The University Of Toledo

Existing Graduate Course Modification Form

* denotes required fields

Contact Person*: `Daniel J. Hammel`   Phone: `530-4128`   (xxx - xxxx)   Email:
`dan.hammel@utoledo.edu`

Present	**Proposed**
Supply all information asked for in this column.(Supply core, research intensive and transfer module info if applicable)	Fill in appropriate blanks only where entry differs from first column.

College*: `College Lang, Lit, and Soc Sci ▾`

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Dept/Academic Unit*:
`Geography and Planning ▾`

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Course Alpha/Numeric*: `GEPL` -
`5420`

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`5420`

Course Title:
`Quantitative Methods in Geographic Research`

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`Quantitative Methods in Geographic Research`

Credit hours: Fixed: `4` or Variable: `    ` to `    `

Credit Hours: Fixed: `3` or Variable: `    ` to
`    `

CrossListings:
`GEPL 4420`

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`GEPL 4420`

`                    ` [Insert]

`                    ` [Insert]

To add a course, type in course ID and click the Insert button.

To remove a course, select the course on left and click the Remove button.

[Remove]

To add a course, type in course ID and click the Insert button.

To remove a course, select the course on left and click the Remove button.

[Remove]

Prerequisite(s)(if longer than 50 characters, please place it in Catalog Description):

`                                        `

Prerequisite(s)(if longer than 50 characters, please place it in Catalog Description):

`                                        `

Corequisite(s)(if longer than 50 characters, please place it in Catalog Description):

`                                        `

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`                                        `

Catalog Description (*only if changed*) 75 words max: **Catalog Description** (*only if changed*) 75 words max:

```
-- currently there appears to be no catalog
description, but a reference to the description
for an outdated course.
```

```
An examination of quantitative methods commonly
used in geographic research with an emphasis on
spatial statistics and cartographic analysis.
```

Has course content changed?   ○ Yes   ◉ No

If course content is changed, give a brief topical outline of the revised course below(less than 200 words)

Proposed effective term*: 201740   (e.g. 201140 for 2011 Fall)

File Type	View File
Syllabus	View

List any course or courses to be deleted.   [   ]   Effective Date: [   ] 📅

[   ]   Effective Date: [   ] 📅

Comments/Notes:

Rationale:

Several years ago GEPL changed its research methods courses from 3 to 4 hours to include a
short laboratory component. Four hour courses make it difficult for our graduate students to
register for the required 9 hours. We have decided to eliminate the lab component and reduce
the class to 3 hours, but keep the content the same. Students will have to do more of
assignments and projects independently, but we do not anticipate problems. Instructors and
teaching assistants in the course are generally available and our computer laboratory is
staffed by a graduate student monitor during most business hours with experience in spatial
statistics.

Approval:

Department Curriculum Authority:	Beth Schlemper	Date 2017/01/07
Department Chairperson:	Daniel Hammel	Date 2017/01/07
College Curriculum Authority or Chair:	David Black	Date 2017/01/27
College Dean:	Barbara Schneider	Date 2017/03/30
Graduate Council:	Constance Schall, GC mtg 4/18/17	Date 2017/04/19
Dean of Graduate Studies:	Amanda C. Bryant-Friedrich	Date 2017/05/01
Office of the Provost :		Date

print

Administrative Use Only

Effective Date: (YYYY/MM/DD)

CIP Code:

Subsidy Taxonomy:

Program Code:

Instructional Level:

Registrar's Office Use Only

Processed in Banner on:

Processed in Banner by:

Banner Subject Code:

Banner Course Number:

Banner Term Code:

Banner Course Title:

GEPL 5420 (3 credit hours)
Quantitative Methods in Geography

Department of Geography and Planning
The University of Toledo
Fall 2017

Instructor: Dr. Yanqing Xu   Office: SM 3035
E-mail: yanqing.xu@utoledo.edu   Phone: (419)530-4196
Office Hours: TR 3:00-5:30 pm and by appointment

