

NEW COURSE FORM

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|---|--|---|---|--|--|
| 1. General Information. | | | | | |
| a. | Submitted by the College of: Arts & Sciences | Today's Date: | 10/18/2011 | | |
| b. | Department/Division: GEOGRAPHY | | | | |
| c. | Contact person name: Matthew Zook | Email: zook@uky.edu | Phone: | 510-410-1410 | |
| d. | Requested Effective Date: | <input checked="" type="checkbox"/> Semester following approval | OR | <input type="checkbox"/> Specific Term/Year ¹ : _____ | |
| 2. Designation and Description of Proposed Course. | | | | | |
| a. | Prefix and Number: GEO709 | | | | |
| b. | Full Title: Advanced GIScience | | | | |
| c. | Transcript Title (if full title is more than 40 characters): | Advanced GIScience | | | |
| d. | To be Cross-Listed ² with (Prefix and Number): | _____ | | | |
| e. | Courses must be described by <u>at least one</u> of the meeting patterns below. Include number of actual contact hours ³ for each meeting pattern type. | | | | |
| | 3 Lecture | _____ Laboratory ¹ | _____ Recitation | _____ Discussion | |
| | _____ Clinical | _____ Colloquium | _____ Practicum | _____ Research | |
| | _____ Seminar | _____ Studio | _____ Other – Please explain: _____ | | |
| f. | Identify a grading system: | <input checked="" type="checkbox"/> Letter (A, B, C, etc.) | <input type="checkbox"/> Pass/Fail | | |
| g. | Number of credits: | 3 | | | |
| h. | Is this course repeatable for additional credit? | | | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> |
| | If YES: | Maximum number of credit hours: | _____ | | |
| | If YES: | Will this course allow multiple registrations during the same semester? | YES <input type="checkbox"/> | NO <input type="checkbox"/> | |
| i. | Course Description for Bulletin: | This course explores advanced applications and topics within GIScience including data mining, scripting, point pattern analysis, data interpolation, geospatial modeling and network analysis and the methodological, epistemological and ontological issues with the classification requirements and analytical capabilities of GIScience. | | | |
| j. | Prerequisites, if any: | GEO609 or consent of instructor | | | |
| k. | Will this course also be offered through Distance Learning? | | | YES ⁴ <input type="checkbox"/> | NO <input checked="" type="checkbox"/> |
| l. | Supplementary teaching component, if any: | <input type="checkbox"/> Community-Based Experience | <input type="checkbox"/> Service Learning | <input type="checkbox"/> Both | |
| 3. | Will this course be taught off campus? | | | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> |
| 4. Frequency of Course Offering. | | | | | |

¹ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

² The chair of the cross-listing department must sign off on the Signature Routing Log.

³ In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from SR 5.2.1)

⁴ You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

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|------------|--|---|--|---------------------------------|
| a. | Course will be offered (check all that apply): | <input checked="" type="checkbox"/> Fall | <input type="checkbox"/> Spring | <input type="checkbox"/> Summer |
| b. | Will the course be offered every year? | YES <input checked="" type="checkbox"/> | NO <input type="checkbox"/> | |
| | If NO, explain: _____ | | | |
| 5. | Are facilities and personnel necessary for the proposed new course available? | YES <input checked="" type="checkbox"/> | NO <input type="checkbox"/> | |
| | If NO, explain: _____ | | | |
| 6. | What enrollment (per section per semester) may reasonably be expected? | 10 | | |
| 7. | Anticipated Student Demand. | | | |
| a. | Will this course serve students primarily within the degree program? | YES <input checked="" type="checkbox"/> | NO <input type="checkbox"/> | |
| b. | Will it be of interest to a significant number of students outside the degree pgm? | YES <input checked="" type="checkbox"/> | NO <input type="checkbox"/> | |
| | If YES, explain: _____ | Students in a range of disciplines, e.g., Anthropology, Forestry, Soil Science, etc., will likely find this course of interest. | | |
| 8. | Check the category most applicable to this course: | | | |
| | <input checked="" type="checkbox"/> Traditional – Offered in Corresponding Departments at Universities Elsewhere | | | |
| | <input type="checkbox"/> Relatively New – Now Being Widely Established | | | |
| | <input type="checkbox"/> Not Yet Found in Many (or Any) Other Universities | | | |
| 9. | Course Relationship to Program(s). | | | |
| a. | Is this course part of a proposed new program? | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> | |
| | If YES, name the proposed new program: _____ | | | |
| b. | Will this course be a new requirement ⁵ for ANY program? | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> | |
| | If YES ⁵ , list affected programs: _____ | | | |
| 10. | Information to be Placed on Syllabus. | | | |
| a. | Is the course 400G or 500? | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> | |
| | If YES, the <i>differentiation for undergraduate and graduate students must be included</i> in the information required in 10.b . You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See <i>SR 3.1.4.</i>) | | | |
| b. | <input type="checkbox"/> The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from 10.a above) are attached. | | | |

⁵ In order to change a program, a program change form must also be submitted.

