SPATIAL ANALYSIS

<u>**CURRICULUM**</u>

Master of Spatial Analysis

DEGREE REQUIREMENTS		Credits
SA8902	Database Management and Spatial Technologies	1
SA8903	Applied Spatial Statistics	1
SA8904	GIS Project Mgmt Applications	1
SA8905	Cartography and Geovisualizatn	1
Two elective credits		2
And one of the following Options		
RESEARCH PAPER Option		
Major Research Paper		(Milestone)
SA8991 Internship*		1
THESIS Option**		
Thesis		(Milestone)

**The Thesis Option is only available to fulltime students and is subject to approval by the program.
The Thesis Option extends the normal time to completion from three to four or five terms.

ELECTIVES		Credits
SA8901	Geospatial Data Analytics	1
SA8906	Spec Topics: Spatial Analysis	1
SA8909	Directed Study in Spatial	1
SA8911	Geodemographics	1
SA8912	Spatial Tech in Strat Planning	1
SA8921	Spatial Analysis of Resources	1
SA8922	Remote Sensing and Spatial Analysis	1
SA8923	Land/Geographic Info Systems	1
SA8931	Community Analytics	1
SA8991	Internship*	1
ES8801	Facl Siting and Env Risk Assessment	1
ES8923	Environmental Assessment	1
ES8925	Dec Making and Stat Plan Mgmt	1
ES8927	Risk Assessment in Envi Mgmt	1
PL8315	Transportation Planning	1
SS8000	Stat Analysis in Soc Science Research	1

* The Internship (SA8991) will be waived for part-time students who are in program-related employment.

<u>**COURSE LISTING**</u>

Thesis
In the thesis option, students conduct advanced research on a topic in the area of spatial analysis. Students propose and carry out independent research under the direction of a faculty supervisor and monitored by a thesis supervisory committee. Upon completion, this research is submitted in a thesis format to the supervisor, and defended by the student before a thesis examining committee. This is a "Milestone." Pass/Fail

Major Research Paper
The major research paper is an opportunity for the student to investigate a particular issue or application in his/her field of specialization. Through the research paper, the student demonstrates a critical understanding of the conceptual, methodological, and/or practical aspects of spatial analysis and the ability to conduct independent research. The research topic is selected in consultation with the student's supervisor and may emanate from class work, research assistantships, or the practicum placement. A research paper proposal is submitted by the end of the Winter term to the supervisor and the program director for approval. Students also share their research projects with the Departmental community in a poster presentation event. The completed research paper is submitted by the end of the Summer term. It is evaluated by a three-person committee, including the supervisor, and is defended in an oral examination. This is a "Milestone". Pass/Fail.

SA8901: Geospatial Data Analytics
Spatial analysis is characterized by large data volumes and an increasing number of data sources, as most government and business databases include geographic references. This course provides an introduction to geospatial data representation and integration in Geographic Information Systems (GIS). Students gain hands-on experience mapping and analysing real-world datasets, from open government data and the Census to environmental measurements and geolocated social media. 1 Credit

SA8902: Database Management and Spatial Technologies
This course focuses on the core principles of Relational Database Management Systems (RDBMS) and the incorporation of spatial data storage and analytic tools. The course takes an applied approach with extensive use of RDBMS software and business intelligence tools with advanced spatial functionality. Students create entity-relationship models and convert them into GIS-ready spatial databases that make use of techniques such as spatial SQL and spatial indexes.1 Credit

SA8903: Applied Spatial Statistics
This course explores the use of various types of spatial statistical analysis. It involves the application and critical assessment of the use of selected univariate and multivariate modeling approaches in the analysis of geospatial data. Specific topics include spatial autocorrelation, the modifiable areal unit problem, spatial interaction modeling, spatial regression, and identification and interpretation of spatial clusters. 1 Credit

SA8904 GIS Project Management Applications
In this course, student teams are working with external "clients" on medium-scale GIS projects. These case studies will focus on the current and potential use of GIS and related spatial technologies in selected environmental, business, health and government applications. The first part of the course will introduce our external clients and projects, as well as GIS project management approaches. The latter part will require student teams to work independently in coordination with their client and the course instructor, and to report back to the course. Course assignments include a critical evaluation of a previous student project, the writing of a project proposal and a final report, and the oral presentation of progress and results. 1 Credit

