Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. *The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.*

College: Liberal Arts   Dept/Division: Geography   Current Alpha Designator/Number: GEO540

Contact Person: James Leonard   Phone: 6-4626

CURRENT COURSE DATA:

Course Title: Quantitative Methods in Geography

Alpha Designator/Number: | G | E | O | 5 | 4 | 0 | | | |

Title Abbreviation: | S | p | a | t | i | a | l | | S | t | a | t | i | s | t | i | c | s | | | | | | |

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1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form*).
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head _____ Date _____

Registrar _____ Date _____

College Curriculum Chair _____ Date _____

Graduate Council Chair _____ Date _____

College: _____   Department/Division: _____   Alpha Designator/Number: _____

Provide complete information regarding the course change for each topic listed below.

Change in CATALOG TITLE: ☒ YES   ☐ NO

From | S|p|a|t|i|a|l| |S|t|a|t|i|s|t|i|c|s| | | | | | | | | | | | | (limited to 30 characters and spaces)

To | S|p|a|t|i|a|l| |S|t|a|t|i|s|t|i|c|s| |a|n|d| |G|I|S| | | | |

If Yes, Rationale | Title better describes the material added to the course.

Change in COURSE ALPHA DESIGNATOR:

From: [| | |]   To: [| | |]   ☐ YES   ☒ NO

If Yes, Rationale |

Change in COURSE NUMBER: ☐ YES   ☒ NO

From: [| | |]   To: [| | |]

If Yes, Rationale |

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale |

Change in CATALOG DESCRIPTION: ☒ YES   ☐ NO   IF YES, fill in below:

From | Application of statistical methods to problem solving in geography. Primary focus on descriptive spatial statistics, mapping, analysis of spatial data, spatial sampling, pattern analysis, and inferential spatial statistics.

To | Statistical methods applied to problem solving in geography and using GIS for display and analysis. Primary focus on descriptive and inferential spatial statistics, mapping, and spatial analysis of data.

If Yes Rationale | Description change better describes the material added to the course.

Change in COURSE CREDIT HOURS: ☒ YES ☐ NO   If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From | 3 credit hours

To | 4 credit hours
Change in credit hours reflects the lecture/lab format and Geographic Information Systems (GIS) material added to the course (see material highlighted in attached syllabus).

Change in COURSE CONTENT: ☐ YES ☒ NO   (May attach separate page if needed)

From |

To |

Rationale |

College: Liberal Arts

Department: Geography

Course Number/Title GEO540 Quantitative Methods in Geography

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

n/a

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

n/a

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

n/a

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

COURSE DESCRIPTION CHANGE
Department:
Course Number and Title:
Rationale:
Course Description (old)
Course Description: (new)
Catalog Description:

COURSE NUMBER CHANGE
Department:
Current Course Number/Title:
New Course Number:
Rationale:
Catalog Description:
Credit hours:

COURSE TITLE CHANGE
Department:
Current Course Number/Title:
New Course Title:
Rationale:
Catalog Description:

COURSE DESCRIPTION CHANGE
Department: Geography
Course Number and Title: GEO540 Spatial Statistics
Rationale: better describes the course.

Course Description (old) Application of statistical methods to problem solving in geography. Primary focus on descriptive spatial statistics, mapping, analysis of spatial data, spatial sampling, pattern analysis, and inferential spatial statistics.

Course Description: (new) Statistical methods applied to problem solving in geography and using GIS for display and analysis. Primary focus on descriptive and inferential spatial statistics, mapping, and spatial analysis of data.

Catalog Description: Statistical methods applied to problem solving in geography and using GIS for display and analysis. Primary focus on descriptive and inferential spatial statistics, mapping, and spatial analysis of data.

Syllabus: GEO 440/540 Spatial Statistics and GIS

Hello, and welcome to GEO440/540 Spatial Statistics and Geographic Information Systems (GIS). Fair warning: most students find this to be a difficult course! The course assumes that you have a solid math head on your shoulders. You don't need previous statistics experience; I didn't have any when I took a similar course as a graduate student. In any case, you'll need to work all practice and homework problems carefully. You'll need to read the materials carefully. You might even find internet explanations that help out with the concepts. Be prepared to work hard! And that's just for three credits. The application of statistical methods to GIS is additional material that makes this course worth four credit hours.

This four credit hour course (Fall 2016, Section 101, CRN 2432) begins on 22 Aug. and ends on 12 Dec. Please note that all times are Eastern USA. Check the official university calendar (http://www.marshall.edu/calendar/academic/) for course drop dates.

