Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
* Submit original form and attach a course syllabus. * 

1. This request is submitted by the Department of Geography.

2. Course prefix, number and complete title of course: GEOG 652 Quantitative Methods in Geography

3. Course description (not more than 50 words): This course is designed to acquaint students with quantitative methods commonly used in geographical research to describe, characterize, model and analyze geo-spatial data.

4. Prerequisite(s) Permission from Instructor Cross-listed with N/A  
Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? ☑ Yes ☐ No  
If yes, from _____ to ______.

6. Is this a repeatable course? ☑ Yes ☐ No  
If yes, this course may be taken _____ times. Will the course be repeated within the same semester/term? ☐ Yes ☐ No

7. Has this course been taught as a 289/489/689? ☑ Yes ☐ No  
If yes, how many times? 2  
Indicate the number of students enrolled for each academic period it was taught. 05C/8, 07C/8

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)  
M.S., Ph.D. students in the Department of Geography

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix | Course # | Title (excluding punctuation)  
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Approval recommended by:  

Head of Department  
Date: 11/26/07  
Signature: [Signature]

Chair College Review Committee  
Date: 11/29/07  
Signature: [Signature]

Dean of College  
Date:  
Signature: [Signature]

Submitted to Coordinating Board by:  

Dean of College  
Date:  
Signature: [Signature]

Director of Academic Support Services  
Date:  
Signature: [Signature]

Effective Date:  
Signature: [Signature]

Questions regarding this form should be directed to Sandra Williams at 845-8836. 
OAR/AS – 04/07

1 of 8 B13
Doug Sherman

From: "Simon Sheather" <sheather@stat.tamu.edu>
To: <sherman@geog.tamu.edu>
Sent: Wednesday, November 28, 2007 2:09 PM
Attach: newcourseapprov_Simon.pdf
Subject: Re: GEOG 652

Doug

Attached, as a pdf file, is a response to your email. Please let me know if you require a signed copy of the memo.

Simon

Simon Sheather
Professor and Department Head
Department of Statistics
Texas A&M University
3143 TAMU
College Station, TX 77843-3143
E-Mail: sheather@stat.tamu.edu
Telephone: 1 979 845 3141
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Assistant: Jennifer South
Telephone: 1 979 845 3191
E-mail: jennifer@stat.tamu.edu

From: Doug Sherman [mailto:sherman@geog.tamu.edu]
Sent: Tuesday, November 27, 2007 8:48 AM
To: Simon Sheather
Cc: v-tchakerian@tamu.edu; Christian Brannstrom
Subject: GEOG 652

Dear Simon,

Our department is proposing a graduate quant methods course for geographical applications. I am asking you to review the proposal and to endorse our proposal. A copy of the proposal and syllabus are attached. We have developed the syllabus to minimize overlap with any existing course offered by your department. Nonetheless, we seek your approval before going forward. If you have any questions about this proposal, please contact me. I am requesting a quick turnaround on this, if possible.

Cheers, Doug
November 28, 2007

MEMORANDUM

TO:          Douglas Sherman, Department Head
             Department of Geography

FROM:        Simon Sheather, Department Head
             Department of Statistics

SUBJECT:     Quantitative Methods in Geography Course

The Department of Statistics does not object to the Department of Geography offering the Quantitative Methods in Geography course (GEOG 652).

This course does not overlap with any of our graduate service courses. We would suggest that requiring STAT 651 as a prerequisite would be a beneficial preparation for those students taking GEOG 652. However, we would not object to offering GEOG 652 without this prerequisite.
Quantitative Methods in Geography

Geography 652, Spring 2007
Department of Geography
Texas A&M University
(3 credit hours)

Instructor: Dr. Hongxing Liu
Office: O&M 814C
Tel: (979)845-7998
Email: liu@geog.tamu.edu

Office hours
Monday 3:00-5:00PM
Tuesday 3:00-5:00PM
and by appointment

Lecture: Mondays 6:00-9:00 pm, O&M 707

Prerequisites: permission of instructor

Class web page: http://geog.tamu.edu/~liu/courses/geog652.htm
Class discussion email list: geog652-liu@listserv.tamu.edu

Course Overview
This course is designed to acquaint students with quantitative analysis techniques and methods commonly used in geographical research to describe, characterize, model, and analyze spatial and geographical data. The lectures cover descriptive geographical indicators and measures for point, linear, and areal features, geographical association and correlation analysis, scale and fractal analysis, spatial diffusion model, cellular automaton models, spatial cluster analysis and regionalization, spatial interpolation methods, spatial gravity and interaction models, and spatio-temporal models. Quantitative materials will be presented with practical application examples. The emphasis of this course is placed on mathematical formulation of geography problems, understanding of basic assumptions and computational procedures, and interpretation of computation results. The mathematical derivations will be briefly reviewed without going into details.

