MS Spatial Informatics Program Description

2016/2017 UMaine Graduate Catalog

(submitted for publication Feb 2016)

Spatial Informatics

The master-of-science degree in Spatial Informatics (MSSI) provides an "all e-learning" "all coursework" degree for place-bound students that desire strong theory, computational, analytical, policy and technical foundations in geographic information science and systems. As a general rule, students may view class videos and accomplish assignments at any time throughout a week in any of the offered program courses and have the weekly opportunity (or requirement) to participate in a one to two hour "live" discussion session at a mutually convenient time for distance class members prior to due dates for weekly assignments. The *MS Spatial Informatics* graduate degree is an "online only" version of the existing and more intense on-campus research-focused *MS in Spatial Information Science and Engineering* degree.

The program focuses on advancing knowledge about spatial information particularly with respect to concepts needed in next-generation information systems. Emphasis is placed on developing novel concepts and methods in the broad field of geographic information science for storing, accessing, analyzing, and managing spatial data, and modeling, extracting, integrating, visualizing, and communicating geospatial information.

Students build on foundations in computer science, mathematics, physics, geography, cognitive science, artificial intelligence, engineering and related fields to study spatio-temporal phenomena and design intelligent spatial information systems. Spatial Informatics may be viewed as a field of study merging knowledge drawn from geographic information science, information science, cognitive science, computer science and engineering.

The program is designed to meet the growing demand in society for graduates with high-level geospatial technology skills and provide a path for women and men from diverse fields to rapidly transition to information system career paths by providing them with foundation graduate level courses in information systems and geographic information science. Similar to an MBA or Law degree, the spatial informatics graduate program accommodates students from wide ranging undergraduate degree backgrounds.

Objectives

Students develop knowledge and technical skills in such areas as information system design, human-computer interaction, database systems design and management, systems development, computer networks, and information law and ethics. They gain working familiarity with one or more programming languages if not already acquired, the concepts of managing resources across local and wide area networks including technical and managerial concepts of distributed systems, client-server systems, world-wide web, digital libraries, and further evolving network-based systems. Relational and object-oriented databases and systems for group decision support are addressed in the context of designing and managing databases. All of these general information systems graduate courses draw on spatial technology examples or contextual environments. The online graduate program specializes in preparing graduates to better utilize location information, geographic information systems, sensors and mobile technologies in accomplishing the day-to-day tasks of businesses and government and to help advance new innovations in these domains. In addition, students have the opportunity to take courses that provide an understanding of business and engineering applications and thus provide further foundations for effective communication with end users.

Master of Science in Spatial Informatics

The Master of Science in Spatial Informatics is available only to distance students. The program consists of the same courses as taken by on-campus graduate students in Spatial Information Science and Engineering taught by the same instructors. Distance students view lectures and class discussions at times of their own choosing while deadlines for electronic delivery of assignments are often the same as for on-campus students. There is no thesis required although students may propose pursuit of a project-based course as part of their graduate program if desired.

As required by the University, all work for a master's degree must be completed within six years. The timing starts with the first semester of registration after admission to the Master of Science in Spatial Informatics.

Degree Requirements

The Master of Science in Spatial Informatics (MSSI) consists of 30 credits, all earned in course work. The program consists of five three-credit required core courses and a minimum of fifteen additional credits from a list of elective courses approved for the program drawn from a range of disciplines but primarily from distance courses offered by the School of Computing and Information Science. If some required courses are duplicative of courses that may have been taken in the student's undergraduate degree program or another graduate program, those courses need not be repeated, and the student will select in consultation with the MSSI Graduate Coordinator and MSSI Steering Committee additional approved courses to arrive at the total of 30 credit hours. All courses listed in the distance program are 3 credits.

Required Courses

The following five courses must be taken and all count toward the graduate degree.

- SIE 505 - Formal Foundations for Information Science (Fall 2016, Instructor: Hahmann)
- SIE 507 - Information Systems Programming (Fall 2016, Instructor: Moratz)
- SIE 515 - Human Computer Interaction (Spring 2017, Instructor: Giudice & Corey)
- SIE 525 - Information Systems Law (Spring 2017, Instructor: Onsrud)
- SIE 550 - Design of Information Systems (Fall 2016, Instructor: Egenhofer)

Elective Courses

Students must take at least fifteen additional credits that are approved in advance by the MSSI Steering Committee from the following approved elective course listings in order to arrive at the total required of 30 credits.

Among courses that are regularly available for distance students include:

- SIE 509 - Principles of Geographic Information Systems (Fall 2016, Instructor: Holden or Beard)
- SIE 510 - Geographic Information Systems Applications (Spring 2017, Instructor: Beard)
- SIE 512 - Spatial Analysis (Fall 2016, Instructor: Beard) Prereq: statistics course
- SIE 555 - Spatial Database Systems (Spring 2017, Instructor: Nittel) Prereq: SIE 507 or programming experience
- SIE 557 - Database System Applications (Spring 2017, Instructor: Nittel)
- SIE 558 - Real-Time Sensor Data Streams (Fall 2016, Instructor: Nittel)
- SIE 570 - Spatial Cognition and Computing (Spring 2017, Instructor: Moratz)
- SIE 590 - Information Systems Internship (Fall 2016 and Spring 2017, Instructor: Onsrud)

Tentative 2016-2017 Schedule of Live Weekly Discussion Sessions by Instructor with Distance Students

Note: Discussion times and days may be altered if alternative times are better suited for enrollees.

