

12 students

d. How will enrollment in other courses be affected? How did you determine this?

No impact on other courses. It is anticipated that the enrollment growth of the proposed GIS&T track of the Masters in Geography will significantly contribute to the long-term viability of this course.

e. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

This course has been taught in the past as an undergraduate course and a graduate special topic course, **Geog 4150/5000 Spatial Database Development with GPS and GIS**

f. Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.

None.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

None. The course will be taught by an existing faculty member and on existing computer facilities in the Department of Geography and Earth Sciences.

1. Personnel

a. Specify requirements for new faculty, part-time teaching, student assistant and/or increased load on present faculty.

None.

b. List by name qualified faculty members interested in teaching the course(s).

Dr. Eric Delmelle, Ms. Laurie Garo.

2. Physical Facility

A computer room that holds 30 people.

3. Equipment and Supplies

Existing GIS facilities in the Department of Geography and Earth Sciences are adequate. The department also has approximately twenty GPS units available.

4. Computer

Existing GIS facilities in the Department of Geography and Earth Sciences, which hold up to thirty students in a session.

5. Audio-Visual

None.

6. Other Resources

None

7. Indicate source(s) of funding for new/additional resources required to support this proposal.

N/A.

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

Library Consultation

- a. Consultation with Library staff initiated by memorandum on March 15 2010
- b. The UNC Charlotte Library Reference Staff indicate that the holdings are adequate to support this proposal.

Consultation with other departments or units

a. Civil and Environmental Engineering: The consultation with the Department of Civil and Environmental Engineering was initiated by memorandum on December 7 2009. The Civil and Environmental Engineering Department approved this proposal.

b. Software and Information Systems: The consultation with the Department of Software and Information Systems was initiated by memorandum on December 7 2009. The Department of Software and Information Systems approved this proposal.

c. Systems Engineering and Engineering Management: The consultation with the Department of Systems Engineering and Engineering Management was initiated by memorandum on December 7 2009. The Department of Systems Engineering and Engineering Management approved this proposal.

d. Computer Science: The consultation with the Department of Computer Science was initiated by memorandum on December 7 2009. The Department of Computer Science approved this proposal.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

Originating Unit

1. The Department of Geography and Earth Sciences received this proposal and passed it unanimously on November 20 2009.

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

II.G. Attachments

The proposed course syllabus can be found on the next page, while the library consultation is found on page 53.

The following departments were consulted on the proposed course *GEOG 5150 Spatial Database Development with GPS and GIS*:

Software and Information Systems
Civil and Environmental Engineering Consultation
Systems Engineering and Engineering Management
Computer Science

The departments we consulted with did not express any objections. Library holdings were judged adequate.

Spatial Database Development with GPS and GIS

Geography 5150

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. In addition, students develop Mobile GIS applications to access Internet Mapping Server (IMS) to download and edit spatial database accessed through wireless networks in the field. Prerequisite: GEOG 4120/5120.

Course Objectives:

Geography 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, and then integrate it with GPS collected geographic locations in the field via hand-held and mobile devices (HP iPAQs or DELL Axim). In addition, they will learn the architecture of ArcIMS, and ArcPad, which are Internet/Hand-held GIS software 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 spatial database, and
- learn how to integrate lightweight hardware (such as Compaq iPAQ), GPS, Internet GIS and wireless communication with a map server and databases accessed through the campus wireless network.

Instructor: *Eric Delmelle*, Ph.D.

Office Location: McEniry 333

Email: eric.delmelle@uncc.edu

Phone: 704-687-5991

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.)

GPS Equipment:

1. **Garmin GPS 12 Map w/ Beacon Antenna (DGPS)**
2. **Teletype GPS chips**
3. **Trimble GPS – GeoCE XT, GeoCE XM and ProXR**

GIS/GPS Software:

1. **ArcGIS 9.0**
2. **ArcPad 6.0 and ArcPad Application Builder**
3. **ArcIMS 4.0**
4. **Pathfinder and Terrasync Professional**

Computer and PDA:

1. **Window XP and Server**
2. **Window CE on HP iPAQ and DELL Axim**

Lecture Schedule*:

Week 1: Introduction to the class. GPS System Overview
LAB: **LB 1** – Introduction to Germin GPS 12 Map

- Week 2:** Basic Principles of GPS Operations
LAB: **LB 2** – Position Variation of Germin GPS 12 Map
- Week 3:** GPS Details / User Equipment: GPS Receivers
LAB: **LB 3** – Introduction to Compaq iPAQ and ArcPad 6.0
- Week 4:** Differential GPS Overview
LAB: **LB 4** – Introduction to ArcPad 6.0
- Week 5:** DGPS / GPS Data and Correction Services
LAB: **LB 5** – ArcPad 6.0 connecting GPS receiver
- Week 6:** GPS Errors and Biases
LAB: **LB 6** – Point data collection with a DGPS Receiver
- Week 7:** GPS Coordinate Systems and GPS Integrations / Applications
LAB: **LB 7** – Creating GIS data with a DGPS Receiver
- Week 8:** Introduction to Mobile GIS and Internet GIS
LAB: **LB 8** – Creating GIS data with a DGPS Receiver
- Week 9:** GPS Data Conversions to GIS Data
Data Flow Diagram (DFD) and Entity-Relation Diagram (ER)
LAB: **LB 9** – Understanding the basics of Trimble Pro XR DGPS Data Collector
- Week 10:** **Midterm EXAM**
LAB: **LB 10** – Planning and Creating a multilayer Data Dictionary using Trimble
Pathfinder Office
- Week 11:** Three Stages of a GPS Project: One: Planning (Modern Structured Analysis Method)

LAB: **LB11** – Continuation of lab 2, with emphasis of collecting data for mini projects
and demonstration of RTK high accuracy DGPS

Week 12: One: Planning – Entity-Relation Diagram

LAB: Group (two persons) GPS project Assignment – NCDOT and Mecklenburg County, NC

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

LAB: Progress Report for Group GPS Project

Week 14: Two: Implementation

Three: Evaluation

Week 15: Contents of the Final Report of the project.

LAB: Progress Report for Group GPS Project

Week 16: Group Project Presentation. Final Project Report Due.

Graduate students

- Should be a leader of the GPS group projects to present the project in class and to write up the final report;
- Final report – At least than 15 pages (undergraduate student: 10 pages)
- Submit one critical review paper (at least 3 pages) after reviewing one of journals regarding GPS or Mobile GIS applications

Student Evaluation* will be based on as followings:

Lab Assignments: 11 * 10 points = 110

Quiz: 2 * 10 points = 20

Group Project:	100
Midterm:	80
Class Participation	20
Critical Review Paper	30

Total: 360 points

Grading Policy: (A = 90-100, B = 80-89, C= 70-79, U =<70)

- Note:
1. Grading and class schedule could be changed due to weather, lab equipment, timing and instructor.
 2. Lab assignment due is 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.

Class participation will be judged by the level of involvement in students in discussions of assigned.

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/polycystate/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 disenrolled 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.

Proposal # GEOG -6407/8407**University of North Carolina at Charlotte****New Graduate Course****Curriculum Proposal from Department of Geography and Earth Sciences****I. TITLE: Proposed New Course: GEOG 6407/8407 Geocomputation****II. CONTENT OF PROPOSALS****A. PROPOSAL SUMMARY AND CATALOG COPY.**

1. **SUMMARY.** The Department of Geography and Earth Sciences proposes to establish a new course to the graduate curriculum: **GEOG 6407/8407. Geocomputation.**

2. **PROPOSED CATALOG COPY. GEOG6407. Geocomputation.** (3 credits). Cross-listed as GEOG 8407. Prerequisite: GEOG5120, or consent of the instructor. This course is devoted to the implementation of computational techniques and resources for the exploration and analysis of (large) spatially referenced databases. The course provides an assessment of the place and contribution of computational methods in spatial data handling. The course explores “new” computationally intensive approaches to doing geography. Topics will include artificial neural networks, machine learning induction algorithms, genetic and other evolutionary algorithms, and other algorithms for spatial data mining. (Fall or Spring).

