



THE UNIVERSITY OF  
**TOLEDO**  
1872

**SPATIALLY INTEGRATED SOCIAL SCIENCE  
Ph.D. GRADUATE PROGRAM HANDBOOK**

**2019-2020**

**PREPARED BY THE GRADUATE FACULTY OF  
GEOGRAPHY AND PLANNING  
ECONOMICS  
POLITICAL SCIENCE  
SOCIOLOGY AND ANTHROPOLOGY**

**THE UNIVERSITY OF TOLEDO**

**AUGUST 2019**

# SISS Graduate Student Handbook AY 2019-20

## INTRODUCTION TO NEW GRADUATE STUDENTS

The faculty and staff of the Departments of Geography and Planning, Economics, Political Science and Public Administration, and Sociology and Anthropology welcome you to our joint graduate program and wish you success in completion of a Doctor of Philosophy degree at the University of Toledo. This *SISS Graduate Handbook 2019-20* has been prepared to introduce you to the program, faculty, facilities and various offices of the University and departments as well as to the members of University and College support staff who can provide official and/or informal assistance. We urge you to read our handbook carefully and keep it constantly in mind as your continuing reference during your graduate studies. Please feel free to offer comments on the contents of our handbook. Each member of our program faculty and staff welcomes you to meet with us during your first semester. If at any time during the program problems related to your graduate studies arise, please feel free to contact appropriate faculty members for advice and counseling.

---

### **The SISS Ph.D. Program** Homepage overview at: <http://www.utoledo.edu/al/siss/>

This program is designed around the application of geographic information science, spatial statistics, spatial econometrics and spatial analysis to study the spatial dimension of human and social dynamics, including interaction of individuals and society, government, and market participants.

This program encompasses a new body of statistical theory dealing with techniques and topics ranging from spatially-weighted regression analysis to error theory in spatially-distributed data, spatial interpolation and sampling methods, the effects of scale and resolution in geographically distributed data, and the confounding effects of boundary alignment and modifiable areal units in data organization and analysis.

These topics, coupled with spatial information processing technologies--notably in the form of geographic information systems (GIS), remote sensing, digital cartography and related technologies--have served as an important catalyst for this emerging spatio-temporal research paradigm.

This approach is underscored by the Center for Spatially Integrated Social Science (CSISS):

CSISS recognizes the key role space plays in human society, and promotes research that advances our understanding of spatial patterns and processes. Cartographic visualization, geographic information systems (GIS), pattern recognition, spatially sensitive statistical analysis, and place-based search methodologies are the tools of spatially integrated social science (SISS) used to integrate knowledge across disciplines and paradigms. From research design to the interpretation of research findings, the use of SISS can advance understanding in nearly every domain of the social and behavioral sciences\* (CSISS, 2003)

Examples cited by the Center for Spatially Integrated Social Science (CSISS) and by Goodchild, *et al.*\*\* , of major topics which transcend disciplinary boundaries and follow the spatio-temporal model. Topics are listed as follows\*\*\*:

- Environmental and climate change
- Criminal justice
- Health and disease
- Economic Development
- Cultural analysis
- Social and business networks
- Urban Studies
- Political Redistricting
- Social and economic inequality
- Community studies
- Transportation
- Economic Restructuring

---

\*CSISS. 2003. *CSISS: Center for Spatially Integrated Social Science Web Site* ([www.csiss.org](http://www.csiss.org)), 2001-2003 by Regents of University of California, Santa Barbara

\*\*Goodchild, M.F., L. Anselin, R.P. Appelbaum, and B.H. Harthorn. 2000. Toward Spatially Integrated Social Science, *International Regional Science Review*, 23(2):139-159.