Teaching Assistant: Sangida Mazumder
E-mail: sangida.mazumder@rockets.utoledo.edu
Office: SM3025
Office Hour: By appointment only

COURSE DESCRIPTION

This course introduces concepts and techniques of a set of quantitative methods in geography, including data collection, management, and analysis. The course is designed as an introduction to spatial analysis and the application of statistical methods in spatial context. Analytical procedures will include graphical presentation of data, descriptive statistics, application of probability and sampling theory, inferential statistics, point & area pattern analysis, correlation & regression analysis, and spatial statistics. The primary emphasis of this course is finding the appropriate technique to use with your dataset. METHODS is the focus of this course, in other words, I will not spend weeks of class time on mathematical details. And I am interested the most in your ability to solve problems with simple and efficient techniques through hands-on experiences. You will learn and develop practical skills in the use of statistical functions in *Excel*, *R* and/or *SPSS* software.

Multiple sessions will be held in a laboratory environment so that students can get familiar with the software in class. There will be occasional discussions in class and we will talk about particular methods applied in the published geography-related literature. Grades will be determined by the completion of a set of exercises which emphasize application of the techniques. Moreover, two examinations will be given, one at the mid-term and another in the final exam period. Occasional quizzes are possible. This course is designed for those who are new to statistics. No prior knowledge of statistics is required to take this course. Some previous math is necessary. Students who successfully complete this course will be able to summarize and present geographic data, perform a wide variety of statistical tests, assess quantitative analyses, and correctly interpret and discuss the results of their analysis. Specific objectives of the course are listed on the following page.

COURSE OBJECTIVES

Upon successful completion of this course, the students will be able to:
   (1) Explain the role of quantitative information in geographic research and applications
   (2) Demonstrate an understanding of basic descriptive statistics and regression methods as they apply to problem solving in geography
   (3) Obtain a rich set of statistical tools for data analysis, with an understanding of how to choose which tool to use and how to implement them in statistical software
   (4) Receive practical experience in using real sets of data addressing meaningful research questions
   (5) Explore how to design studies to collect appropriate data for addressing research questions

MATERIALS

We will be using quite a few books this semester. *McGrew, J. C., et al. 2014. An Introduction to Statistical Problem Solving in Geography, Waveland Press (3ʳᵈ Edition)*, might be a useful desk reference, especially for those not familiar with statistics. Lab materials with detailed instructions will be provided by the instructor. Other potentially useful source: *Rogerson, P.A. 2015, Statistical Methods for Geography, SAGE (4ᵗʰ Edition)*

EVALUTION

The only way to learn GIS is to practice, practice and practice. The course is projects-oriented. Concepts, methods and skills are built into each project. Grades will be assigned as follows:

≥ 94 = A	73-76 = C
90-93 = A-	70-72 = C-
87-89 = B+	67-69 = D+
83-86 = B	63-66 = D
80-82 = B-	60-62 = D-
77-79 = C+	<60 = F

GRADING

Activity	Description	Weight	Due Data
Class Participation	In-class Assignment/Participation in Discussion	5%	
Lab Assignments	8 – 10 labs	40%	Post on Blackboard
Mid-Term Exam		20%	Oct 13 (Thurs) 11:00 am -12:40 pm
Final Exam		25%	Dec 15 (Thurs) 10:15 am -12:15 pm
Literature Review Paper*	25 to 30 page literature review of a specific topic related to quantitative analysis in Geography	10%	
Total		100%	

* Graduate Students Only

TOPIC

1. **Introduction to Quantitative Methods for Geography**
   a. The scientific method
   b. Exploratory and confirmatory approaches in geography
   c. Overview of key terms and concept

2. **Key Concepts in Statistics**
   a. Types of data
   b. Measures of central tendency and variability
   c. Spatial data and descriptive statistics

3. **Probability and Discrete Probability Distributions**
   a. Sample spaces, random variables, and probabilities
   b. Binomial processes and the binomial distribution

4. **Continuous Probability Distributions and Probability Models**
   a. The normal distribution
   b. The exponential distribution