GEOG8407. Geocomputation. (3 credits). Cross-listed as GEOG 6407. Prerequisite: GEOG5120, or consent of the instructor. This course is devoted to the implementation of computational techniques and resources for the exploration and analysis of (large) spatially referenced databases. The course provides an assessment of the place and contribution of computational methods in spatial data handling. The course explores “new” computationally intensive approaches to doing geography. Topics will include artificial neural networks, machine learning induction algorithms, genetic and other evolutionary algorithms, and other algorithms for spatial data mining. (Fall or Spring).

B. JUSTIFICATION.**1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

With the advent of high performance computing environments and geospatial information technologies, new ways to conducting research in geography have emerged as attractive alternative to conventional quantitative geography. This course presents the opportunity to expose graduate students to the frontier in geospatial modeling research from a computational perspective. Both doctoral and masters students will benefit from this exposure. This course will complete other courses in geographic methodology and geographic information science presently offered in the Department of Geography and Earth Sciences. It will position graduating students at an advantage in the job market.

2. The Prerequisite

Students who take this class are expected to master the fundamental knowledge of the theories and techniques in GI S&T, demonstrated skills in operating GIS, and intermediate understanding of statistical analysis applied to geographic data. The classes *GEOG 5120 Introduction to Geographic Information Systems (4 credits)* and *GEOG 6100/8100 Quantitative Analysis in Geography* are offered for that purpose.

3. Course numbering is consistent with the level of academic advancement of students for whom it is intended.

The course number, GEOG6407/8407, follows other GIS&T classes numbered 64xx/84xx.

4. Improvements of this proposal on the scope, quality and/or efficiency of programs and/or instruction

See above elaborations in **1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

C. IMPACT.

1. Group(s) of students will be served by this proposal

The proposed class is expected to primarily serve masters and doctoral graduate students in Geography, as well as to a lesser extent, students in the INES doctoral program, masters students in the Earth Sciences Masters program, as well as select graduate students in SIS.

2. Effect this proposal will have on existing courses and curricula

a. When and how often will added course(s) be taught?

At most once a year, in the fall semester;

b. How will the content and/or frequency of offering of other courses be affected?

No effect.

c. What is the anticipated enrollment in course(s) added (for credit and auditors)? 10

d. How will enrollment in other courses be affected? How did you determine this?

No impact on other courses. It is anticipated that the natural growth of the Ph.D. in Geography as well as the enrollment growth of the proposed GIS&T track of the Masters in Geography will significantly contribute to the long-term viability of this course.

e. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

This course has been taught once as a special topic course, **Geog 6030/8030 Topics in Geographic Techniques: Geocomputation**, offered in Fall 2009. Enrollment was **9**.

f. Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.

None.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

None. The course will be taught by existing faculty and on existing computer facilities in the Department of Geography and Earth Sciences.

1. Personnel

a. Specify requirements for new faculty, part-time teaching, student assistant and/or increased load on present faculty.

None.

b. List by name qualified faculty members interested in teaching the course(s).

Jean-Claude Thill

2. Physical Facility

A lecture room that holds 15 people.

3. Equipment and Supplies

Existing GIS and computational facilities in the Department of Geography and Earth Sciences.

8. Computer

Existing GIS and computing facilities in the Department of Geography and Earth Sciences, which hold up to 20 students in a session.

9. Audio-Visual

None.

10. Other Resources

None.

11. Indicate source(s) of funding for new/additional resources required to support this proposal.

N/A.

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

Library Consultation

Consultation with Library staff initiated by memorandum on March 10 2010. The UNC Charlotte Library Reference Staff indicate that the holdings are adequate to support this proposal (see attached).

Consultation with other departments or units

a. Software and Information Systems: The consultation with the Department of Software and Information Systems was initiated by memorandum on December 7 2009. The Department of Software and Information Systems did not express any objections.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

1. The Department of Geography and Earth Sciences received this proposal and passed it unanimously on November 20 2009.

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

G. Attachments

The proposed course syllabus can be found on the next page, while the library consultation is found on page 54.

The following departments were consulted on the proposed *course 6407/8407 Geocomputation*:

Software and Information Systems

The departments we consulted with did not express any objections. Library holdings were judged adequate.

Geog 6030/8030

Topics in Geographic Techniques: Geocomputation

Syllabus

Fall 2009

Tuesday and Thursday 12:30-1:45

111 McEniry

Jean-Claude Thill

Jean-Claude.Thill@uncc.edu

687-5909

Office hours: Thursday 2-3:30 or by appointment (432 McEniry)

A. Course Description.

This course is devoted to the implementation of computational techniques and resources for the exploration and analysis of (large) spatially referenced databases. The course provides an assessment of the place and contribution of computational methods in spatial data handling. The course explores “new” computationally intensive approaches to doing geography. Topics will include artificial neural networks, machine learning induction algorithms, genetic algorithms, and other algorithms for spatial data mining.

B. Course Objectives.

At the end of the semester, students should achieve goals of the course as follows;

1. Understand the respective roles and contributions of KDD, data mining, machine learning, geocomputation in scientific research
2. Understand the relationship between geocomputation and quantitative geography
3. Understand the principles, advantages and disadvantages of artificial neural networks, inductive machine learning, and their use for research in geography

4. Understanding when each modeling approach mentioned under point (3) is best used
5. Understand the principles of evolutionary algorithms and the class of scientific problem of geography they are best suited for
6. Gain first hand experience of the modeling approaches mentioned under points (3) and (4)
7. Develop an ability to critically read scientific literature on geocomputation
8. Develop and implement a research project incorporating geocomputation research approaches and geocomputational reasoning.

C. Tentative Course Outline.

1. Overview of GeoComputation, Geographic Data Mining, Knowledge Discovery, Machine Learning, etc.
2. GVis and Data Mining
3. Machine Learning: Decision Trees, Association Rules, etc.
4. Neurocomputing
5. Evolutionary Algorithms

D. Administrative information.

1. No textbook. Several recommended texts:

Openshaw, S. and C. Openshaw. Artificial Intelligence in Geography. 1997, Wiley, Chichester.

Openshaw, S., and R.J. Abraham. GeoComputation. 2000, Taylor & Francis, London.

Longley, P.A., S.M. Brooks, R. McDonnell, B. MacMillan. Geocomputation: A Primer. 1988. Wiley, Chichester.

Miller, H.J., and J. Han. Geographic Data Mining and Knowledge Discovery. Taylor and Francis, 2001.

Witten, I.H., and E. Frank. Data Mining. 2005. Elsevier, San Francisco.

Agarwal, P., and Skupin, A. Self-organizing Maps. 2008. Wiley, Chichester.

Additional readings from the scientific literature will be assigned during the semester.

3. Student evaluation:

		Percent of grade
a.	Papers on Technique or Domain of Application	30
b.	Term paper or Project	40 (incl. 10 pts for oral presentation)
c.	Class participation	30

Class participation will be judged by the level of involvement of students in the discussion of assigned readings and the substance of reading reports. The final paper will be submitted at the time of the paper presentation on a conceptual or implementation topic of urban regional modeling.

4. Specify policies that apply to this course:

a. University integrity

Each student is expected to abide by the Code of Student Academic Integrity. The Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. The following is prohibited in that Code as violating those standards:

- Cheating. Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices in any academic exercise. This definition includes unauthorized communication of information during an academic exercise.
- Fabrication and Falsification. Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of altering information, while fabrication is a matter of inventing or counterfeiting information for use in any academic exercise.
- Multiple Submission. The submission of substantial portions of the same academic work (including oral reports) for credit more than once without authorization.
- Plagiarism. Intentionally or knowingly presenting the work of another as one's own (i.e., without proper acknowledgement of the source). The sole exception to the requirement of acknowledging sources is when the ideas, information, etc, are common knowledge.
- Abuse of Academic Materials. Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource material.
- Complicity in Academic Dishonesty. Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

b. Attendance

Attendance is expected, but not required. No grade will be assigned on the basis of the student's attendance.

c. Grading policy

A, B, C, and Unsatisfactory, with the following numerical grade equivalence:

A	90 and above
B	80 to 89.9
C	70 to 79.9
Unsatisfactory	Under 70

Participation responsibilities. Each student is obliged to contribute constructively to the class discussion each week. High quality discussions will ensue only if students come prepared and contribute to discussions at a level commensurate with graduate performance.