\*\*\* please consult pp. 142-148 in Goodchild, *et al.* (2000) and pp. C2-C5 in the *CSISS Project Description* for a more detailed treatment of these topics including cited work from the social science research literature. ([http://www.csiss.org/aboutus/reports/csiss\\_descript.pdf](http://www.csiss.org/aboutus/reports/csiss_descript.pdf))

## TIME TO COMPLETION

Students are expected to complete the program in a timely manner with normal time to completion being five years or less. Students are expected within the first two years to concentrate on class activity and complete the general comprehensive examination. In the third year efforts are concentrated on completing the qualifying exam for Ph.D. Candidacy and developing the dissertation topic. The remainder of the third and the fourth years are devoted to completion and defense of the dissertation. Students will be evaluated at the end of each year by the program director and, where appropriate, their dissertation advisor. Students deemed not to be making timely progress toward their degree will not be permitted to continue with funding. **After a period of seven (7) years, students will be required to apply for readmission per the rules of the College of Graduate Studies that may involve additional fees, course recertification and other requirements.**

## SOURCES OF PROGRAM INFORMATION

This *SISS Graduate Student Handbook* is a composite of information obtained from a variety of official references as well as faculty decisions made during planning of the program. You should become familiar with the *UT College of Graduate Studies Catalog and the College of Graduate Studies Handbook*. If you have been awarded an assistantship or an internship, you must read the regulations contained in the *Graduate Assistant Handbook*. Both are available online from the College of Graduate Studies (COGs) website. Program degree requirements must comply with official COGs requirements but some variation is possible and these are discussed in detail later.

## ADMISSION INFORMATION

Initial contact with the SISS Ph.D. Program by a prospective graduate student normally occurs through a letter of inquiry, e-mail message or advertisement response requesting information and an application form. If interested in the program, the application form, fee, transcripts, and letters of recommendation will be forwarded to COGs by the student. When all materials have been compiled, these are sent to the program director for evaluation and, eventually, the credentials are examined by the SISS Graduate faculty. Prospective students must have completed a Master's Degree in a Social Science discipline (or equivalent) earned from a department of approved standing and granted by an accredited college or university. Applicants must have also completed one course covering geographic information systems and one course in multivariate statistics. New graduate students who are deficient in these requirements must complete prerequisites prior to entering the program. In addition, the following materials must be submitted to COGs for consideration for admission:

1. A completed Graduate School application form
2. Graduate Record Examination scores
3. Three letters of recommendation
4. Transcripts from Previous Academic Institutions
5. A completed Statement of Purpose
6. TOEFL Scores for International Students

Additional requirements for all students from non-English speaking countries must achieve satisfactory scores (80+) on the Test of English as a Foreign Language (TOEFL). All students are required to take the GRE. All international students must also demonstrate that they have adequate financial resources for their graduate education before they can be admitted. All foreign students are required to have health and accident insurance at time of registration. Prospective students can apply to the program through the College of Graduate Studies link:

<http://www.utoledo.edu/graduate/prospectivestudents/>

## DOCTORAL DISSERTATION

The Spatially Integrated Social Science Ph.D. Program specifies the completion of a dissertation as a requirement of the Doctor of Philosophy degree. The dissertation requires 24 credits. The title of the dissertation must be reported to the Program Director and filed with COGs no later than one semester prior to the expected date of graduation. The student's dissertation advisor must approve the title of the dissertation. The advisor and committee must approve the dissertation for defense and file date of defense with COGs. Advisor in consultation with the student and other committee members shall schedule the date of the defense. Students are required to be enrolled for a minimum of one credit in dissertation hours within term that defended dissertation is completed and uploaded to OhioLink. The dissertation must be submitted in electronic format to OhioLINK four weeks prior to the end of the term of graduation. The College of Graduate Studies will review the format of dissertation documents no later than six weeks prior to the end of the term.

## MINIMUM ENROLLMENT

Graduate students who have completed their course work and are working on class projects, dissertation, and/or who are using university facilities and services, (*i.e.*, the library, health services, computer services, laboratories, consulting with faculty, applying for graduation, *etc.*) may have to register for a minimum of one graduate credit hour each semester. The rules for enrollment and use of facilities often changes. Access to certain other facilities and services, such as the student recreation center and parking, will require additional user fees.

