SSCI 599 Spatial Modeling
Course Syllabus - Spring 2014

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Office Hours: Via Skype - Mondays, 1-2 p.m. and Wednesdays, 5-6 p.m., PT
I am always available via email. Also, I am available for chats via phone or Skype, audio or video, most days and times *by prior arrangement* via email. According to needs and the course schedule, we will also meet in my Adobe Connect room for a few face-to-face sessions. Just get in touch if you need to communicate with me!

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Course Scope and Purpose

The use of spatial analytical models has become increasingly common in the study of social and environmental systems. Such models are used to help us learn about the systems we're interested in, to help guide future research by identifying knowledge and data 'gaps', to aid in the design of management and monitoring strategies, and to make predictions about unmeasured patterns and processes. This course will take you beyond the basic understanding of spatial analysis tools you learned in SSCI 583 Spatial Analysis.

Why should you take this course? This course will provide you with an understanding of a range of spatial modeling concepts, approaches and applications, as well as methods for determining the suitability of a particular modeling approach for a given task. Designed as an online version of an advanced studio course and graduate seminar, you will work individually and in groups to explore, learn, and teach about several different solutions to geospatial modeling challenges.

Expectations in the workplace for today's GIS professionals include the ability to learn continuously, work with many different kinds of data and with other professionals in other disciplines, domains, and agencies. There are many unique and deep skill sets needed in today's world. However, they do not stand alone; the ability to collaborate, to learn from others and to expand opportunities jointly are essential. The collaborative component of this course is essential.

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Learning Outcomes

On completion of this course, students should be able to:

- Explain how complex spatial models can be used to help solve and understand environmental and social problems and management challenges.
- Describe the range of tools and techniques that fall within the collection of spatial analytical models.
- Represent spatially and temporally dynamic social and environmental processes using spatial modeling tools.
- Assess the validity, uncertainty and sensitivity of model results, both in the research literature and in your own work.
- Use and integrate with ArcGIS, alternative modeling solutions including open source GIS options and external software applications
- Solve GIS tasks of moderate complexity independently with the help of various online resources.
- Collaborate with others to develop team expertise in advanced modeling tools.
- Working with domain experts, outline possible modeling solutions for their loosely specified spatial problems.
- Convey complex technical information and modeling results to a non-technical audience through presentations, reports and graphics.
- Describe how different GIS, modeling, mathematical, and statistical software packages can be integrated to produce results that none of these systems in isolation is able to produce.

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Textbooks and other readings

The required textbooks for this course are:

O'Sullivan, David, and George LW Perry. 2013. *Spatial Simulation: Exploring Pattern and Proces*s. Wiley-Blackwell.

Mitchell, Andy. 2012. *The Esri Guide to GIS Analysis, Volume 3: Modeling Suitability, Movement, and Interaction*. Redlands, CA, Esri Press.

Additional readings that focus on topics relevant to course themes selected by students will be identified as part of the literature search components of each course section.

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Course Structure

The main theoretical concepts will be provided through text readings and self-directed research you will do in the published literature and on the web and through hands-on experimentation with various tools and technologies.

The course will generally unfold on a triweekly basis. Each set of three weeks will be focused on a particular aspect of spatial modeling. In order to make sure you are exposed to as broad a range of material as possible, the class will be divided into small groups, each of which will be charged with learning about a different modeling solution or environment. Group members will support each other as you learn your assigned topic, completing some intermediate assignments. At the end of the three

weeks, each group will present what they have learned to the rest of the class in a brief tutorial (written or on-line). In this way you will learn some of the material deeply while also learning a bit about related topics. You will finish the course by completing a spatial modeling project on a topic of your choice either on your own or in a self-identified group.

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Assessment

There are several different kinds of assignments with at least one due weekly. These are described in the Weekly Folders on Blackboard. Due dates are shown in the summary that follows.

Graded Blogs/Wikis (7 worth a total of 23 points, varying individual weights) – Throughout the term the class will explore a variety of topics through graded blogs and wikis. These tasks are designed to engage you in the material and to expand your research results beyond what you are personally able to uncover. Requirements for participation by way of comments and responses will be provided in detail in the assignment instructions.

Resume Assignment (1 worth 2 points). We require all current students to post and maintain a public resume, short biography and recent photo on our shared GIST Student Community Blackboard site. With your permission, your resume will be included in the GIST Resume Book. The latter is compiled annually and along with our web presence used to promote our programs and more importantly, your skills, experience, and professional aspirations.

Tutorial Assignments (3 worth a total of 9 points) – On completion of three tutorials about statistics and modeling tools and environments, you will complete a brief assignment to demonstrate your acquisition of the relevant skills and knowledge.

Group Modeling Learning Modules (3 worth a total of 36 points) – Each of the three group work sections will end with the presentation of a brief learning module through which you will teach your classmates what you have learned (teaching is the best way to learn!). A portion of these points will be assigned through self and peer review which will be described in the assignment instructions.

Final Project – (3 components worth a total of 30 points) - To integrate your learning of all the material covered in the course, you will design, undertake and report on an individually chosen spatial modeling project. The Final Project will have three components including a proposal with theoretical context and model conceptualization (12 points), a public presentation (6 points, made on-line via *Adobe Connect*) and a fully annotated and illustrated project report on your model implementation (12 points).