Instructor Bio

I am your instructor, James Leonard, Ph.D., from the Department of Geography in the College of Liberal Arts at Marshall University. I received my Ph.D. from the University of Cincinnati in 2001 and began working at Marshall University in fall of that year. I was previously employed for about five years by the WV Department of Environmental Protection as a Geographic Information Systems Analyst and Systems Administrator. I am a Christian and a Huntington native with a beautiful and talented wife who decorates cakes and five children, ages 16 to 3. We like to travel. We have visited the libraries/homes/graves of 36 out of 38 dead US Presidents. We have also visited/toured 46 US states and 5 Canadian provinces. In my spare time, I like to read, do yard work, light construction/remodeling, and target shoot. I hope you'll post some interesting information about yourself on the Bio discussion board so that I can get to know you, too.

Course Materials and Cost

1. McGrew, J.C., Jr., A. J. Lembo, Jr., and C.B. Monroe. 2014. *Introduction to Statistical Problem Solving in Geography*, 3rd ed. Long Grove, IL: Waveland Press. About $50 new.
2. Holcomb, Z.C. 2014. *SPSS Basics: Techniques for a First Course in Statistics*, 5th ed. About $60 new.
3. Worksheets, assignments, and readings posted in MUOnline as PDFs.
4. A good calculator.

Course Objectives and Structure

Description from University Catalog:
Statistical methods applied to problem solving in geography and using GIS for display and analysis. Primary focus on descriptive and inferential spatial statistics, mapping, and spatial analysis of data. 4 credits. Prerequisite: GEO426, IST423, or permission.. Recommended prerequisites: Knowledge of algebra and ACT Math 21 or SAT Math 510 or GRE Quantitative 150. Previous statistics course is helpful.

This course meets Geography Department statistics requirement (4 credit hours).

Course Learning Outcomes	How students will practice each outcome	How student achievement will be assessed
Students will calculate spatial statistics and problem solve using spatial statistical thinking.	Readings, discussion, exercises	Exercises, exams
Students will read, evaluate, and interpret spatial statistical research.	Readings, discussion, exercises	Exercises, exams
Students will employ appropriate technologies for spatial statistical analysis such as mapping, GIS, and SPSS.	Readings, discussion, exercises	Exercises, exams
Students will apply geostatistics to GIS.	Readings, discussion, exercises	Exercises, exams

This course is divided into two Units. Each Unit consists of:

- Textbook readings
- Other readings provided as PDFs or webpages
- Exercises
- GIS application of geostatistics
- Quizzes
- Assignments
- Unit exam

Work through the Units one step at a time. In this way, you'll see all the course material.

<div style="background-color:green;color:white">Time Commitment</div>

If you are an average student, expect to spend 9-12 hours each week for this class to get a grade of C.

<div style="background-color:green;color:white">Course Grading</div>

Grades will be based on ten homework assignments (20 points each) for 200 points; four quizzes (25 points each) for 100 points; two exams (100 points each) for 200 points. Graduate students will have more extensive exercises and exam questions. Final grades will be determined by the total number of points you have earned:

- A = 500 - 455 points (100-91%)
- B = 454 - 405 (90-81%)
- C = 404 - 355 (80-71%)
- D = 354 - 325 (70-65%)
- F = 324 or less (less than 65%)

Exercises assigned during a week must be submitted by 11:59pm the Friday of that week. Assignments are not accepted after that time. Thus, an assignment given the week of August 29 is due by 11:59pm on September 2. Quizzes occurring during a week must be completed by 11:59pm the Friday of that week. Exams are due by 11:59pm on the day listed in the schedule, always a Monday. No extra credit is possible and no grades will be scaled or curved.