Full time status is considered nine (9) hours enrolled in a term and is the minimum required for students to receive funding. ***Any students receiving federal student loans or similar financial assistance may be required to enroll for nine (9) hours. Such students should consult with the Financial Aid Office on campus to determine their eligibility and enrollment requirements.***

## GRADE POINT AVERAGE

Regulations of the Graduate Faculty require that graduate students maintain a grade point average of 3.0 on a 4-point system for all courses completed as well as an average of 3.0 on a 4-point system for courses completed in the program of specialization. Students whose grade point average falls below 3.0 on the 4-point scale are subject to dismissal from the program. Only grades of A, A-, B+, B, B-, C+, C, C-, D+, D, D- and F are used in determining grade point averages. Graduate students are not allowed to be assigned IN grades for graduate course work.

Students are also required to have a B or better in the program's six core courses (SISS 7010; SISS 7020; SISS 8010; SISS 8020; SISS 8030; SISS 8040). Students who do not attain a B or better in the core courses (except SISS 8040) would have to retake that course(s) and would be ineligible to take the comprehensive exam at the end of the first year in residence.

## REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY DEGREE IN SPATIALLY INTEGRATED SOCIAL SCIENCE

The *College of Graduate Studies Catalog* contains the degree requirements for a Doctor of Philosophy degree in Spatially Integrated Social Science. Each new graduate student will be expected to become familiar with these requirements. To assist new students and to maintain a progress report, Table 1 has been prepared that contains a more detailed inventory of information. During advanced registration every semester, each student will be expected to meet with the Program Director or their Dissertation Advisor to examine individual progress in the program and to prepare course schedules for the following semester. This may require the completion of a Plan of Study in consultation with the Program Director. Once students have reached 60 credit hours, revised Plan of Study may be required for each subsequent term registration. Graduate student progress is also tracked and recorded by the Program Director. Important items related to a graduate student's record of progress are discussed below and include:

1. **Prerequisites.** One graduate-level course covering geographic information systems and one course in multivariate statistics are required. New graduate students who are deficient in these requirements must complete prerequisites prior to entering the program.
2. **Master's Degree (or equivalent).** Students must have a graduate-level background in the social sciences or related field.
3. **Graduate Record Examination.** All incoming graduate students must take the GRE in preparation for the program.
4. **Program Record.** The doctoral degree requires 60 semester hours beyond the Master's Degree with 36 course credits and 24 dissertation credits. 18 credits (six courses) are required as core courses. Three courses (9 credits) can be selected from a set of advanced seminar courses and three courses (9 credits) can be selected as electives within one of the allied social science departments administering the program: Geography and Planning, Economics, Political Science and Public Administration, or Sociology and Anthropology. All courses must be approved by the program director or dissertation advisor. Enrollment for dissertation credit is reserved for the third and fourth years of the program after course work has been completed. Students are eligible to take a minimum of six credits of dissertation and up to 9 credits in a semester.
5. **Comprehensive Examination.** A comprehensive examination will be scheduled for the summer following the end of the first year of the graduate program and will cover material presented in the first five core courses of the program (SISS 7010, 7020, 8010, 8020, 8030). To qualify, a student must have a "B" or better in all five initial core courses. Upon successful completion of the examination, the student can begin taking advanced seminars and electives in the second year of residence. Students who fail their comprehensive exam may be given a second attempt after one more semester at the discretion of the SISS committee.
6. **Dissertation.** Each student must complete 24 credit hours of dissertation (SISS 8960). In the Spring Semester of the second year of residence, students can begin to establish a Dissertation Advisory Committee (by completing a Program Dissertation Advising Form). The dissertation committee will consist of a Committee Chair and four readers. All must be regular members of the Graduate Faculty or must serve at the consent of the Graduate Dean. Students will also enroll in the final core course (SISS 8040: Research Design). It is during this time that the student should begin to focus on establishing a dissertation topic. The following year (Year 3) of residence will begin with a Qualifying Exam at the beginning of the Fall Semester. The Qualifying Exam will test each student on the basis of their knowledge and skills in the area(s) of their dissertation topic. Upon completion of the qualifying exam, students will prepare a dissertation proposal and defend it by end of semester. Upon successful completion of the defense, each student will work on their dissertation for the remainder of Year 3 and into Year 4. Students must successfully defend their dissertation before their