Assessment Due Dates

Unless otherwise indicated in the assignment handouts, all assignments are due by 11:59 pm Pacific Time (PT) on Mondays. Your attention to on-time assignment submission is essential if I am to meet my goal to return comments on your submitted assignments before the next one is due. Sometimes this is impossible, so I will post a notice on anticipated delays if needed.

Strict penalties apply for late assignments as follows:

- All assignments will be docked 2 points up to FOUR days late. No points will be given for submissions more than FOUR days late.

- Additionally, no written work will be accepted for grading after 5:00 p.m. PT on the last day of classes.

Summary of Assessments

Assessment	Number	Points Each	Total Points
Weekly Assignments			
Resume Assignment	1	2	2
Wikis and Blogs	7	3 to 6	23
Tutorial Assignments	3	3	9
Group Lessons	3	12	36
Project Components			
Proposal	1	12	12
Presentation	1	6	6
Final Report	1	12	12
Total	17	-	100 points

The grade breaks across the 100 possible points for this course will be as follows. Note that for graduate work, C- is a failing grade. Values indicate the lower end of each letter range to the left.

Break	93	90	85	75	65	55	45	0
Grade	A |	A- |	B+ |	B |	B- |	C+ |	C |	C-

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Requirements

Technology – ArcGIS is provided online via the GIST Server; hence, you do not need to install it on your own computer. Instead, every student must have the following technology requirements:

- A computer with a fast Internet connection.
- A functional webcam and a microphone for use whenever a presentation or meeting is scheduled.
- A current web browser, Firefox recommended, to access the GIST Server

GIST Server and Tech Support – This course will utilize the SSI GIST Server which is a virtual desktop. You access the GIST Server at https://gistonline.usc.edu. If you are unable to connect to the server or experience any type of technical issues, send an email *using your USC account* to GIST Tech Support at gistsupport@dornsife.usc.edu, making sure to copy (cc) me on the email. GIST Tech Support is available Monday through Friday, 9:00am-5:00pm PT.

Communications – This is a distance learning course, so most of our interactions will be asynchronous (not at the same time). All materials to be handed in will be submitted via Blackboard. It is each student's responsibility to stay informed about what is going on in our course. In addition to email

about time-sensitive topics, any important announcements will be posted on the Announcement page in Blackboard. Be sure to check these each time you log onto Blackboard.

I will send via email through Blackboard any notices that are time sensitive. Please be sure that you read as soon as possible all email sent from Blackboard or from me. Do not ignore course email until the day before assignments are due. Also double check to be sure that email sent from the USC blackboard account does not go into your junk mail!

While I am usually on-line all day and will probably respond to emails from students very quickly, I will endeavor to respond to all email within 24 hours of receipt, aiming for no more than 36 hours delay. In the rare case when I expect to be off-line for more than 24 hours, I will post an announcement on the Blackboard site.

Workload – This is a four credit, one semester course. Students should expect to spend 10-15 hours per week completing the work in this course.

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Resources for On-line Students

Our course Blackboard site provides links to several different resources that you may need. In particular, you will be making frequent use of the on-line USC Library that is available to all registered students through the link http://www.usc.edu/libraries. Once on this site, you can find additional resources for distance students under the link "Library Services". Many other resources and links to key people you may need to contact are also listed on the Blackboard site under Other Resources and Contacts.

Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to an instructor as early in the semester as possible. DSP is located in STU 301 and is open from 8:30 a.m. to 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://scampus.usc.edu/files/2013/05/appendix_a.pdf. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

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Important Administrative Dates

1/13: Spring semester classes begin
1/20: Martin Luther King Day, university holiday
1/31: Last day to register and add classes, change enrollment option to Pass/No Pass or Audit, purchase or waive tuition refund insurance or drop a class without a mark of "W," and receive a 100% refund
2/17: Presidents' Day, university holiday
3/17-22: Spring recess
4/11: Last day to drop a class with a mark of W
5/2: Spring semester classes end, final date for submission of all course work
5/16: Commencement

Course Schedule

Week	Start Date	Topic	Text Readings*	Assignments due Monday	Points
1	13-Jul	Introduction	O&P Ch 1		
2	20-Jan	Statistical Foundations	O&P Ch 2-5	Resume	2
				Intro Blog	6
3	27-Jan			Modeling Wiki 1	3
4	3-Feb	ArcGIS Modeling Tools	Mitchell Ch 4-6	Tutorial Assignment (Stats)	3
				Modeling Wiki 2	3
5	10-Feb			Tools Wiki 1	3
6	17-Feb			Tutorial Assignment (ArcGIS)	3
7	24-Feb	External Models	O&P Ch 6	Lesson presentation	12
8	3-Mar		O&P Ch 7	Tools Wiki 2	3
9	10-Mar		O&P Ch 8	Tutorial Assignment (External model)	3
	17-Mar	Spring Recess			
10	24-Mar	Modeling Environments	O&P Ch 9	Lesson presentation	12
11	31-Mar			Project proposal	12
12	7-Apr			Tools wiki 3	3
13	14-Apr	Geocomputation		Lesson presentation	12
14	21-Apr	Project		Geocomp Wiki	2
15	28-Apr			Project presentation	6
				Project report (due May 2)	12

*Additional readings will be assigned to address modeling themes chosen by students

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