

Geospatial Data Science , P.S.M.

About The Program :

The Department of Geography and Urban Studies offers graduate work leading to the Professional Science Master's (P.S.M.) degree in Geospatial Data Science. The program combines advanced training in data science and GIS core skills with professional development and business ethics to prepare students to enter the workforce. Our courses introduce students to statistical and computer programming and a variety of cutting-edge spatial analysis technology. The Department of Geography and Urban Studies faculty have expertise in a range of GIS applications, including urban, health, environment, business, location analysis, geovisualization, and remote sensing. The program curriculum is informed by an advisory board of industry professionals and incorporates real-world experiences through project-based learning and an internship capstone requirement. Graduates are well prepared to pursue certification as a GIS professional (GISP).

Career Options: The program will train a workforce that is highly competent to meet the challenges faced by public, regulated, and private sector industries and also adaptable to the future needs of the industries. It provides access to a professional career, requiring both technical skills and professional development training in areas related to business, policy, and ethics. Students will seek careers as information officers, data scientists, geospatial engineers, and data consultants.

Prerequisites for Admission:

- Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree in any field is appropriate. An undergraduate GPA of 3.0 or an undergraduate GPA of 2.5 with 2 to 4 years of relevant professional experience is preferred.

Areas of Specialization:

The program specializes in Geospatial Data Science and Geographic Information Systems and offers coursework in geovisualization, geospatial programming, statistics, big data, and machine learning. The Department offers students the opportunity to learn in research laboratory settings equipped with the latest technologies.

Requirements of Programs:

- **Total Credit Hours:**

Number of Credits Required to Complete the Program Beyond the Baccalaureate: 30

Number of Credits Required to Complete the Certificate: 12

- **Culminating Events:**

Capstone in Geospatial Data Science: The capstone course (GUS 9187) provides an experiential and industry-relevant learning experience for students matriculated in the Professional Science Master's in Geospatial Data Science program at Temple. Students

engage in a structured internship experience (140 hours during the term) identified with the guidance of P.S.M. faculty at Temple and a prospective employer. The student completes a geospatial data science project during the internship that draws on the technical and professional skills developed through the P.S.M. curriculum.

Required Courses (M.S. with Geospatial Data Science)

Core Courses

Advanced Statistics for Urban Applications – This course teaches advanced statistical methods to examine urban processes and patterns. The course covers spatial point pattern analysis, multivariate regression, logit and probit regression, spatial econometrics, Geographically Weighted Regression (GWR), and hierarchical linear modeling.

Geovisualization – Maps can be powerful devices for communication, but also tools for exploration of relationships among social and physical processes manifesting in space. This computer-intensive course will focus on this dual purpose of maps as tools for visual communication and visual thinking. You will create data-driven products that combine geographic and statistical visualizations for static, interactive, and animated display. Previous experience with a programming language will be helpful. A previous course in cartography is recommended but not required. Heavy emphasis on open source tools.

Big Geospatial Data –

Application Development – This course introduces students to geospatial software development through the creation of standalone software applications and plugins that add new functionality to major GIS software products. The emphasis will be on geospatial algorithms and object-oriented programming. Other topics in software design will be addressed including documentation, version control, user interface design, software testing, and software project management. The course will be taught using Python, JavaScript, or another major programming language with strong geospatial support. There will be a heavy emphasis on Free and Open Source Software, and active participation in the developer community outside of the classroom. At the end of the course students will have produced fully functioning geospatial software, shared their code to a public online repository, generated documentation, and promoted their work publicly.

GIS Ethics and Professional Practice – The focus of this course is on the ethical use and application of spatial data and geographic information systems and technologies. Topics covered include overviews of the geospatial industry and GIS profession, issues of spatial data sharing, the maintenance of privacy, and laws applicable to spatial data and GIS. Students will learn about the primary GIS industry sectors and professional organizations, and the codes of ethics and codes of conduct associated with being a GIS professional. A variety of case studies presenting ethical issues relating to the ethical use and application of spatial data and GIS are presented and discussed throughout the semester as a vehicle for exploring issues of ethics and professional practice. At the end of the course students are expected to be able to define the GIS industry, its sectors, and its workforce; explain the legal and ethical issues germane to the GIS profession; demonstrate familiarity with potential ethical challenges presented to GIS professionals; and understand how established codes of ethics and conduct apply to the GIS profession.

Electives (3 Credits Worth)

Non-Didactic Courses

GIS Capstone – The GIS Capstone course provides an experiential learning experience for students matriculated in the Professional Science Master's in GIS program at Temple. Students engage in a structured internship experience (140 hours during the semester), identified with the guidance of PSM faculty at Temple and a prospective employer. The student will complete a GIS-oriented project during the internship that draws on the GIScience and professional skills developed through the PSM curriculum. Student performance will be evaluated based on three criteria: 1) employer report of student performance during the internship, 2) student presentation of project, and 3) student-submitted report of project. The projects will be presented to PSM faculty and students at the conclusion of the semester and reports will be made available to employers and members of the Advisory Board. This course is required for all students matriculated in the GIS PSM at Temple. Students are expected to complete 140 hours of internship experience during the semester and to participate in an online course to reflect on their experiences during the internship. Students **MUST** have their internship opportunity approved by the instructor prior to the start of the semester.

Courses:

Click [HERE](#) for more information on the courses below.

- Advanced Statistics for Urban Applications
- Big Geospatial Data
- GIS Ethics and Professional Practice
- Special Topic Seminars
- Geosimulation
- Advanced Remote Sensing
- Geovisualization
- Application Development
- GIS Capstone 3
- GIS Programming
- Remote Sensing