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# GPHY 588,01: Spatial Analysis and Modeling

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# GPHY 588-01 Course Syllabus
# Spatial Analysis and Modeling

## STON 218

## Tuesday & Thursday, 9:30 – 10:50 AM

## 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; Friday 11-12; and by appointment |

## 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.

## Required textbook and supplementary materials:

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

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.

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

## Course Requirements

| | |
|---|---|
| Attendance | 10 percent |
| Quizzes | 45 percent |
| Article reviews | 45 percent |
| Total | 100 percent |

Attendance will be taken daily. Of the approximate 26 regular class meetings, 21 will be counted for credit.

You will complete a number of quizzes and assignments during the semester, to assist your understanding of the course material. Any work produced must be original.

A total of six quizzes (~15 questions each) will be offered through the semester, to be completed in the class period. Exam format is a combination of multiple choice answers, true-false answers and short answers. Questions will refer to content in the textbook and/or treated in class.

Three article reviews (~2,000 words each) about applications in spatial analysis and modelin will be submitted on Moodle by December 20th, 11:55 PM. Guidelines to prepare the quizzes and the article reviews are provided on the course Moodle site.

At the time of the quiz you may not use anything else, which includes your cell phone, ball caps and other hats, books, notebooks, etc.

## 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

| Class dates | Units and Topics | Reading(s) | Activities |
|---|---|---|---|
| Tue, Aug 30 | Introduction to the course | | |
| Thu, Sept 1 | 1. Concepts in spatial analysis and modeling | Required: Unwin & O'Sullivan, pp. 1-29, 33-53 | |
| Tue, Sept 6 | 1. Concepts in spatial analysis and modeling | Required: Unwin & O'Sullivan, pp. 1-29, 33-53 | |
| Thu, Sept 8 | 1. Concepts in spatial analysis and modeling | Required: Unwin & O'Sullivan, pp. 93-118 | |
| Tue, Sept 13 | 2. Point modeling | Required: Unwin & O'Sullivan, pp. 121-154, 157-183 | Quiz Unit 1 (30') |
| Thu, Sept 15 | 2. Point modeling | Required: Unwin & O'Sullivan, pp. 121-154, 157-183 | |
| Tue, Sept 20 | 2. Point modeling | Required: Unwin & O'Sullivan, pp. 121-154, 157-183 | |
| Thu, Sept 22 | 2. Point modeling | Required: Unwin & O'Sullivan, pp.121-154, 157-183 | Journal Club 1 (30') |
| Tue, Sept 27 | 2. Point modeling | Required: Unwin & O'Sullivan, pp. 121-154, 157-183 | |
| Thu, Sept 29 | 3. Line modeling | Required: Unwin & O'Sullivan, pp. 135-166 **(First Edition, scanned copy available on Moodle)** | Quiz Unit 2 (30') |
| Tue, Oct 4 | 4. Network modeling | Required: Unwin & O'Sullivan, pp. 135-166 **(First Edition, scanned copy available on Moodle)** | |
| Thu, Oct 6 | 5. Lattice modeling | Required: Unwin & O'Sullivan, pp. 187-213 | |
| Tue, Oct 11 | 6. Field modeling | Required: Unwin & O'Sullivan, pp. 239-275 | |
| Thu, Oct 13 | 7. Spatial dependence | Required: Unwin & O'Sullivan, pp. 187-213, 215-236 | Quiz Units 3-6 (30') |
| Tue, Oct 18 | 8. Boolean algebra and spatial association | Required: Unwin & O'Sullivan, pp. 315-337 | |
| Thu, Oct 20 | 9. Spatial regression | Required: Unwin & O'Sullivan, pp. 277-313 | Quiz Units 7-9 (30') |
| Tue, Oct 25 | 10. Spatial interpolation | Required: Unwin & O'Sullivan, pp. 277-313 | |
| Thu, Oct 27 | 10. Spatial interpolation | Required: Unwin & O'Sullivan, pp. 277-313 | |
| Tue, Nov 8 | **Election Day – No Classes, Offices Closed** | | |
| Thu, Nov 10 | 10. Spatial interpolation | Required: Unwin & O'Sullivan, pp. 277-313 | Journal Club 2 (30') |
| Tue, Nov 15 | TBD | | Quiz Unit 10 (30') |
| Thu, Nov 17 | TBD | | |
| Tue, Nov 22 | 11. Mapping of multivariate patterns | Required: Unwin & O'Sullivan, pp. 55-87 | |
| Thu, Nov 24 | **Thanksgiving Break – No Classes, Offices Closed** | | |
| Tue, Nov 29 | 12. Spatial simulation | Required: Unwin & O'Sullivan, pp. 341-368 | |
| Thu, Dec 1 | 12. Spatial simulation | Required: Unwin & O'Sullivan, pp. 341-368 | |
| Tue, Dec 6 | 13. Machine learning | Required: Unwin & O'Sullivan, pp. 341-368 | Quiz Units 11-12 (30') |
| Thu, Dec 8 | 13. Machine learning | Required: Unwin & O'Sullivan, pp. 341-368 | Journal Club 3 (30') |
| Tue, Dec 20 | Deadline for the submission of article reviews | | |

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.