<div style="background-color:green;color:white">Schedule</div>

- August 22: Quantitative methods in research; data characteristics; math warm up.
  - Readings: MLM (McGrew, Lembo, Monroe) chapter 1 and chapter 2 (pp. 21-27)
  - Homework #1: Holcomb chapters 1, 2.
- August 29: Examining data using pictures--histograms, box plots, maps.
  - Readings: MLM chapter 2 (pp. 27-35), PDF documents
  - Homework #2: Mapping exercise handout; Holcomb chapters 3, 4, 5.
- September 5: ==Data classification and visualization using GIS==
  - Readings: MLM chapter 2 review, PDF documents
  - ==Homework #3: PDF documents==
- September 9: Quiz 1 (chapters 1-2) deadline.
- September 12: Descriptive statistics = Describing data with numbers (central tendency--mean, median, mode; dispersion--range, quantiles, standard deviation, variance, coefficient of variation; and skewness); using Excel for descriptive stats.
  - Readings: MLM chapter 3, PDF documents
  - Homework #3: PDF documents; Holcomb chapters 6, 7.
- September 19: Intro to the normal distribution (z scores)
  - Readings: PDF documents
  - Homework #4: Holcomb chapter 8; worksheets 19, 20, 21.
- September 23: Quiz 2 (chapter 3 and the normal distribution) deadline.
- September 26: Descriptive spatial statistics
  - Readings: MLM chapter 4; PDF documents
  - Homework #5: PDF documents
- October 3: ==Using GIS for spatial center, standard distance, directional distribution; first half of ESRI Virtual Campus== *Introduction to Spatial Pattern Analysis*
  - ==Homework #6: PDF documents (Geostatistics exercise; Allen chapter 7 parts 7-1 through 7-4)==.
- October 10: **Exam 1**.
- October 17: Pearson's correlation; linear regression.
  - Readings: MLM chapters 16 (pp. 239-247) and chapter 17, PDF documents
  - Homework #7: Worksheet 23 (show hand drawn scattergrams and calculations); Holcomb chapters 9 and 10; Worksheet 28 (show hand drawn scattergrams and calculations); Holcomb chapter 11; PDF documents.
- October 24: ==Mapping regression residuals using GIS==
  - Readings: MLM chapter 17
  - ==Homework: PDF document==.
- October 28: Quiz 3 (chapters 16, 17) deadline.
- October 31: Probability and the normal distribution; sampling.
  - Readings: MLM chapter 5 (pp. 77-81), chapter 6 (pp. 93-96); PDF documents
  - Homework #8: PDF documents
- November 7: Sampling; Estimates in sampling.
  - Readings: MLM chapter 7 and 8, PDF documents
  - Homework #9: PDF documents
- November 11: Quiz 4 (chapters 5, 6, 7, 8) deadline.
- November 14: Null hypothesis; confidence intervals; inferential stats; hypothesis testing; one-sample difference of means test.
  - Readings: MLM chapter 9, PDF documents
  - Homework #10: PDF documents; Holcomb ch. 12.
- November 14: Hypothesis testing; two sample difference tests, independent samples.
  - Readings: MLM chapter 10 (pp. 155-163), PDF documents
  - Homework #11: PDF documents; Holcomb chapter 14.
- November 21: Thanksgiving week.
- November 28: Quiz 4 (chapters 9-10) deadline.
- November 28: Two sample difference tests, dependent samples; ANOVA.

- o   Readings: MLM chapter 10 (pp.168-173) and chapter 11 (ignore Kruskal-Wallis)
  - o   Homework #12: Matched pairs t handout; PDF documents; Holcomb chapters 13 and 15.
- December 5: Inferential spatial stats; using GIS for pattern analysis--nearest neighbor, cluster analysis; second half of ESRI Virtual Campus *Introduction to Spatial Pattern Analysis*
  - o   Readings MLM chapters 13-15
  - o   Homework #13: PDF documents (Nearest neighbor analysis, Join count analysis; Allen chapters 8-9 all parts)
- December 12: **Exam 2**.

A proctor will not be required for quizzes or exams, nor will any other special arrangements be required. Students with disabilities must contact me for special arrangements for quizzes and exams and have the university Office of Disabled Student Services verify these special arrangements.

Discussions

The General and Bio Discussion Boards give you an opportunity to raise questions with other students or discuss general topics related to the course. The General and Bio discussions are not graded. The practices of courtesy and respect that apply in the traditional classroom also apply online.

On-Campus Requirements

This course is offered entirely online and you do not need to come to campus. You can communicate with me via the course *Discussion* boards or *Mail (internal)* tool.

Academic Honesty

University policy states that any act of a dishonorable nature which gives the student engaged in it an unfair advantage over others engaged in the same or similar course of study is prohibited. In my class, for any cheating or plagiarism however minor, you will earn a final grade of F. In addition, University sanctions for academic dishonesty include a permanent record of your dishonesty, suspension from the institution for one year for the second offense, and dismissal from the institution for the third offense.

Resources

Me: If you are not sure about something, the best thing to do is to ask about it right away! Something that may seem obvious to me may not be obvious to you at all! Email me with the *Mail/Messages* tool. I will respond to your emails within 72 hours, so you should contact me well in advance of any deadlines if you have questions. If you can't access the course mail tool, you may send an emergency email to my regular Marshall email address leonard@marshall.edu.

Academic Support Services: Marshall University offers a variety of academic support services to students enrolled in online courses accessible through MUOnline.

Marshall University IT Service Desk: This online environment may be new or difficult for you. If you run into any difficulties, don't wait! Send an email or call our IT Service Desk right away. Most problems are easily solved, but obviously they have to hear from you before they can help:

servicedesk@marshall.edu, (304) 696-3200 (Huntington, WV), (304) 746-1969 (Charleston, WV), (877) 689-8638 (Toll free)

University Policies

By enrolling in this course, you agree to the "Marshall University Policies" found at www.marshall.edu/academic-affairs. They are many; you should read them all.

Marshall University | College of Liberal Arts | Department of Geography