Proposal # GEOG -6408/8408**University of North Carolina at Charlotte****New Graduate Course****Curriculum Proposal from Department of Geography and Earth Sciences****I. TITLE: Proposed New Course: GEOG 6408/8408 Spatial Optimization****II. CONTENT OF PROPOSALS****A. PROPOSAL SUMMARY AND CATALOG COPY.**

1. **SUMMARY.** The Department of Geography and Earth Sciences proposes to establish a new course to the graduate curriculum: **GEOG 6408/8408. Spatial Optimization**

2. **PROPOSED CATALOG COPY. GEOG 6408. Spatial Optimization** (3 credits). Cross-listed as GEOG 8408. Prerequisite: Introduction to Geographic Information Systems (GEOG5120), or consent of the instructor. Spatial Optimization is articulated around the explicit use of GIS tools and techniques to solve coverage, distance-decay problems as well as routing problems integrating geographic information. Case studies in various domains such as urban planning retailing or transportation. Problem formulation and solution techniques to optimally preserve existing natural reserves, such as reservoir resources or locating natural corridors between biologically rich areas to protect diversity. (Fall or Spring).

GEOG 8408. Spatial Optimization (3 credits). Cross-listed as GEOG 6408. Prerequisite: Introduction to Geographic Information Systems (GEOG5120), or consent of the instructor. Spatial Optimization is articulated around the explicit use of GIS tools and techniques to solve coverage, distance-decay problems as well as routing problems integrating geographic information. Case studies in various domains such as urban planning retailing or transportation. Problem formulation and solution techniques to optimally preserve existing natural reserves, such as reservoir resources or locating natural corridors between biologically rich areas to protect diversity. (Fall or Spring).

B. JUSTIFICATION.1. **THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

Quantitative techniques as well as Geographic Information Science are important components of both the Masters program in Geography and Ph.D. program in Geography and Urban Analysis offered by the Department of Geography and Earth Sciences. In this context, *GEOG 6408/8408 Spatial Optimization* (3credits) is at the intersection of these two constituents, and will significantly contribute to both programs. A new track in Geographic Information Science is being proposed for the Masters program. The course applies a suite of GIS techniques to the

field of optimization and multicriteria decision making, which will better position graduating students to find a professional position.

2. The Prerequisite

Students who take this class are expected to master the fundamental knowledge of the theories and techniques in GIS&T, demonstrated skills in operating GIS, and some basic understanding of linear algebra. The class *GEOG 5120 Introduction to Geographic Information Systems (4 credits)* is offered for that purpose.

3. Course numbering is consistent with the level of academic advancement of students for whom it is intended.

The course number, GEOG 6408/8408, follows other GIS&T classes numbered 6408/8408.

4. Improvements of this proposal on the scope, quality and/or efficiency of programs and/or instruction

See above elaborations in 1. **THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

C. IMPACT.

1. Group(s) of students will be served by this proposal

The proposed class is expected to primarily serve masters and doctoral graduate students in Geography, as well as to a lesser extent, draw students from the INES doctoral program, students specializing in transportation in the MSc. in Engineering, as well as selected students in SIS and Engineering Management.

2. Effect this proposal will have on existing courses and curricula

a. When and how often will added course(s) be taught?

At most once a year, in the Fall semester;

b. How will the content and/or frequency of offering of other courses be affected?

No effect.

c. What is the anticipated enrollment in course(s) added (for credit and auditors)? 12

d. How will enrollment in other courses be affected? How did you determine this?

No impact on other courses. It is anticipated that the natural growth of the Ph.D. in Geography as well as the enrollment growth of the proposed GIS&T track of the Masters in Geography will significantly contribute to the long-term viability of this course.

e. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

This course has been taught once as a special topic course, **Geog 6000/8000 Topics in Economic Geography: Spatial Optimization Transportation and Spatial Information**, offered in Spring 2008. Enrollment was **15**.

f. Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.

None.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

None. The course will be taught by existing faculty and on existing computer facilities in the Department of Geography and Earth Sciences.

1. Personnel

a. Specify requirements for new faculty, part-time teaching, student assistant and/or increased load on present faculty.

None.

b. List by name qualified faculty members interested in teaching the course(s).

Eric Delmelle.

2. Physical Facility

A lecture room that holds 15 people.

3. Equipment and Supplies

Existing GIS facilities in the Department of Geography and Earth Sciences.

12. Computer

Existing GIS facilities in the Department of Geography and Earth Sciences, which hold up to 20 students in a session.

13. Audio-Visual

None.

14. Other Resources

None: Optimization software Lingo (student version) is readily available and free.

15. Indicate source(s) of funding for new/additional resources required to support this proposal.

N/A.

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

Library Consultation

Consultation with Library staff initiated by memorandum on March 20 2010
The UNC Charlotte Library Reference Staff indicate that the holdings are adequate to support this proposal (see attached).

Consultation with other departments or units

Civil and Environmental Engineering: The consultation with the Department of Civil and Environmental Engineering was initiated by memorandum on December 7 2009. The Civil and Environmental Engineering Department approved this proposal.

Software and Information Systems: The consultation with the Department of Software and Information Systems was initiated by memorandum on December 7 2009. The Department of Software and Information Systems did not express any objections.

Systems Engineering and Engineering Management: The consultation with the Department of Systems Engineering and Engineering Management was initiated by memorandum on December 7 2009. The Department of Systems Engineering and Engineering Management approved this proposal pending minor revision to the spatial optimization syllabus this proposal.

Computer Science: The consultation with the Department of Computer Science was initiated by memorandum on December 7 2009. The Department of Computer Science did not express any objections.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

1. Originating Unit

1. The Department of Geography and Earth Sciences received this proposal and passed it unanimously on November 20 2009.

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

II.G. Attachments

The proposed course syllabus can be found on the next page, while the library consultation is found on page 57.

The following departments were consulted on the proposed course *GEOG 6408/8408 Spatial Optimization*:

Software and Information Systems
Civil and Environmental Engineering Consultation
Systems Engineering and Engineering Management
Computer Science

While library holdings were judged adequate, we did receive valuable comments from Systems engineering and Engineering Management regarding this proposed course, and we changed our syllabus accordingly. The other departments we consulted with did not express any objections.

Fall 2008

Lecture: Tuesday 5-7.15PM, 401 McEniry

Eric Delmelle (office McEniry 428 *now* 333)

Tel: (704) 686-5991

Office hours: TR: 12.30-1.30pm; TR: 3.15-4.45pm

Email: eric.delmelle@uncc.edu**Geog 6000/8000****Spatial Optimization****Syllabus**

A. Course Description

GEOG 6408/8408. Spatial Optimization (3 credits). Geography 6000/8000 - is a course on quantitative techniques that can be applied to support the decision making in broadly understood resource management situations (i.e. natural, human, financial resources) involving geographic data. The course material focuses on analytical optimization techniques, especially location-allocation problems, site feasibility (in a mathematical modeling approach), multiple criteria evaluation. In addition, the course also introduces concepts in decision making.

Rather than presenting purely a "cookbook" or "canned" approach students will be exposed to both theory and mathematics behind the decision support methods prior to using decision support software tools. Take-home problems will be used to ground the lecture material and help students place techniques in a decision problem context. The goal of the course is to familiarize students with various analytical decision support techniques and tools, which can be applied to decision-making situations, requiring to prioritize and choose from multiple decision options. This class should prove valuable to individuals interested in decision support for resource management/development both in private and public sectors.