The practical component involves eight major assignments. Assignments aim to give students hands-on experience in using available software packages to conduct geographical analysis using the methods and techniques covered in this course.

With the completion of the course requirements, students should be able to: (1) understand and critically review geographical research literature that employs basic quantitative analysis techniques and methods; (2) recognize which method should be utilized when a real-world situation calls for some sort of quantitative analysis; (3) apply common quantitative methods to describe, analyze and interpret geo-spatial data sets; (4) gain hands-on practice and skills in using computer software to conduct quantitative analysis.

Textbook

PowerPoint Slides

Course Requirements and Policies

Class Participation
Class attendance is mandatory. Students are expected to attend all the lectures. It is unlikely that the students will do well if they do not attend class. Students’ attendance for this course will be recorded, accounting for 5% of the final grade.

Exams
There will be two non-cumulative exams: mid-term and a final. Each exam covers about half of the course. No make-up exams will be given unless students missed an exam for a valid and verified reason, as defined in the section 7 of the Texas A&M University Student Rules. An unexcused absence from an exam will result in a zero for that exam.

Assignments and Exercises
This course has eight major assignments and a class project. Write-ups for assignments must be typed, and hand-written work will not be accepted. The due date for assignments and exercises will be specified on the handouts. A penalty of 5% per day will be deducted for late submissions.

Evaluation and grading
Grades will be assigned on the scale of A (>=90%), B (80-89%), C (70-79%), D (60-69%), and F (<60%) and weighted as follows:

- Mid-term: 25%
- Final exam: 25%
- Assignments: 45%
- Class Participation: 5%
- Total: 100%
Copyright and Plagiarism Policy
The materials used in this course are copyrighted. These materials include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless permission is expressly granted.

Texas A&M have a Scholastic Dishonesty policy to which both students and faculty must comply. As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, http://student-rules.tamu.edu, under the section “Scholastic Dishonesty.”

Aggie Code of Honor
The honor code is fundamental to the value of the A&M experience. Know the Code:

An Aggie does not lie, cheat, or steal or tolerate those who do.

The new Aggie Honor System Office web-address: http://www.tamu.edu/aggiehonor/

The Americans with Disabilities Act (ADA)
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall, or call 845-1637.
Geography 652 (Quantitative Methods in Geography)
Tentative Lecture topics

Topic 1: Overview: quantitative techniques and methods in geographical research

Topic 2: Geographical sampling, descriptive statistics, and hypothesis test

Topic 3: Point pattern Analysis

Topic 4: Topology, connectivity, and accessibility of network

Topic 5: Shape index and location quotient of polygon data and measures for directional data

Topic 6: Measurement scale, power laws and fractal dimension

Topic 7: Spatial association and autocorrelation of geographical variables

Topic 8: Multivariate geo-spatial model calibration and applications

Topic 9: Spatial interaction models and their applications

Topic 10: Geographical data reduction and pattern discovering techniques

Topic 11: Spatial interpolation and prediction methods

Topic 12: Areal Interpolation & DASYMmetric Mapping

Topic 13: Spatial diffusion and cellular automaton models

Topic 14: Geographical classification and regionalization

Topic 15: Spatio-temporal techniques and models
Geography 652
Quantitative Methods in Geography
Tentative Exercises and Assignments

Ass #1: Geographical sampling and robust geographical indicators

Ass #2: Population potential surface and fractal analysis

Ass #3: Discovering geographical pattern and relationships

Ass #4: Multivariate geographical models: calibration, interpretation and prediction

Ass #5: Spatial cluster and regionalization

Ass #6: Spatial interpolation of continuous geographical variables

Ass #7: Spatial interaction and gravity models

Ass #8: Spatio-temporal data analysis techniques and models