NEW COURSE FORM

Signature Routing Log

General Information:

Course Prefix and Number: GEO 709

Proposal Contact Person Name: Matthew Zook

Phone: 510-410-1410

Email: zook@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

| Reviewing Group | Date Approved | Contact Person (name/phone/email) | Signature |
|------------------|---------------|---|-----------|
| Chair, Geography | 10/17/11 | Sue Roberts / 7-2399 / sueroberts@uky.edu | |
| DUS, Geography | 10/17/11 | Michael Samers / 7-2931 / Michael.Samers@uky.edu | |
| College of A&S | 11/08/11 | Anna Bosch, Assoc. Dean / 7-6689 / bosch@uky.edu | |
| | | / / | |
| | | / / | |

External-to-College Approvals:

| Council | Date Approved | Signature | Approval of Revision ⁶ |
|------------------------------|---------------|----------------------------|-----------------------------------|
| Undergraduate Council | | | |
| Graduate Council | | | |
| Health Care Colleges Council | | | |
| Senate Council Approval | | University Senate Approval | |

Comments:

⁶ Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

GEO 709: ADVANCED GISCIENCE (Sample syllabus for Spring 2012)

Instructor: Dr. Matthew Zook

Phone: 859-257-2931 Email: zook@uky.edu (Email is the best way to contact me)

Office: POT 1475

Office hours: Tues/Wed (2:00 pm – 4:00 pm) or by appointment

This course meets Monday afternoon from 1 to 4 pm in CB313.

Bulletin Course Description

This course explores advanced applications and topics within GIScience including data mining, scripting, point pattern analysis, data interpolation, geospatial modeling and network analysis and the methodological, epistemological and ontological issues with the classification requirements and analytical capabilities of GIScience.

Prereqs: GEO609 or consent of instructor

Required Textbooks

Chang K-t.2010. Introduction to Geographic Information Systems, McGraw Hill. ISBN: 0-07-282682-7.

Slocum T.A., McMaster R.B., Kessler F.C., and Howard H.H. 2009. Thematic Cartography and Geographic Visualization, Prentice-Hall. ISBN: 0-13-035123-7.

Wong D.W.S. and Lee J. 2005. Statistical Analysis of Geographic Information with ArcView GIS and ArcGIS, John Wiley & Sons Ltd. ISBN: 0-471-46899-1.

Course Description

This course explores advanced applications and topics within GIScience including data mining, scripting, point pattern analysis, data interpolation, geospatial modeling and network analysis and the methodological, epistemological and ontological issues with the classification requirements and analytical capabilities of GIScience. Lectures will focus on the greater understanding of GIS theory, technology, and applications. Lab assignments provide students with practice in utilizing ArcGIS software and related GIS software on development, management, and analysis of GIS data. The GIS labs are an important part of a GIS training. They are designed to provide students with hands-on experience in GIS and data modeling and assist students in understanding the advanced tools in GIS. ESRI's ArcGIS 10.0 is the primary software in the lab but we also explore other software systems. During this class session, we will run a total of ten-to-eleven labs. All labs will be conducted in the CB 313. It is vital that students attend class on days that the exercises are assigned, as I will guide students through the steps necessary to complete the exercise. It is also vital to complete the exercises on time, as new exercises often depend on completion of the previous exercise. Much of your grade on individual exercises is determined by completing the exercise on time.

Course Objectives

Course objectives are (1) to utilize GIS for conducting spatial analyses, (2) to understand advanced geographic information science terms and concepts, (3) to develop skills in the written communication and critique of geographic information, (4) and to understand a variety of spatial data models.

Student Learning Outcomes

In addition to further building technical skills and competencies, students will also develop advanced GIS skills. Students shall be able to:

- Apply advanced principles of map design to create a map that is coherent and convincing, as well as technically correct;
- Perform advanced analytic operations in a GIS, including network analysis, scripting and interpolation;
- implement complicated cartographic models using a GIS software;
- Critically analyze the ontological constructs used with GIScience.

Course Grading and Requirements

Class attendance & participation (5%)

Regular class attendance and active participation in classroom activity will be important to your learning experience in this class. You will be evaluated on your willingness to contribute to class discussions as well as class attendance. Roll will be taken at the beginning of every lecture and lab. If you are late, it is your responsibility to see me at the end of the class to make sure I have marked you present. If you are late for more than 30 minutes or leave class early without instructor's approval, 0.5 point will be deducted.