B. Prerequisites

Students participating in this course are expected to have a good knowledge of introductory mathematics, concepts of GIS (be comfortable with the use of GIS software tools). Students are also expected to have some programming knowledge; the programming language does not matter. Having familiarity with linear algebra and matrix manipulation is a plus, especially in the beginning of the semester.

C. Class meetings

The only class period will be devoted to lecture and exercise demonstration. Except for the first weeks, we will usually have about 1h30 to 2hours of lecture, take a break, and then head to the computer lab for exercises. To gain the most from lectures I recommend you read relevant material from the text before class that I will give you. Usually, on top of the lecture, we will discuss one to two papers a week.

D. Exercises

A series of about 7 to 12 exercises will provide hands-on experience. Those exercise will be take-home, and you will usually have about one week or more to complete them. At first, exercises will involve linear programming problems mostly, to be solved by

hand and on the computer using LINDO/LINGO. LINDO and LINGO will be installed on the computers in the Geography Lab. A few exercises will also integrate GIS (ArcGIS, ArcInfo) for solving location-allocation problems. One or two programming exercises will be implemented within the Matlab environment, or the programming language of your choice. Towards the end of the semester we will have one or two multi-criteria assignments. Students can expect to become familiar in the use of LINDO and LINGO upon completion of this course.

E. Final Project

Students will also work towards a final project that they will present in class. Topics can range from an application of a location-allocation model, a literature review of existing models for a particular problem, or a multi-criteria decision project dealing with weight sensitivity. I would recommend working on an application of a particular location-allocation model. Students will team up together (pairs of 2) for the final project. The project will also be presented in class towards the end of the semester.

At any rate, graduate students should have a research topic by mid-October and a one-page proposal by October 30th. Guidelines are as follows:

The presentation will take place on Tuesday December 9. The presentation should remain short: 15 minutes, so make sure you don't exceed about 15-20 slides if you do a power point presentation. The presentation will illustrate your paper.

The paper is due by Friday December 12 by 5pm. The paper will be 10 pages long (single-spaced, 12pts font), excluding abstract, figures, tables, maps and illustrations. The topic of the paper should be narrowly defined: not an "all-I-have-learned-in-GEOG-6000/8000"-type paper. It should be a methodologically sound, original research. You are free to research the topic of your choice, but keep in mind that the subject should be in the framework of the course. The paper should be a well-structured text composed of the following part:

- A 10 to 15 lines abstract;
- An introduction, where the objective of the paper is presented;
- A body, possibly made of several numbered sections, where the literature is reviewed, the methodology is outlined, the data are described, the arguments are discussed, and the results are presented;
- A conclusion;
- A bibliography listing all the references quoted in the text (no extra references). The references should cover both the methodological aspects (beyond the obvious reference to your textbook, intro text on GIS, etc...) of the paper as well as the substantive part of it. A minimum of 15 references (excluding web pages) is required.

Quotations must be accompanied by the author's name, year of publication, and page as follows: "... (Quantificus, 1999, p123). The bibliography must be consistently organized.

F. Textbook

The good news is that there is no textbook for this class. For the linear programming part of the class, I recommend (but not require) the book Linear Programming by J. Ignizio and T. Cavalier at Prentice Hall (1994). I realized the book is expensive, so I will make copies of the chapter we will cover. I also use another book called Network and Discrete Location: Models, Algorithms and Applications from Daskin (1995), which I

have in my office. We will discuss some of the models describe in it. You are welcome to make copies of it. We will also use some chapters from GIS and Multicriteria Decision Analysis by Malczewski, J. (1999). John Wiley and Sons.

G. Readings

I will give in class a a list of of readings (in the form of journal articles). Everyone is supposed to read those articles and be prepared to discuss them in class. Be prepared to have at least one question about the paper. One student will summarize and lead the discussion of one paper. I will assign those in class. The structure of the article presentation should be as follows:

Reference of the article

Context and purposes of the study

Data and methods used

Results

What are the shortcomings of the paper

Are there specific passages of the paper you did not understand.

How can the paper be improved

H. Class Notes

Class notes, exercise handouts and other material will be made available through blackboard (<http://express.uncc.edu>). Let me know if you have problems accessing it.

I. Grading System

The grading system is summarized as follows. There will two exams, one in class, one take-home. As aforementioned, there will be 7-12 labs/homeworks/exercises. Final grade will be calculated out of 100. The grades are given as follows: A: >89.5, B: 79.5 - 89.5, C: 69.5 - 79.5, U:70. **Participation responsibilities:** each student is obliged to contribute to the class discussion each week. High quality discussion will be ensured only if students come prepared and contribute to discussion at that level commensurate with graduate students.

Task	Number	Points
Exam	2	100/200 total
Lab exercises	7-12	Will vary
Article presentation	1	25
Final project & presentation	1	100
Participation	1	30

J. Ethics

If you are contemplating an ethical failure please read the code of student academic integrity: <http://www.legal.uncc.edu/policies/ps-105.html>, so you can plan for the consequences. I encourage students to work on their own, yet helping each other understanding the concepts is fine.

K. Subjects covered in class

1. Linear Programming and Solving Methods (Simplex) 1 week.
2. Branch and Bound, Integer Programming and Knapsack problems. Steepest ascent method (hill climbing) 1 week.
3. Graph theory, network and flow problems. Building Networks in Geodatabase and checking for topology. Computing shortest path and Traveling Salesman Problem in ArcGIS by means of Network Analyst. Using GIS to estimating the impact of Network versus Euclidean distance in

location modeling and its impact in terms of accessibility. 1 week.

4. Location-allocation models (9weeks):

a. Location of undesirable facilities: R-separation and R-benefit models, p-dispersion. Use of Lingo to solve problem, visualization in ArcGIS. Application to disposal of hazardous wastes. 1½ week.

b. Center problems and median problems. Application of GIS and network application for siting EMS services. 1½ week..

c. Covering problems. LCSP, MCLP and other probabilistic coverage models. Locating backup facilities. Application with GIS to locating bus stops and cell tower allocation. Spatial Interaction modeling. 2 weeks.

d. Network Node Removal Impact Problem (Network Survivability, Interdiction and System Flow) ½ week.

e. Application of routing and coverage modeling: maximum and minimum visibility path in GIS using Spatial Analyst and Line-of-Sight (Viewshed). Shortest Covering Path. Routing optimization problem (Hazmat routing) ½ week.

f. Sustainable multiobjective land-use allocation. Optimizing natural resources and reservoir resources Optimizing the design of nature resources for protection of biological diversity and corridor allocation for connecting disparate reserves. 3 weeks.

5. Special Topic: Spatial sampling optimization ½ week.

6. Heuristic Methods: Greedy, Simulated Annealing, Genetic Algorithms, Tabu Search. ½ week.

7. Use of Spatial Decision Making Techniques and Multiple Criteria Decision Making (MCDM) to solve Geographic Problems: use of map algebra and model builder within GIS. Evaluation Criteria, Decision Alternatives and Constraints. Criterion Weighting Techniques and Sensitivity Analysis. 1 week.

8. Student project presentation. 1 week.

Proposal # GEOG -6406/8406**University of North Carolina at Charlotte****New Graduate Course****Curriculum Proposal from Department of Geography and Earth Sciences****I. TITLE: Proposed New Course: GEOG 6406/8406 Spatial Information and Mobility****II. CONTENT OF PROPOSALS****A. PROPOSAL SUMMARY AND CATALOG COPY.**

1. **SUMMARY.** The Department of Geography and Earth Sciences proposes to establish a new course to the graduate curriculum: **GEOG 6406/8406. Spatial Information and Mobility.**

2. **PROPOSED CATALOG COPY. GEOG6406. Spatial Information and Mobility.** (4 credits). Cross-listed as GEOG 8406. Prerequisite: GEOG5120, or consent of the instructor. This course focuses on issues related to the collection, storage, and dissemination of data and information used in transportation analysis, planning, and operations. Students will be exposed to the functionality of geographic information systems and concepts of Geographic Information Science that enable these tasks, as well as to traditional travel data collection techniques. Advanced data collection and information dissemination approaches are also discussed, including the use of probes, sensors, GPS, and other wireless communication devices. The fundamentals of Intelligent Transportation Systems form a central part of the course. Finally, the state-of-the-art and future of location-based services and telematics systems is discussed from the perspective of personal mobility and spatial information. (Fall or Spring).