committee in an open forum in order to complete their degree requirements. The defense of a dissertation is to be approved by the dissertation advisor in consultation with the dissertation committee, and must notify COGS of the date. Once the defense has been scheduled by the dissertation advisor, a notice will be provided to the program director who will post and distribute public announcements of the defense. Students are not permitted to schedule dissertation defenses and are required to be present for the defense (Skype, video or voice call in or other means of remote participating in defense by the candidate are not permitted).

**TABLE 1. Course Sequence and Requirements Timetable**

<b><u>Year 1</u></b>
<p><b>Fall Semester (9 credits):</b>            7020: Geographic Information Science in SISS            8010: Foundations of Spatially Integrated Social Science            8940: Econometrics</p> <p><b>Spring Semester (9 credits):</b>            7010: Spatial Statistics            8020: SISS Theory            8030: Advanced Spatial Data Analysis</p> <p><b>Summer Semester:</b>            Comprehensive Examination based on Core Courses</p>
<b><u>Year 2</u></b>
<p><b>Fall Semester (up to 9 credits):</b>            Choice: Advanced Seminar or Elective            Choice: Advanced Seminar or Elective; Choose dissertation advisor in this semester            Choice: Advanced Seminar or Elective</p> <p><b>Spring Semester (up to 9 credits):</b>            8040: Research Design            Choice: Advanced Seminar or Elective; Formation of dissertation committee in this semester            Choice: Advanced Seminar or Elective</p>
<b><u>Year 3</u></b>
<p><b>Fall Semester (up to 9 credits):</b>            Qualifying Exam at beginning of semester            Prepare dissertation proposal and defend by end of semester  <i>General Seminar Courses or Directed Readings</i></p> <p><b>Spring Semester (up to 9 credits):</b>            Dissertation</p>
<b><u>Year 4</u></b>
<p><b>Fall Semester (up to 9 credits):</b> Dissertation</p> <p><b>Spring Semester (up to 9 credits):</b> Dissertation</p>

**Human Subjects Research Review Requirements.** All research projects (papers and dissertations) that require the use of human subjects as data sources (*i.e.* surveys, experiments, *etc.*) must be approved by the University Office of Research. A Human Subjects Research Review Committee form must be filed by investigators in this case. It is emphasized that if this form is not on file at the time a dissertation employing human subjects that is for graduation may be jeopardized.

**7. Assistantships and Awards.** Teaching Assistantships and Research Assistantships will be made available on a competitive basis for qualified students. Assistantships are awarded on a yearly basis; students who are awarded an assistantship in their first year should not necessarily assume that assistantships will be available in subsequent years. However, the SISS Faculty will make every effort to provide four years of support for qualified students. Factors that enter into the awarding of assistantships include the availability of funds and each student's record of performance. Assistantships are also contingent upon student's academic status in the program and current Plan of Study on file with COGs. Delays in preparing and submitting the Plan of Study could impact awarding of funds and tuition waivers. Students who are awarded Teaching Assistantships should become familiar with the *Graduate Assistant Handbook*, prepared by the College of Graduate Studies.