Reading Assignment (5%)

Reading assignment (5 articles) is provided to develop critical thinking about GIScience. This approach encourages students to read research articles, and more importantly, improve on their writing skills. Each student is tasked with reviewing and critiquing (with a critique review at least two pages in length). The critique reviews are due a week after they are assigned. Please follow these guidelines to critique the assigned research articles: (1) Provide full citation, Title, Author(s), Journal/volume/page number, (2) Describe the main points, as well as the problem and conclusion, and (3) Critically evaluate the article pointing out the strengths and weaknesses.

- Your article must be typed using a 12-point (typeface) Arial or Times Roman font with double spacing. Each paragraph must be properly indented.
- Tips: How well are the objectives of the paper stated, and how well are they then followed throughout the article? Does the author provide appropriate references to justify

the arguments made? Is the approach logical? Are the results interpreted reasonably? Are the conclusions valid? Does the abstract capture the main aspects of this article?

Lab assignment & quizzes (30%)

There will be one lab each week. Each lab is on a basis of 10 points. Each lab is assigned weekly and is due at the beginning of the following lab period. Late work will be deducted 10% daily. Pop quizzes will be given to examine your learning outcomes from previous class sessions. I will not announce when the quiz will be in advance. Taking lecture notes, actively thinking, and asking/answering questions will help you to understand the content in order to do well in labs and quizzes. Should you miss any class sessions, ask your classmates to fill in what you miss.

Project (30%)

Student will work as a team (or individually) to undertake a project. I will provide the project guideline with deadlines separately. A presentation in class and a poster are required to present the result. Final posters are due by 5:30 pm on April 13, 2012.

Midterm Exam (30%)

Midterm exam will take place in class on Wednesday, February 23, 2012. There will be no final exam, instead you should focus on your final project to achieve high quality of GIS learning. However, if projects are poorly designed, final exam may be offered to consolidate your learning experience.

A final numerical score for the course is calculated as the weighted average of all components. Based on the final score, a final letter grade is assigned to the following scale:

A: 90-100 B: 80-89 C: 70-79 E: Below 70

Final Exam – n/a

Course Policies:

Submission of Assignments:

All projects, papers and assignments are due at the beginning of lecture on the day indicated. Assignments turned in after this time (including at the end of class) will be docked 10 percent for every day late (including weekends). Assignments will NOT be accepted beyond five days after the due date.

Attendance Policy.

Attendance is crucial to your success in this class but role will NOT be regularly taken. Excused absences will be made, in accordance with Senate Policy on excused absences.

Excused Absences:

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences:

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of *Student Rights and Responsibilities* (available online <http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where

students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

COURSE SCHEDULE

| Week | Topic | Readings |
|-------------|--|--------------------------------|
| 1 | Lec1: Course Introduction & Geovisualization Lab1: Geovisualization: 3D Visualization and Animation | Slocum et al. Ch11 and 20 |
| 2 | Lec2: Data Mining and Point Pattern Analysis Lab2: Cluster analysis of points | Wong & Lee (Read article 1) |
| 3 | Lec3: Data Mining and Polygon Pattern Analysis Lab3: Clusters analysis of polygons | Wong & Lee Chp 8 |
| 4 | Lec4: Raster Data Analysis Lab4: Operations on raster data | Chang Chp13 |

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|-----------|--|-------|
| 5 | Lec5: Terrain Mapping and Analysis | Chang |
| | Lab5: Terrain mapping and surface analysis | Chp14 |
| 6 | Lec6: Viewsheds and Watersheds (Read article 2) | Chang |
| | Lab6:Viewshed analysis and watershed delineation | Chp15 |
| 7 | Midterm Exam: | |
| | Wrap up labs1-7. Work on term project. | |
| 8 | Spring Break (No Class) | |
| 9 | Lec7: Interpolation & Geostatistical Models (Read article 3) | Chang |
| | Lab7: Trend surface model and Kriging for interpolation | Chp16 |
| 10 | Lec8: Dynamic segmentation | Chang |
| | Lab8: Route and Event Analysis | Chp17 |
| 11 | Lec9: Path Analysis and Network Applications | Chang |
| | Lab9: Network Analysis using GIS (Read article 4) | Chp18 |
| 12 | Lec10: Modeling and Programming in GIS (Read article 5) | Chang |
| | Lab10: Vector & Raster modeling & programming in GIS | Chp19 |
| 13 | Work on the project | |
| 14 | Work on the project | |
| | Poster due at 5:30 pm | |
| 15 | Student Presentation of Term Projects | |