GEOG8406. Spatial Information and Mobility. (4 credits). Cross-listed as GEOG 6406. Prerequisite: GEOG5120, or consent of the instructor. This course focuses on issues related to the collection, storage, and dissemination of data and information used in transportation analysis, planning, and operations. Students will be exposed to the functionality of geographic information systems and concepts of Geographic Information Science that enable these tasks, as well as to traditional travel data collection techniques. Advanced data collection and information dissemination approaches are also discussed, including the use of probes, sensors, GPS, and other wireless communication devices. The fundamentals of Intelligent Transportation Systems form a central part of the course. Finally, the state-of-the-art and future of location-based services and telematics systems is discussed from the perspective of personal mobility and spatial information. (Fall or Spring).

B. JUSTIFICATION.**1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

Geographic Information Science and urban mobility are two strong components of the Masters program in Geography and Ph.D. program in Geography and Urban Analysis offered by the Department of

Geography and Earth Sciences. A new track in Geographic Information Science is being proposed for the Masters program. *GEOG 6406/8406 Spatial Information and Mobility (4 Credits)* will significantly contribute to both programs by offering a course at the intersection of Geographic Information Science and mobility analysis in urban environments. The course covers a wide range of advanced topics pertaining to concepts and models of data collection, data use, and data modeling in urban mobility and transportation systems, which will better position graduating students to find a professional position.

2. The Prerequisite

Students who take this class are expected to master the fundamental knowledge of the theories and techniques in GI S&T, demonstrated skills in operating GIS, and some basic understanding of the geographic concepts of spatial interaction and transportation and mobility. The class *GEOG 5120 Introduction to Geographic Information Systems (4 credits)* is offered for that purpose.

3. Course numbering is consistent with the level of academic advancement of students for whom it is intended.

The course number, GEOG6406/8406, follows other GIS&T classes numbered 64xx/84xx.

4. Improvements of this proposal on the scope, quality and/or efficiency of programs and/or instruction

See above elaborations in **1. THE NEED AND HOW IT IS MET BY THE PROPOSED CLASS.**

C. IMPACT.

1. Group(s) of students will be served by this proposal

The proposed class is expected to primarily serve masters and doctoral graduate students in Geography, as well as to a lesser extent, students in the INES doctoral program, PPOL doctoral program, students specializing in transportation in the MSc. in Engineering, as well as select students in SIS.

2. Effect this proposal will have on existing courses and curricula

a. When and how often will added course(s) be taught?

At most once a year, in the spring semester;

b. How will the content and/or frequency of offering of other courses be affected?

No effect.

c. What is the anticipated enrollment in course(s) added (for credit and auditors)? 10

d. How will enrollment in other courses be affected? How did you determine this?

No impact on other courses. It is anticipated that the natural growth of the Ph.D. in Geography as well as the enrollment growth of the proposed GIS&T track of the Masters in Geography will significantly contribute to the long-term viability of this course.

e. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

This course has been taught once as a special topic course, **Geog 6000/8000 D01 Transportation and Spatial Information**, offered in Spring 2008. Enrollment was **6**.

f. Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.

None.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

None. The course will be taught by existing faculty and on existing computer facilities in the Department of Geography and Earth Sciences.

1. Personnel

a. Specify requirements for new faculty, part-time teaching, student assistant and/or increased load on present faculty.

None.

b. List by name qualified faculty members interested in teaching the course(s).

Jean-Claude Thill

2. Physical Facility

A lecture room that holds 15 people.

3. Equipment and Supplies

Existing GIS facilities in the Department of Geography and Earth Sciences.

16. Computer

Existing GIS facilities in the Department of Geography and Earth Sciences, which hold up to 20 students in a session.

17. Audio-Visual

None.

18. Other Resources

None.

19. Indicate source(s) of funding for new/additional resources required to support this proposal.

N/A.

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

Library Consultation

Consultation with Library staff initiated by memorandum on March 10 2010

The UNC Charlotte Library Reference Staff indicate that the holdings are adequate to support this proposal.

Consultation with other departments or units

Civil and Environmental Engineering: The consultation with the Department of Civil Engineering was initiated by memorandum on December 7 2009. The Civil Engineering Department did not express any objections.

Software and Information Systems: The consultation with the Department of Software and Information Systems was initiated by memorandum on December 7 2009. The Department of Software and Information Systems did not express any objections.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

Originating Unit

1. The Department of Geography and Earth Sciences received this proposal and passed it unanimously on November 20 2009.

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

II.G. Attachments

The proposed course syllabus can be found on the next page, while the library consultation is found on page 56.

The following departments were consulted on the proposed course *GEOG 6406/8406 Spatial Information and Mobility*

Software and Information Systems
Civil and Environmental Engineering Consultation

Library holdings were judged adequate, and the departments we consulted with did not express any objections regarding this proposed course.

Spring 2008

Lecture: Tu-Th 12:30-1:45pm, 111 McEniry

Jean-Claude Thill

Lab: Fr 10:00-11:50am, 445 McEniry

Geog 6000/8000 D01**Transportation and Spatial Information****Syllabus**

A. Course Description

This course focuses on issues related to the collection, storage, and dissemination of data and information used in transportation analysis, planning, and operations. Students will be exposed to the functionality of geographic information systems and concepts of Geographic Information Science that enables these tasks, as well as to the traditional travel data collection techniques. Advanced data collection and information dissemination approaches are also discussed, including the use of probes, sensors, GPS, and other wireless communication devices. The fundamentals of Intelligent Transportation Systems form a central part of the course. Finally, the state-of-the-art and future of location-based services and telematics systems is discussed from the perspective of personal mobility and spatial information.

B. Objectives of the Course

At the end of the semester, students should achieve goals of the course as follows;

1. Understand the fundamentals of network data models in GIS
2. Understand the need for, principles of, and operations of network data manipulations
3. Familiarize with the geospatial and attribute network, transportation, and mobility data sources
4. Understand the main methods of collection of primary transportation flow, and mobility data
5. Understand the principles of GPS, its use in transportation and mobility research
6. Gain first hand experience of the concepts and principles covered in points (1)-(4) through practical exercises and lab assignments
7. Develop and implement a research project incorporating some new concepts and principles introduced in the class lectures

8. Understand the principles of local-based services, and telematics, especially their geospatial aspects.

C. Tentative course outline

1. GIS-T, Spatial Information, and Data Integration
2. O-D Data: Secondary Sources
3. GIS-T Data Models
 - Graph Theory and Network Analysis
 - Network Representation of a Transportation System
 - Mathematical Models of Travel Distances, Self-distances
 - Linear Referencing Methods and Systems
 - Data Models for ITS
4. Spatial Data Manipulation
 - Spatial Data Quality and Errors
 - Geocoding
 - Translation between Location Referencing Methods
 - Spatial Aggregation, Connectors
 - Network Aggregation and Generalization
 - Conflation
5. Traffic and Travel Time Data
 - Network, Traffic, Congestion, and Travel Time
 - Advanced Data Collection Techniques
 - Probes
 - Vehicle Location and Positioning Systems, GPS
 - Map Matching and Data Accuracy
 - Wireless Communications
6. Behavioral Survey
 - Types of Surveys
 - Data-Collection Methods
 - GPS and GIS in Travel Diaries Collection
7. Intelligent Transportation Systems
 - Defining ITS
 - Elements, Market Packages, Technologies
 - ITS Architectures
 - ITS Data Standards
 - Benefits Evaluation

- Cases Studies
8. Location-Based Services and Telematics
- What is LBS, Telematics?
 - Emergence of LBS and Telematics
 - Basic Uses and Services
 - Locational Concepts, location awareness
 - Interoperability and Standards
 - Spatial and Non-Spatial Requirements
 - The Future of LBS and Telematics

C. Administrative information

1. Texts:

Geographic Information Systems for Transportation / H. Miller and S.-L. Shaw
Oxford, New York: Oxford UP, 2001.