**Teaching Assistantships.** A teaching assistantship provides a stipend and that also allows tuition fees to be waived. Therefore, this award is presented only to highly qualified students. A teaching assistant functions as a member of the instructional staff of their allied department. In this position, students are expected to conduct themselves in a professional manner in representing the university and department. Teaching assistants are assigned to specific faculty members' courses and are generally expected to teach recitation sections, help in grading of evaluation, to have scheduled office hours and meet regularly with students. Teaching Assistants will be required to provide an average of 20 hours per week on assigned duties during each term. Teaching Assistants are required to attend orientation and training sessions organized by the Center for Teaching Excellence.

**Research Assistantships.** Selected research assistantships may also available, depending on external research funds. Students awarded a research assistantship are normally provided a stipend and tuition fee waiver. Under this form of support, the student is assigned to work on specific research projects of individual faculty members. The specific functions performed by the student are determined by the nature of the project. Research Assistants will be required to provide an average of 20 hours per week on assigned duties during each term.

## **SPECIAL HONORS OR AWARDS**

Additional stipends are available from the College of Graduate Studies (COGs) for students with outstanding undergraduate records. These include Board of Trustees scholarships and scholarships from foundations and societies. Information about these awards is available from the COGs, but the faculty occasionally nominates students with exceptional credentials.

## GRADUATE STUDENT USE OF DEPARTMENT FACILITIES

**Department Laboratories.** Graduate students are given access to the department instructional computer laboratory. Please consult with each respective department with respect to the use of these lab facilities. Graduate students using the Geography Labs are permitted to use these facilities twenty-four hours a day. We request that when working in the lab that outside doors be locked during the hours that the labs are officially closed (9:00 PM to 9:00 AM). In addition, we urge graduate students to use caution in the use of these facilities during evenings and weekends for their own personal safety and security. Selected graduate students will have access to the *Geographic Information Science and Applied Geographics (GISAG) Laboratory*. This laboratory is restricted to faculty sponsored research and contract work and only those students assigned to specific projects will be permitted access.

**Photocopying.** Copy machines are available in the department offices and may be used only during business hours with permission of department secretaries or faculty. **Due to budgetary limitations free copying of personal materials, including class-work is prohibited.** Graduate teaching assistants may use photocopy machines without cost only for instructional class activity related to their teaching assignments, subject to approval by their primary course instructor.

**Graduate Office Space.** For Academic Year 2019-20, graduate students will occupy offices in Snyder Memorial 2190A, 3022 & 3025. Office space, however, is not always guaranteed and will be provided when available to graduate students. Office space is at a premium and may require several persons sharing an office. It is the responsibility of each person in an office to provide a quiet, clean and supportive work environment.

**University Computer and Library Services.** The use of university computer and library services is governed by the rules of these centers. Graduate students entering the program will be given information on services and computer accounts early in their first semester of residence.

**Graduate Student Association Services.** The graduate student association provides professional social support services to students. A department representative to the graduate student association is elected each year by our students. The association provides many important services to students including financial grants for career development (travel grants) and small grants for thesis and dissertation research. Students are encouraged to compete for these awards in order to support travel to professional meeting and expenditures associated with their thesis research.

## FEE PAYMENTS

Students receiving assistantships or internships are given stipends and in/out of state fee waivers during the Fall, Spring and Summer terms. In all cases, students are responsible for the graduate application and matriculation fees, general fees and parking fees. In order to avoid late fees, all fees listed on a student's account should be paid before term starts. Graduate teaching assistants are eligible for a reduction in their parking fees. Health insurance is also available through COGs. Teaching assistants are given a reduced rate for health insurance and may elect the payroll deduction option for their share of the charges. All other students must pay the full payment at the beginning of each semester. A family health insurance plan, paid by the student, is also available through the university.



### **CLASS REGISTRATION PROCEDURES**

Students are expected to meet with the program director each semester to select the following semester's courses. The graduate advisor must approve the student's course selections. Depending on their year in the program, and total credit hours earned to date, a revised Plan of Study may be completed in order for the student to enroll for classes. Students who have completed their qualifying examination may also wish to review course selections with their dissertation advisor if appropriate. *Final approval remains within the authority of the program director.* After their first semester in residence, students are encouraged to take advantage of the early registration period to avoid the inconveniences associated with the late open registration. Each semester, the student should review their Plan of Study (form found on the College of Graduate Studies) and update as needed or required. It needs to be signed by the advisor, SISS Director and then go to the Dean's Office.