5. **Inferential Statistics: Confidence Intervals, Hypothesis Testing, and Sampling**
   a. Confidence intervals
   b. Hypothesis testing
   c. Testing of sample means: the z- and t- tests

6. **Analysis of Variance**
   a. Analysis of variance with two categories
   b. Testing the assumptions

7. **Correlation**
    a. The nature of correlation
    b. A significance test for r
    c. The correlation coefficient and sample size

8. **Regression**
    a. Assumptions of regression
    b. Standard error of the estimate
    c. Dummy variables and categorical dependent variable

9. **Point Patterns**
    a. The analysis of point patterns
    b. Geographic patterns in areal data
    c. Local statistics

10. **Spatial Regression**
    a. Spatial lag model and spatial error model
    b. Geographically weighted regression

Tentative Schedule – Subject to change		
Week #	*Class Dates*	*Topic*
Week 1	Aug 23	Topic 1
	Aug 25	Topic 1
Week 2	Aug 30	Topic 2
	Sep 1	Topic 2
Week 3	Sep 6	Topic 2
	Sep 8	Topic 3
Week 4	Sep 13	Topic 3
	Sep 15	Topic 3
Week 5	Sep 20	Topic 4
	Sep 22	Topic 4
Week 6	Sep 27	Topic 4
	Sep 29	Topic 5
Week 7	**Oct 4 (No class)**	**Fall Break**
	Oct 6	Topic 5
Week 8	Oct 11	Topic 5
	Oct 13	**Midterm**
Week 9	Oct 18	Topic 6
	Oct 20	Topic 6
Week 10	Oct 25	Topic 6
	Oct 27	Topic 7
Week 11	Nov 1	Topic 7
	Nov 3	Topic 7
Week 12	Nov 8	Topic 8
	Nov 10	Topic 8

Week 13	Nov 15	Topic 8
	Nov 17	Topic 9
Week 14	Nov 22	Topic 9
	Nov 24 (No class)	**Thanksgiving**
Week 15	Nov 29	Topic 9
	Dec 1	Topic 10
Week 16	Dec 6	Topic 10
	Dec 8	Topic 10
Week 17	**Dec 15 (Thursday)**	**Final exam** **10:15am – 12:15pm**

POLICIES

Class attendance

Students are expected to attend regularly all classes in which they are enrolled. It is the responsibility of the student to notify the instructor ahead of time of an absence. Your participation in the learning activities provided during class is important to your learning success in this course and is assessed for grading purposes. Because the study of quantitative methods is largely "cumulative" (i.e., understanding one topic depends upon understanding the previous ones), it is important to keep up in the class. All students are expected to come to class prepared and on time, and remain for the full class period.

Make-up & late work policy

Make-up exam will only be arranged with an official doctor's "note" or some other official documentation. All assignments are due at the due date posted on Blackboard. Assignments submitted after the deadline are considered late and will be penalized. Late work is accepted up to five days after the due date, with a 10% penalty for each day late.

Email and class messages

The best way to reach me is by e-mail as I check it often. The University is using only the official "utoledo" email addresses for all email correspondence to students. Please send any questions and other correspondence to me with your University of Toledo e-mail address. It also helps to put the course name in the subject line, such as "Quantitative Methods in Geography".

Office Hours

Please stop by my office hours to discuss any concerns or questions you have about the course and its contents. If these times are inconvenient for you, I am happy to schedule an appointment with you. If you have an appointment with me and conflict arises, please let me know as soon as possible.

Scholastic Dishonesty

Academic work submitted by students shall be the result of their thought, research, or self-expression. Academic work is defined as, but not limited to tests, quizzes, whether taken electronically or on paper; projects, either individual or group; classroom presentations, and homework. I will not tolerate academic dishonesty. It is your responsibility to know what constitutes academic dishonesty. If you are unsure, you should consult the University policy in the Student Handbook and the University Catalog.

Accommodations and Accessibility

Any student needing to arrange a reasonable accommodation for a documented disability should contract the Office of Accessibility at Rocket Hall Room 1820, 530-4981 (voice), 530-2612 (TTY).