Geographic Information Systems in Transportation Research / J.-C. Thill
Oxford: Pergamon, 2000.

Additional reading material will be made available during the semester.

2. Office:

Location, Room # 432, McEniry

Phone, (704) 687-5909

E-mail: jfthill@uncc.edu

Office hours: TU 2:00-3:30 pm.

You are encouraged to stop by to see me and discuss course-related issues or others.

3. Specify policies that apply to this course:

- a. University integrity

Each student is expected to abide by the Code of Student Academic Integrity. The Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. The following is prohibited in that Code as violating those standards:

- Cheating. Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices in any academic exercise. This definition includes unauthorized communication of information during an academic exercise.
- Fabrication and Falsification. Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of altering information, while fabrication is a matter of inventing or counterfeiting information for use in any academic exercise.
- Multiple Submission. The submission of substantial portions of the same academic work (including oral reports) for credit more than once without authorization.
- Plagiarism. Intentionally or knowingly presenting the work of another as one's own (i.e., without proper acknowledgement of the source). The sole exception to the requirement of acknowledging sources is when the ideas, information, etc, are common knowledge.
- Abuse of Academic Materials. Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource material.
- Complicity in Academic Dishonesty. Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

b. Attendance

Attendance is expected, but not required. No grade will be assigned on the basis of the student's attendance.

c. Grading policy

A, B, C, and Unsatisfactory, with the following numerical grade equivalence:

A	90 and above
B	80 to 89.9
C	70 to 79.9
Unsatisfactory	Under 70

Participation responsibilities. Each student is obliged to contribute constructively to the class discussion each week. High quality discussions will ensue only if students come prepared and contribute to discussions at a level commensurate with graduate performance.

d. Student evaluation:

		Percent of grade
a	Exam	45
b	Term paper or project	30
c	Class participation	15
d	Lab	15

The grade of "I" (incomplete) may, at the discretion of the instructor, be given to a student who requests it in writing (TYPED). The student must have a passing average in the course and must submit an official medical or other third party excuse. The "I" grade will stand for ONE SEMESTER ONLY (or one summer), after which it will be changed to a letter based on the points accumulated.

e. Tests:

A single, open-book exam is scheduled. Students are expected to adequately master the material discussed during the lectures or assigned as readings.

Tentative date of exam: TBD.

f. Make-up examinations:

Make-up exams are administered only in unusual circumstances.

g. Extra credits

There will be no extra credits.

h. Course organization

The class will follow a lecture/seminar format.

i. Prerequisites:

Introduction to Geographic Information Systems (Geog 5120)

j. Laboratory

Syllabus distributed next Friday during the lab period

Short Form (Memo):

Change of course title (GEOG 6/8130) from 3D visualization of Geographic Information to Geovisualization

The following communication with Rob McGregor indicates that a short form is necessary to change a course title.



MEMO FORM COURSE AND CURRICULUM PROPOSAL

*To:

From: Department of Geography and Earth Sciences

Date:

Re:

SUMMARY: State clearly and concisely the proposed less substantive changes. Please give a brief statement as to why the change is being proposed.

Ex. "The Biology Department proposes to add a prerequisite to the existing course, BIOL 2222."

Ex. "The College of Information Technology proposes a change in the course description for ITCS 6132."

The department of Geography and Earth Sciences proposes a slight modification in the title and description of an existing course (Geog 6130/8130): "3d Visualization of Geographic Information" to a more generic title "Geovisualization".

FOR CONSULTATION WITH OTHER DEPARTMENTS:

1. Does the proposed change affect other departments?
 Yes No

2. If Yes, please list the other departments affected by the proposed change:

3. Have you consulted with each department listed in question 2 regarding the proposed change?
 Yes No

4. Result(s) of Consultation(s):

RESOURCES: Indicate the additional resources required, if any, to implement and maintain the proposed change:


None.

PROPOSED CATALOG COPY:

Geog 6130/8130: Geovisualization
 Cartographic design, representation versus communication, cognitive and perceptual issues, visual variables and color, proportional symbology, choropleth and flow mapping. Representation of change (space-time).
 Exploratory data analysis. Interactive, dynamic and animated mapping. Strong laboratory component with various exercises in GIS and graphic software.

***NOTE:** Proposals for undergraduate courses should be sent to the Undergraduate Course and Curriculum Committee Chair. Proposals for graduate courses should be sent to the Graduate Council Chair. Proposals related to both undergraduate and graduate courses, e.g., courses co-listed at both levels, must be sent to both.

Revised 01/28/05
 OAA/jdp
 Page 2 of 2

 You replied on 10/8/2009 11:15.

Delmelle, Eric

From: McGregor, Rob **Sent:** Wed 10/7/2009 11:36
To: Delmelle, Eric
Cc:
Subject: FW: Short form/Long Form Question
Attachments:

Eric,

Sorry to take so long getting back to you about your question. It strikes me that what you are proposing amounts to editorial changes in the catalog course description, and I am comfortable with this being done with a short form. Feel free to email or call if you would like to discuss this.

Thanks!

Rob Roy

Rob Roy McGregor
Professor of Economics
Coordinator of MS in Economics Program
Department of Economics
UNC Charlotte
9201 University City Boulevard
Charlotte, NC 28223
Email rrmcgreg@uncc.edu

https://unccmail.uncc.edu/exchange/Eric.Delmelle/Inbox/FW:%20Short%20form_xF8FF... 10/19/2009

Phone 704-687-7639

Fax 704-687-6442

From: Parks, Annette
Sent: Friday, October 02, 2009 9:22 AM
To: McGregor, Rob; Delmelle, Eric
Cc: Mack, Donna; Reynolds, Tom
Subject: Short form/Long Form Question

Eric,

Thank you for your question about the changes to your graduate course. I am forwarding your question to Rob Roy McGregor to answer, as he is the Chair of the Graduate Council.

Thank you,

Annette Parks

Annette Parks | Executive Assistant to the Dean
UNC Charlotte | The Graduate School
9201 University City Blvd. | Charlotte, NC 28223
Phone: 704-687-7248 | Fax: 704-687-3279
arparks@uncc.edu | <http://www.graduateschool.uncc.edu>

If you are not the intended recipient of this transmission or a person responsible for delivering it to the intended recipient, any disclosure, copying, distribution, or other use of any of the information in this transmission is strictly prohibited. If you have received this transmission in error, please notify me immediately by reply email or by telephone at 704-687-7248. Thank you.

From: Delmelle, Eric
Sent: Thursday, October 01, 2009 4:17 PM
To: Mack, Donna

https://unccmail.uncc.edu/exchange/Eric.Delmelle/Inbox/FW:%20Short%20form_xF8FF... 10/19/2009

Subject: question on course change

Hi Donna:

I am Eric Delmelle, assistant professor in geography and earth sciences.

I am considering slightly modifying the title of an existing graduate course (GEOG 6/8130 : 3D Visualization of Geographic Information), and some of its contents to reflect new technologies. Does this process call for a short memo form, or a long form proposal?

Thank you,

eric delmelle

--

Geography and Earth Sciences at UNCC

Charlotte, NC 28223

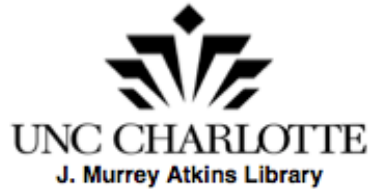
Phone: (704) 687 5991

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https://unccmail.uncc.edu/exchange/Eric.Delmelle/Inbox/FW:%20Short%20form_xF8FF... 10/19/2009

Consultations

Library – proposed track in GIS&T



Consultation on Library Holdings

To: Eric Delmelle

From: Dawn Hubbs

Date: March 24, 2010

Subject: Master of Arts in Geography with GIS & Technologies Track

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dawn Hubbs Date: March 24, 2010

Please Check One:

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

Comments:

Library resources are adequate to support a Master of Arts in Geography with a Geographic Information Science and Technologies Track. The software and electronic equipment necessary for this program are the responsibility of the Department of Geography and Earth Sciences. The Library has relevant electronic databases to support the program, and a significant number of journals. To increase support of the program, the University Librarian is working with the Provost to increase the amount of funding available to purchase monographs. Also, the Library makes an effort to purchase journals that have a significant number of Interlibrary Loan requests; for example, negotiating a license to purchase access to Transportation Research Record, which students and faculty have needed for a number of years.