### **DEPARTMENT COLLOQUIA**

Throughout the year our four departments host various visiting scholars. In most cases, these individuals will present lectures and seminars to graduate students. The presentations provide a unique opportunity to augment our existing faculty ranks and to give students a chance to meet and speak with many outstanding scholars. All faculty and graduate students are expected to attend these functions. Students are reminded that one of the important criteria in selection for assistantships is a commitment to professional development; attendance at departmental colloquia is evidence of this commitment.

### **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS and ATTENDANCE AT PROFESSIONAL MEETINGS**

Students are encouraged to join professional organizations affiliated with the four allied departments. Many of these organizations offer student membership rates and special student programs at professional meetings. Students are encouraged to attend professional meetings and to present papers. The faculty is pleased to work with students in helping them prepare presentations. When possible financial support to attend meetings and present papers will be provided to students.

### **ACADEMIC GRIEVANCE PROCEDURE**

In the event that a graduate student has an academic grievance, he or she should attempt to resolve the problem by adhering to the following procedure:

1. Discuss the problem with the instructor involved
2. If no resolution can be achieved, the student should present his or her grievance to the chairperson of the department
3. If the problem is still not resolved, the student should see the dean of the college
4. If a resolution has been unsuccessful at the college dean's level, the student may present the grievance to the Dean of the College of Graduate Studies.
5. The final appeal can be made to the Committee on Academic Standing of the Graduate Council and its decision shall be binding on all parties involved in the grievance.

Note: Graduate students must file the initial grievance with the instructor and a copy to the department no later than one semester after the occurrence of the incident.

### **SEXUAL HARASSMENT**

The University of Toledo has very strict regulations regarding sexual harassment and discrimination. We ask all graduate students to be aware of these policies and follow the regulations. Teaching assistants should be especially careful in dealing with students to avoid any potential incidents that may jeopardize their professional careers. Any incidents of sexual harassment should be immediately reported to the program director and their respective department chair in which the course is offered. <http://www.utoledo.edu/title-ix/discrimination-resources.html>

## PROGRAM CORE FACULTY

Bhuiyan M. Alam. Professor, Department of Geography and Planning, B.S. Bangladesh University; M.S. Asian Institute of Technology; M.S. Florida State University; Ph.D., Florida State University. Specialties: GIS, Transportation Planning, Environmental Planning, Urban & Regional Planning, Regional Development.

Kevin P. Czajkowski. Professor, Department of Geography and Planning, B.S. State University of New York at Oneonta, Ph. D., University of Michigan. Specialties: Remote Sensing, Weather and Climate, Physical Hydrology and Atmospheric-Land Surface Processes.

Daniel J. Hammel. Professor and Associate Dean, Department of Geography and Planning, B.A. Kansas State University, M.A., Ph.D., University of Minnesota. Specialties: Urban/Economic Geography, Housing, Urban Planning.

Patrick L. Lawrence. Professor and Chair, Department of Geography and Planning, B.E.S. University of Waterloo; M.Sc. University of Guelph; Ph.D. University of Waterloo. Specialties: Ecosystem/Environmental Management, Water Resources/Watershed Management, Land Use Policy and Planning.

David Jim Nemeth. Professor, Department of Geography and Planning, B.A. and M.A. California State University-Northridge; Ph.D., University of California-Los Angeles. Specialties: Philosophy and Methodology, Cultural Geography, Geography of Asia, Conservation and Resources.

Neil Reid. Professor, Department of Geography and Planning, Director Urban Affairs Center, B.A. The University of Glasgow; M.A. Miami University; Ph.D. Arizona State University. Specialties: Industrial Geography, Economic Geography, Urban Geography.