Fall 2016 (Eastern Time Zone)

SIE 505 - Mon 7pm	SIE 507 – Tues 7pm	SIE 509 – Wed 7pm	SIE 512 – Thurs 7pm	SIE 550 – Fri 7pm
SIE 558 – Mon 8pm				

Spring 2017 (Eastern Time Zone)

SIE 510 - Mon 7pm	SIE 557 – Tues 7pm	SIE 525 – Wed 7pm	SIE 554 – Thurs 7pm	
SIE 515 – Mon 8 pm	SIE 570 – Tues 8 pm	SIE 555 – Wed 8pm		

Potential Courses that may be Offered by Distance in Future Years

- SIE 516 - Virtual Reality: Research and Applications (typically in Fall, Instructor: Giudice & Corey)
- SIE 554 - Spatial Reasoning (typically in Spring, Instructor: Egenhofer)
- SIE 559 - Geosensor Networks (typically in Spring, Instructor: Nittel) Note: alternates with SIE 558

- SIE 571 - Pattern Recognition and Robotics (typically in Spring, Instructor: Moratz)
- SIE 580 - Ontology Engineering Principles (typically in Spring, Instructor: Hahmann)

Students may propose additional elective graduate courses than those listed to be included on their program of study on a case-by-case basis or added to the list. Depending on student interests and background and course availability for distance students, some students may choose to propose one or more courses from the list of UMaine Applied GIS Courses (https://spatial.umaine.edu/applied-gis-courses-and-projects/) for inclusion in their program of study. Some of the elective graduate courses may require prerequisites in addition to the minimum required for general admission to the MSSI graduate program.

Detailed Requirements

- Programs of Study are approved for each student by the Steering Committee for the MSSI graduate program. This committee consists of the MSSI Graduate Program Coordinator and two additional graduate faculty members in the department or affiliated with the program.

- Each student's Program of Study must include the five required core courses with the remainder of courses to be selected from an approved course list maintained by the department or proposed by the student and assessed for possible approval. The MSSI Steering Committee assesses the reasonableness of such requests and makes the final decision on whether specific additional courses serving the objectives of the MSSI program and the needs of the student may be included. Each student's Program of Study must be approved in advance by the MSSI Steering Committee. Students should NOT assume that any combination of program courses will be approved by the Steering Committee.

- At least 15 credits of the 30 required on a student's program of study must be at the 500 level or above.

- Up to two courses may be taken at other universities by distance methods or otherwise if contained on the student's graduate program of study and approved in advance by the MSSI Steering Committee.

- Up to two graduate courses may be transferred into the student's graduate program of study if taken prior to admission to the Graduate School, the courses did not count towards the student's undergraduate degree requirements, and the courses are approved by the MSSI Steering Committee.

- The MSSI Graduate Coordinator serves as the advisor for each student admitted to the program and the MSSI Steering Committee serves as the graduate committee for each student in the program.

- All students must complete the entire M.S. graduate program of study within a six-year period (as established by the Graduate School).

Admission Requirements

Admission to the University of Maine Master of Science in Spatial Informatics is competitive. In its admission process, the graduate faculty considers the potential of applicants to complete the program successfully and achieve positions of leadership in the private or public sectors. For all of our graduate programs we are generally seeking students that score at the mean or above on the verbal, quantitative and analytical segments of the GRE exam and in the 50th percentile or above on the exam overall. We generally seek an undergraduate grade point average of 3.0 or above. Exceptions are considered on a case-by-case basis.

At a minimum an applicant must have a four-year U.S. bachelor's degree from an accredited college or university, or a four-year international equivalent. Within their curriculum, all applicants should have completed a university course in Algebra as a minimum math prerequisite for admission. Previous programming courses or experience are recommended but not required. The review committee considers both the curriculum completed and the institution attended in its assessment.

All students apply through the Graduate School and the entire application packet including transcripts, test scores and letters of recommendation must be received before a formal acceptance will be issued typically. To be considered for Fall admission, completed applications should be received 8 weeks prior to the beginning of the term.

Graduate Faculty

M. Kate Beard-Tisdale, Ph.D. (Wisconsin, 1988), Professor. Geographic information systems, spatial analysis, digital libraries.
Max J. Egenhofer, Ph.D. (Maine, 1989), Professor and Director of School. Geographic database systems, spatial reasoning, GIS user interface design, research methodologies.
Nicholas Giudice, Ph.D. (Minnesota, 2004), Assistant Professor. Neurocognitive engineering, multimodal spatial learning, human computer interaction.
Reinhard Moratz, Ph.D. (Universitat Bielefeld, 1992), Associate Professor. Spatial knowledge representation in cognitive systems, qualitative spatio-temporal representation, human-robot interfaces, integration of spatial perception and description.
Silvia Nittel, Ph.D. (Zurich, Switzerland, 1994), Associate Professor. Spatial database management systems, mobile object systems, heterogeneous information systems, high performance architectures.
Harlan J. Onsrud, J.D. (Wisconsin, 1982), Professor and Graduate Coordinator. Computer and information systems law, spatial technology cyberlaw issues, computer ethics, responsible conduct of research.