Dawn Hubbs
Evaluator's Signature

March 24, 2010
Date

Revised 10/29/08
OAA jdp

Library – geog 5150: spatial database development with GPS/GIS



Consultation on Library Holdings

To: Eric Delmelle
 From: Dawn Hubbs
 Date: March 23, 2010
 Subject: GEOG5150 Spatial Database Development

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dawn Hubbs Date: March 23, 2010

Please Check One:

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

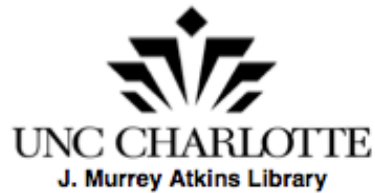
Comments:

Students in GEOG5150, Spatial Database Development with GPS/GIS, 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, GeoScience World 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), SpringerLink, Blackwell-Synergy, Wiley InterScience and Kluwer Online Journals contain a significant amount of research. Some representative journal titles include *Geoinformatica*, *Journal of Geographical Systems*, *International Journal of Geographical Information Science : IJGIS*, *Transactions in GIS*, *GPS Solutions*, *ISPRS Journal of Photogrammetry and Remote Sensing*, *Geographical Analysis*, *Computers, Environment and Urban Systems*, *Computers and Geosciences*, *Journal of Geodesy*, and *Environmental Modelling and Software*. Students may have to request some material through Interlibrary Loan.

 Dawn Hubbs
 Evaluator's Signature

 March 23, 2010
 Date

Revised 10/29/08
 OAA jdp

Library – geog 6407: geocomputation**Consultation on Library Holdings**

To: Eric Delmelle
 From: Dawn Hubbs
 Date: March 23, 2010
 Subject: GEOG 6407 Geocomputation

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dawn Hubbs Date: March 23, 2010

Please Check One:

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

Comments:

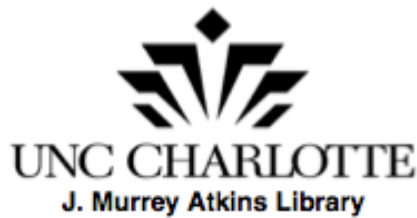
Students in GEOG6407, Geocomputation, will be required to "Develop an ability to critically read scientific literature on geocomputation," and "Develop and implement a research project incorporating geocomputation research approaches and geocomputational reasoning." Some relevant electronic databases to support their research are Compendex, GEOBASE, GeoScience World and Web of Science. Most have some full-text availability. The publisher-based full-text collections of The ACM Digital Library, IEEE Xplore, Science Direct (Elsevier), SpringerLink, Blackwell-Synergy, and Wiley InterScience contain a significant amount of research. Some representative journal titles include *GeoInformatica*, *Journal of Geographical Systems*, *International Journal of Geographical Information Science: IJGIS*, *Geographical Analysis*, *Computers, Environment and Urban Systems*, and *Computers and Geosciences*. Students may have to request some material through Interlibrary Loan.

Dawn Hubbs
 Evaluator's Signature

March 23, 2010
 Date

Revised 10/29/08
 OAA:jdp

Library – geog 6408: spatial optimization



Consultation on Library Holdings

To: Eric Delmelle
From: Dawn Hubbs
Date: March 23, 2010
Subject: GEOG6408/8408 Spatial Optimization

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dawn Hubbs **Date:** March 23, 2010

Please Check One:

- Holdings are superior
- Holdings are adequate X
- Holdings are adequate only if Dept. purchases additional items.
- Holdings are inadequate

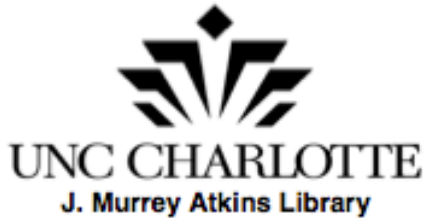
Comments:

GEOG6408/8408 Spatial Optimization is not heavily dependent on library resources. However, students will be required to write an original research paper, with a minimum of 15 references. Electronic databases available range from business (Business Source Premier, EconLit), broad social science (Academic Search Premier, PAIS, Web of Science) to engineering/geography/geosciences (ASCE Civil Engineering Database, Compendex, GEOBASE, GeoScience World, Web of Science). Many supply full-text links. Students may have to request some material through Interlibrary Loan. While it is not finalized as of this date, the Library is negotiating the license to obtain electronic access to *Transportation Research Record*, a major resource for the students with transportation interests.

 Dawn Hubbs
Evaluator's Signature

 March 23, 2010
Date

Library – geog 6406: spatial information and mobility



Consultation on Library Holdings

To: Eric Delmelle

From: Dawn Hubbs

Date: March 24, 2010

Subject: GEOG6406/8406 Spatial Information and Mobility

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dawn Hubbs **Date:** March 24, 2010

Please Check One:

- Holdings are superior
- Holdings are adequate **X**
- Holdings are adequate only if Dept. purchases additional items.
- Holdings are inadequate

Comments:

Library resources are adequate to support GEOG6406/8406 Spatial Information and Mobility. Students are required to complete a research project. Selected electronic databases available include Compendex, IEEE Explore, ASCE Civil Engineering database, GEOBASE, GeoScience World, Web of Science, TRIS. Many supply full-text links. Students may have to request some material through Interlibrary Loan. While it is not finalized as of this date, the Library is negotiating the license to obtain electronic access to *Transportation Research Record*, a major resource for the students in the various transportation tracks.

 Dawn Hubbs
Evaluator's Signature

 March 24, 2010
Date

Department consultations (communication by email)

Page 1 of 1

Delmelle, Eric

From: Allan, Craig **Sent:** Tue 12/15/2009 10:43
To: Thill, Jean-Claude; Delmelle, Eric; Strickland, Jamie
Cc:
Subject: FW: Course consultation
Attachments:

-----Original Message-----

From: Chu, Bei-Tseng
Sent: Tuesday, December 15, 2009 9:23 AM
To: Allan, Craig
Subject: Course consultation

Dear Allan,

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

GEOG 5150 Spatial Database Development with GPS/GIS, GEOG Geocomputation, GEOG 6408 Spatial Optimization, GEOG 6406

Best,

--Bill Chu
Professor and Chair
Department of Software and Information Systems

<https://unccmail.uncc.edu/exchange/Eric.Delmelle/DOCUMENTS/Department-related%20...> 5/1/2010

Delmelle, Eric

From: Allan, Craig **Sent:** Mon 12/14/2009 10:30
To: Delmelle, Eric; Strickland, Jamie; Thill, Jean-Claude
Cc:
Subject: FW: GIS Courses
Attachments:

From: Young, David
Sent: Monday, December 14, 2009 8:48 AM
To: Allan, Craig
Subject: RE:

Craig,

I circulated your proposals for GEOG 5150, GEOG 6408, GEOG 6406, and GEOG 6130 to CEE faculty members,

and those who responded did so with encouragement for the courses. I support their opinions and hope our 2 departments can work together in and through these courses.

Regards,

David

From: Allan, Craig
Sent: Monday, December 07, 2009 1:37 PM
To: Young, David; Tolone, Bill; Ribarsky, William; Teng, Gary Teng
Subject:

Dear David, Bill, Bill and Garry

package? Can we vote at next week's faculty meeting and send it on?