M. Beth Schlemper, Associate Professor, Department of Geography and Planning B.A., M.A., University of Missouri Columbia, Ph.D., University of Wisconsin Madison. Specialties: Historical Geography, Geographic Education.

Sujata Shetty, Professor, Department of Geography and Planning, Ph.D., Urban/Regional Planning, University of Michigan, Ann Arbor. Specialties: Community & Economic Development Planning, Gender & Planning, International Development.

Oleg Smirnov, Associate Professor, Department of Economics, Ph.D., Resource Economics, West Virginia University. Specialties: Spatial Econometrics, Regional Economics

Yanqing Xu, Assistant Professor, Department of Geography and Planning, Ph.D., Public Health and GIS, Louisiana State University. Specialties: GIS, Urban Geography, Quantitative Methods, Public Health.

April Ames, Assistant Professor, Department of Occupational and Public Health, Ph.D. SISS, University of Toledo.

Saatvika Rai, Assistant Professor, Department of Political Science and Public Administration, Ph.D. University of Kansas.

## **PROGRAM AFFILIATED FACULTY**

David C. Black, Associate Professor, Department of Economics, Ph.D., 1992, Economics, SUNY Buffalo. Specialties: Monetary Theory, Money and Banking.

Kevin J. Egan, Associate Professor, Department of Economics, Ph.D., 2004, Economics, Iowa State University. Specialties: Environmental and Resource Economics, Microeconometrics, Applied Welfare Economics.

Dwight Haase, Associate Professor, Department of Sociology and Anthropology, Ph.D., Sociology, University of Wisconsin, Madison. Specializations: Globalization, Economic Sociology, Quantitative Methods.

## SISS COURSE LIST

### The Core Courses (6)

#### **SISS 7010: SPATIAL STATISTICS**

(ALAM)

[3 hours] The course deals with statistical theory and state-of-the-art applied statistical techniques for spatial data analysis. The range of topics include descriptive statistics, statistical modeling and hypothesis testing in the presence of spatial dependence and spatial heterogeneity. Emphasis is made on geospatial statistics, local statistics and spatial diagnostics for spatial patterns.

#### **SISS 7020: GEOGRAPHICAL INFORMATION SCIENCE IN SISS**

(CZAJKOWSKI)

[3 hours] The course covers in detail the underlying theory and assumptions associated with GIS and remote sensing. The course emphasizes the fundamental elements of cartography, geodesy, statistics, mathematics and geo-computational methods that form the foundation for the development of GIS and spatial analysis tools. Additional topics include spatial databases architectures, algorithms, and applications. Exploratory spatial data analysis. Visualization of spatial data. Spatial database cyber-infrastructure.

#### **SISS 8010: FOUNDATIONS OF SPATIALLY INTEGRATED SOCIAL SCIENCE (SISS)**

(NEMETH/HAMMEL)

[4 hours] This is an introductory course to spatial analysis for social scientists. The course will examine the historical development of the social sciences, their philosophical and methodological approaches to research, and the emergence of the spatial perspective in social science research. The course focuses on (1) the conceptualization and formalization of space and spatial relations, with exploration of characteristics of spatial data, effects of spatial proximity and distance, and topological characteristics of space, (2) the study of spatial processes: discrete and continuous, volitional and natural, stochastic and deterministic, and (3) an analytical treatment of spatial patterns related to social processes with examination of spatial dependence, heterogeneity, spatial clusters. Other approaches include graph theoretical representation of space, spatial networks, and spatial hierarchies.

#### **SISS 8020: SISS THEORY (SMIRNOV)**

[3 hours] This course prepares students to carry out advanced work requiring preparedness in theoretical and methodological aspects of spatial analysis in social sciences. The course concentrates on (1) the spatial organization of society and (2) spatial human and social dynamics. The topics includes spatial interactions and social institutions, spatial random utility theory, spatial economic growth and convergence, spatial stratification, income inequality, segregation among others.

