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GPHY 589.02: Cartography / GIS Laboratory

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GPHY 589-01 Course Syllabus
GIS Laboratory: Spatial Analysis and Modeling

STON 218

Monday, 12:30 – 1:50 PM

Instructor information

Instructor:	Dr. Fernando Sanchez-Trigueros, Adjunct, Department of Geography, UM
Office:	Stone Hall, Room 207
Email:	Fernando.Sanchez@mso.umt.edu
Office hours:	Tue 11-12; Wed 11-12; F 11-12; or by appointment

Introduction

This course aims to complement the theoretical content of GPHY 588 01 (Spatial Analysis and Modeling) with a practical component. Applications will be demonstrated with a number of software tools for spatial analysis and modeling, especially R, ArcGIS, CrimeStat and Geoda. No prior knowledge in programming, scripting or command-line is required. No prior knowledge in probability, statistics and simulation is required either, but introductory knowledge of these disciplines will help the student to assimilate the course content.

Learning Outcomes

- Apply spatial measures and models for several representations of spatial processes, namely, point sets, line trees, networks, lattices and fields.
- Familiarize with specialized software for spatial analysis and modeling, with emphasis on point processes, spatial association, spatial regression, spatial interpolation and spatial simulation.
- Write up research reports on spatial analysis and modeling.

Recommended textbook and training materials

O'Sullivan, D. and Unwin, D.J. (2010). *Geographic Information Analysis*, Second Edition. Hoboken, NJ, Wiley.

Albeit not mandatory, the above textbook is recommended to secure a correct understanding of the practicals. You can purchase a regular version of the text from a source other than the bookstore. Check out half.com (http://www.half.ebay.com/textbooks) and the Internet for affordable used copies of the textbook.

Obviously, there are many publications on spatial analysis and modeling that would do as well. Some of those make use of the software tools that we are going to apply and will be referred to in the class sessions.

A UM Moodle course supplement has been established for this course. Access is from the University's webpage (http://umonline.umt.edu/). See the Training Materials section for guidance on the mandatory practicals.

Course Requirements

Attendance	10 percent
Research portfolio	90 percent
Total	100 percent

Attendance will be taken daily. Of the 15 regular class meetings, 12 will be counted for credit.

A portfolio of 12 practicals will be offered through the semester, to be submitted on Moodle by December 20, 11:55 PM. Guidelines to prepare the portfolio will be provided on the course Moodle site.

Grading

The best individual strategy to ensure that you receive a grade you can live with is to work to meet and/or exceed course requirements. Remember, A's are rewards for Superior Performance, B's for Above Average Performance, and C's for Average Performance.

Course grades will be based upon the following percentages of the total points possible for the course as weighted by the criteria specified in course requirements.

A	< 93.0%		C	73.0-76.9%
A-	90.0-92.9%		C-	70.0-72.9%
B+	87.0-89.9%		D+	67.0-69.9%
B	83.0-86.9%		D	63.0-66.9%
B-	80.0-82.9%		D-	60.0-62.9%
C+	77.0-79.9%		F	< 59.9%

Additional Policies

Course engagement and in-class practicals will require your presence in class. Please inform me of necessary or planned absences in advance of those. Absences related to occasional or protracted illnesses can be excused, and work made up, with proper notification and documentation (also see below for exam make-up policy). In short, be prepared to provide documentation for events causing absences if you wish extensions.

All students at the University of Montana must practice academic honesty at all times. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/vpsa/policies/student_conduct.php

It is extremely disruptive to have students arrive late and/or leave early, aside from the fact that full attendance of the student is expected in this in-class course. Not only will your presence throughout the entire class period keep me happy, it will help you to understand the material better. Please let me know in advance, as far as possible, that you might be arriving late and/or leaving early. In the event of that happening, please try to take a seat that is close to the classroom door so your disruption is minimal.

Cell Phones: **OFF**, or on vibrate mode if you subscribed to the University's Emergency Notification System.

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Provisional Course Calendar

Classes	Topic	Reading(s)	Activities
Mon, Aug 29	Introduction to the course How to prepare the research portfolio		
Mon, Sept 5	**Labor Day – No Classes, Offices Closed**		
Mon, Sept 12	Introduction to the R statistical environment		
Mon, Sept 19	Point patterns: homogeneous models		Practical 1
Mon, Sept 26	Point patterns: inhomogeneous models		Practical 2
Mon, Oct 3	Marked point patterns		Practical 3
Mon, Oct 10	Linear and graph analysis		Practical 4
Mon, Oct 17	Autocorrelation analysis		Practical 5
Mon, Oct 24	Boolean algebra and spatial association		Practical 6
Mon, Oct 31	Geographically Weighted Regression		Practical 7
Mon, Nov 07	Spatial interpolation: global functions		Practical 8
Mon, Nov 14	**TBD**		
Mon, Nov 21	Spatial interpolation: focal functions		Practical 9
Mon, Nov 28	Spatial interpolation: kriging		Practical 10
Mon, Dec 5	Hypothesis testing by simulation		Practical 11
Mon, Dec 12	Hypothesis testing by simulation		Practical 12
Tue, Dec 20	Deadline for the submission of the research portfolio		

Provisional nature of course schedule indicates that, though every attempt will be made to adhere to this schedule, it is not written in stone. Any impact of deviations from the schedule on course activities will be considered and adjusted for.