Craig

-----Original Message-----

From: Ozelkan, Ertunga
 Sent: Thursday, February 18, 2010 10:59 AM
 To: Delmelle, Eric
 Cc: Teng, Gary Teng; Allan, Craig
 Subject: RE: GIS Course

Hi Eric,

It was good meeting you as well.
 Your course proposal with the suggested changes look good.
 Good luck,

Ertunga

Ertunga C. Ozelkan, Ph.D.
 Assistant Professor, Systems Engineering and Engineering Management
 Associate Director, Center for Lean Logistics and Engineered Systems
 University of North Carolina at Charlotte
 Tel: 704-687-4990, Fax: 704-687-3616
<http://seem.uncc.edu>
<http://seem.uncc.edu/clles/>

-----Original Message-----

From: Delmelle, Eric
 Sent: Tue 2/16/2010 14:57
 To: Ozelkan, Ertunga
 Subject: RE: GIS Course

Dear Ertunga

Thank you again for your useful comments last week. I enjoyed our meeting and look forward to work with you. I have attached a revised version of the course proposal. changes are mostly on the first page (course description), and also at the end (page 9-10: topics covered)

Let me know if you would like to see more changes....
 eric

--
geoeath.uncc.edu
 Charlotte, NC 28223
 (704) 687 5991
 --

-----Original Message-----

From: Ozelkan, Ertunga
 Sent: Mon 2/8/2010 15:52
 To: Delmelle, Eric
 Subject: FW: GIS Course

fyi

Ertunga C. Ozelkan, Ph.D.
 Assistant Professor, Systems Engineering and Engineering Management
 Associate Director, Center for Lean Logistics and Engineered Systems
 University of North Carolina at Charlotte

<https://unccmail.uncc.edu/exchange/Eric.Delmelle/Deleted%20Items/RE:%20FW:%20GIS...> 5/1/2010

Tel: 704-687-4990, Fax: 704-687-3616
<http://seem.uncc.edu> <<http://seem.uncc.edu/>>
<http://seem.uncc.edu/clles/>

From: Ozelkan, Ertunga
Sent: Mon 2/8/2010 15:39
To: Teng, Gary Teng; Allan, Craig
Subject: RE: GIS Course

Dear Craig,

I would like to thank Dr. Elmelle for the elaboration that you forwarded.

I think a new advanced course on spatial optimization can be valuable, and in general, I support the introduction of more optimization related courses as it is an important expertise for our students especially for those conducting research.

We just need to make sure some of the details are streamlined with what we already have.

Looking at the topics listed on pages 36-37: it seems topics 1, 2, 5 are the main overlaps with the INES 8090/EMGT 6952 Engineering Systems Optimization course and topics 7, 8, 9 are the main overlaps with the INES 8090/EMGT 6915 Engineering Decision Analysis Course. I understand that a some amount of overlap is unavoidable, and perhaps desirable to emphasize some important tools and techniques but considering that the 10th topic is presentations, 6 of the 9 topics seem to be overlapping (not to mention that some of the other topics such as location problem/heuristics are covered briefly but not emphasized in our courses)

Since the courses we offer are available to INES students it would be nice to have this new spatial optimization course build onto what we already have, this way we would not divide the (already few) potential engineering/INES students to fewer numbers.

I am attaching the syllabus for both of the courses mentioned above so it can help with further streamlining. I will be glad to talk to Dr. Elmelle for further clarification.
Best Regards,

Ertunga

Ertunga C. Ozelkan, Ph.D.
Assistant Professor, Systems Engineering and Engineering Management
Associate Director, Center for Lean Logistics and Engineered Systems
University of North Carolina at Charlotte
Tel: 704-687-4990, Fax: 704-687-3616
<http://seem.uncc.edu> <<http://seem.uncc.edu/>>
<http://seem.uncc.edu/clles/>

From: Teng, Gary Teng
Sent: Mon 2/8/2010 09:48

<https://unccmail.uncc.edu/exchange/Eric.Delmelle/Deleted%20Items/RE:%20FW:%20GIS...> 5/1/2010

Spatial Database Development with GPS and GIS

Geography 4150

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. In addition, students develop Mobile GIS applications to access Internet Mapping Server (IMS) to download and edit spatial database accessed through wireless networks in the field. Prerequisite: GEOG 4120.

Course Objectives:

Geography 4150 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, and then integrate it with GPS collected geographic locations in the field via hand-held and mobile devices (HP iPAQs or DELL Axim). In addition, they will learn the architecture of ArcIMS, and ArcPad, which are Internet/Hand-held GIS software 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 spatial database, and
- learn how to integrate lightweight hardware (such as Compaq iPAQ), GPS, Internet GIS and wireless communication with a map server and databases accessed through the campus wireless network.

Instructor: *Eric Delmelle*, Ph.D.

Office Location: McEniry 333

Email: eric.delmelle@uncc.edu

Phone: 704-687-5991

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.)

GPS Equipment: 1. **Garmin GPS 12 Map w/ Beacon Antenna (DGPS)**

4. Teletype GPS chips
5. Trimble GPS – GeoCE XT, GeoCE XM and ProXR

GIS/GPS Software:

1. ArcGIS 9.0
2. ArcPad 6.0 and ArcPad Application Builder
3. ArcIMS 4.0
4. Pathfinder and Terrasync Professional

Computer and PDA:

1. Window XP and Server
2. Window CE on HP iPAQ and DELL Axim

Lecture Schedule*:

Week 1: Introduction to the class. GPS System Overview

LAB: **LB 1** – Introduction to Germin GPS 12 Map

- Week 2:** Basic Principles of GPS Operations
LAB: **LB 2** – Position Variation of Germin GPS 12 Map
- Week 3:** GPS Details / User Equipment: GPS Receivers
LAB: **LB 3** – Introduction to Compaq iPAQ and ArcPad 6.0
- Week 4:** Differential GPS Overview
LAB: **LB 4** – Introduction to ArcPad 6.0
- Week 5:** DGPS / GPS Data and Correction Services
LAB: **LB 5** – ArcPad 6.0 connecting GPS receiver
- Week 6:** GPS Errors and Biases
LAB: **LB 6** – Point data collection with a DGPS Receiver
- Week 7:** GPS Coordinate Systems and GPS Integrations / Applications
LAB: **LB 7** – Creating GIS data with a DGPS Receiver
- Week 8:** Introduction to Mobile GIS and Internet GIS
LAB: **LB 8** – Creating GIS data with a DGPS Receiver
- Week 9:** GPS Data Conversions to GIS Data
Data Flow Diagram (DFD) and Entity-Relation Diagram (ER)
LAB: **LB 9** – Understanding the basics of Trimble Pro XR DGPS Data Collector
- Week 10:** **Midterm EXAM**
LAB: **LB 10** – Planning and Creating a multilayer Data Dictionary using Trimble Pathfinder Office
- Week 11:** Three Stages of a GPS Project: One: Planning (Modern Structured Analysis Method)

LAB: **LB11** – Continuation of lab 2, with emphasis of collecting data for mini projects
and demonstration of RTK high accuracy DGPS

Week 12: One: Planning – Entity-Relation Diagram

LAB: Group (two persons) GPS project Assignment – NCDOT and Mecklenburg County, NC

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

LAB: Progress Report for Group GPS Project

Week 14: Two: Implementation

Three: Evaluation

Week 15: Contents of the Final Report of the project.

LAB: Progress Report for Group GPS Project

Week 16: Group Project Presentation. Final Project Report Due.

Student Evaluation* will be based on as followings:

Lab Assignments: 11 * 10 points = 110

Quiz: 2 * 10 points = 20

Group Project: 80pts (100pts for graduate since they take leading role)

Midterm: 80

Class Participation 20

Total: 310 points

Grading Policy: (A = 90-100, B = 80-89, C= 70-79, D = 55-69, F =<55)

- Note:
1. Grading and class schedule could be changed due to weather, lab equipment, timing and instructor.
 2. Lab assignment due is 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.

Class participation will be judged by the level of involvement in students in discussions of assigned.

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:

4. In accordance with University policy, students who engage in disruptive classroom activities will be disenrolled from the class.
5. **Plagiarism**, self-plagiarism, and cheating on exams will result in fail in the course and expulsion from the University is possible.
6. 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.