#### **SISS 8030: ADVANCED SPATIAL DATA ANALYSIS**

(SMIRNOV)

[3 hours] The course covers models of spatial processes: spatial autoregressive models, gaussian Markov random field models, auto-logistic models, spatial discrete choice models. The topics include spatial panel data models and their applications and estimation methods: generalized method of moments, likelihood-based, and minimum distance; spatial sampling. Applications to a broad range of social science problems.

#### **SISS 8040: RESEARCH DESIGN**

(COORDINATOR: HAMMEL)

[2 hours] The course introduces students to research and research technicalities: what is research, how to write research papers and research proposals, how to design and manage research project, etc. To help students make a transition from course work to research, the course requires to complete a short communication (2,000 words), which will grow into a research paper of 'publishable' quality students must write during the third year.

#### **SISS 8960: DISSERTATION**

[1-9 hours] Completion of Doctoral Dissertation--a total of 24 credit hours is required.

## The Advanced Seminar Courses

### **SISS 7030: GEO-COMPUTATION**

(TBA)

[3 hours] Advanced follow-up to SISS 7020. Computational foundations of spatial analysis. Elements of computational geometry, finite mathematics, surface modeling and computation of continuous phenomena. Specialized numerical analysis of spatial data within a GIS environment. Requires programming expertise.

### **SISS 8150: ADVANCED QUALITATIVE ANALYSIS IN SISS**

(TBA)

[3 hours] Advanced qualitative analysis techniques and applications to a broad range of spatially oriented social science problems.

### **SISS 8160: POLICY EVALUATION AND SISS**

(BACHELOR, AJILORE)

[3 hours] Examination of the role of space, place and location in the analysis of public policy, with particular emphasis on spatial approaches to needs analysis and policy and program evaluation. The seminar will provide a detailed review of policy analysis and evaluation techniques and literature. Students will complete an original research paper utilizing spatial analysis in the evaluation of a policy or a program.

### **SISS 8170: SPACE AND SOCIETY: CRITICAL THEORY IN SISS**

(HAMMEL)

[3 hours] Critical examination of both the role of spatial inquiry and its limitations to the understanding of society and space. Major components of the seminar will deal with a detailed review of the literature and preparation of papers for presentation.

### **SISS 8180: DISCRETE CHOICE SPATIAL PROCESS MODELING**

(SMIRNOV)

[3 hours] A specialized follow-up to SISS 8010 and SISS 8020. Focuses on the study of the human factor in spatial processes. The main goal is to advance understanding of spatial aspects of human factor and social dynamics by modeling discrete choice spatial processes. The course covers issues of model design, estimation methods, applied model development, and analytical techniques for the analysis of spatial phenomena.

### **SISS 8190: ADVANCED MODELING METHODS AND TECHNIQUES IN SISS**

(TBA)

[3 hours] Advanced spatial modeling techniques for social scientists including a detailed examination of the role of systems theory and operations research in SISS. The integration of models within GIS and remote sensing systems will be included along with a detailed review of the literature and preparation of papers for presentation. Advanced follow-up to SISS 7010 and SISS 8030; The basic idea of Methods Group trio:

SISS 7010 Advanced Spatial Statistics (Method I),

SISS 8030 Advanced Spatial Data Analysis (Method II),

SISS 8165 Advanced Spatial Modeling Methods and Techniques (Methods III)

### **SISS 8200: Spatial Perspectives on the Environment**

(CZAJKOWSKI)

[3 HOURS] Examination of the relationship between SISS approaches and human interaction with the natural environment. STUDENTS will study and use different types of spatial models applied to specific applications. Significant attention devoted to the applications of GIS and remote sensing to the study of human-environmental interactions.

### **SISS 8210: SPATIAL TRANSPORT MODELING AND PLANNING (ALAM)**

[3 hours] A specialized course dealing with the modeling and simulation of transportation systems and planning for future transportation facilities.