SA8905 Cartography and Geovisualization
The course introduces cartographic principles and their application to the design of thematic maps using Geographic Information Systems (GIS). Textbooks and lectures introduce the fundamental elements of cartographic design, different approaches to data representation, and novel map types. The role of maps at different stages of spatial analysis is examined. Students will gain hands-on experience with GIS and statistical software through lab assignments that involve data exploration, analysis, and cartographic presentation. 1 Credit

SA8906 Special Topics: Spatial Analysis
This elective course examines advanced topics in areas related to the program that are not covered by existing courses. It allows students to study current research in spatial analysis and to explore new emerging models of practice. The particular theme, topic and structure of the course will vary in response to trends in the field, availability of specialists, and student interest. The course description will be announced prior to scheduling the course. 1 Credit

SA8909: Directed Study in Spatial Analysis
With the approval of the program director and faculty advisor, students may take the Directed Study course to gain knowledge in an area relevant to their research interests, for which no graduate-level course is offered in a given year. The course permits the student to survey a coherent body of literature in an area of study related to Spatial Analysis. It will normally be a directed reading course under the supervision of a faculty member with expertise in the chosen subject area. A program of supervised, advanced study will be negotiated on an individual basis with the faculty member. Students are required to present the results of one term's work in an organized format. 1 Credit

SA8911 Geodemographics
This course surveys practical, conceptual, and methodological issues associated with the application of spatial techniques to marketing and segmentation. Stress is given to the use of a range of socioeconomic and demographic variables. Methods include multivariate techniques for market definition and segmentation, focusing on applications of cluster analysis. The course also addresses the management issues in the use of geodemographics and related spatial analysis within public and private sector decision-making. 1 Credit

SA8912 Spatial Technology in Strategic Planning
The course examines the application of spatial technologies, particularly GIS, to strategic planning issues that affect the commercial sector of the economy. The focus is on analysis of retail and service activities from the perspective of both the private and public sector policy makers. Specific issues include: spatial impact analyses, use of GIS as a corporate management system, retail and services network planning, and location-allocation modeling. The course will adopt a variety of presentation formats including lectures, seminars and laboratory sessions. 1 Credit

SA8921 Spatial Analysis of Land Resources
This course deals with the spatial modeling and spatial analysis of landscapes and physical/environmental resources. Lectures, seminars, and lab sessions will focus on geospatial landscape modeling, simulation of spatio-temporal processes, analysis of land-use patterns, and GIS-based environmental impact assessment. 1 Credit

SA8922 Remote Sensing and Spatial Analysis
Applications of advanced image processing will be the focus of this course. Remotely sensed data from passive and active remote sensing systems will be examined. Techniques relevant to optical, thermal, and microwave imagery will be investigated with an emphasis on optical data. The objective is to develop an understanding of the principles behind each technique and consider their suitability for different applications. Experience in the processing of remotely sensed data will be gained using image analysis software. The importance of image interpretation will also be emphasized. 1 Credit

SA8923 Land/Geographic Information Systems

Land information refers to any physical, legal, economic or environmental information that concerns land, water, groundwater, subsurface resources, or air. Increasingly, organizations are adopting a Geographic Information Systems approach to data collection and management. The intent of this course is to expose students to the key components required to build and deploy Land/GIS. Topics such as database design, data formats, projection systems, metadata standards will be reviewed in lecture/discussion format. Subsequently, groups of students will be responsible for designing tutorials on data collection methods and tools. The final class project involves field work for data collection and hands-on use of GIS software to deploy a community resource and potential decision-making tool. 1 Credit

SA8931 Community Analytics

This course addresses spatial analysis concepts, techniques, and tools to address program planning and decision-making in the social and community fields. Government and the non-profit sector increasingly rely on large, spatially explicit datasets as evidence in vulnerability and needs assessments as well as predictive analytics. The course draws on real-world application examples in social service delivery, community infrastructure investment, public health, and crime pattern analysis. 1 Credit

SA8991 Internship

The internship is designed to be an unpaid field placement that provides students with an understanding of the types of problems, policies, and procedures that involve spatial analysis in specific public or private sector environments. The internship will be arranged by the program director in discussion with the student. Students will work for two days per week for the duration of one term. The placement is evaluated through a practicum report of 8-10 pages. The report presents the current role and expected development of spatial analysis in the placement organization; describes the student's tasks during the placement; and compares the practicum experience with the academic view of spatial analysis. The student may also be subject to an oral examination about the internship experience by the program director and faculty advisor in consultation with the internship host. Pass/Fail. 1 Credit

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