

GEOSPATIAL COMPUTER SCIENCE (GSCS)

GSCS 6102 Graduate Seminar

1 Semester Credit Hour (1 Lecture Hour)

Advanced topic study and presentation by students, faculty, or visiting scientists. Meets one hour weekly. Must be taken three times by all GSCS PhD students.

GSCS 6302 Graduate Seminar

3 Semester Credit Hours (3 Lecture Hours)

This is a 3-credit course that is intended to help facilitate the development of a student's dissertation research ideas and to contribute to the student's professional development as a doctoral level researcher in the field of geospatial computer science. The course focuses on developing professional research skills typically not provided in formal coursework such as methods for novel research, literature review, developing a research prospectus, presenting scientific research, research ethics, peer-review process, and professional society engagement. At the outcome, students will have a better understanding of the research process and a foundation to aid their development as a doctoral student and professional scientific researcher.

GSCS 6321 Geospatial Data Structures

3 Semester Credit Hours (3 Lecture Hours)

The representation of spatial data is an important issue in diverse areas including computer graphics, geographic information systems (GIS), robotics, and many others. Choosing an appropriate representation is a key to facilitate operations such as spatial search. This course will focus on representation of point data and object data, which are the important types of spatial data. Various fundamental data structures on spatial data, such as quadtrees, kd-trees, grid structures, kd-trees, and R-trees will be explored. The use of these structures to address some important problems will also be covered.

GSCS 6329 Scientific Visualization

3 Semester Credit Hours (3 Lecture Hours)

This course presents principles and methods for visualizing data resulting from measurements and calculations in both the physical sciences and the life sciences. The emphasis is on using 2D and 3D computer graphics to garner insight into multi-dimensional data sets for understanding and solving scientific problems. Topics include visualization software and techniques, human vision attributes and limitations, data encoding, data representation, volume rendering, flow visualization, and information visualization.

Prerequisite: COSC 5327 and GSCS 6321.

GSCS 6331 Advanced Geospatial Computing

3 Semester Credit Hours (3 Lecture Hours)

Seminar in reading and critical evaluation of academic literature in the field of and fields relating to geospatial computing. Student will design, implement, and evaluate an advanced, contemporary geospatial computing technology to solve a geospatial problem.

GSCS 6344 Ubiquitous Positioning

3 Semester Credit Hours (3 Lecture Hours)

The aim of this course is to introduce the principle of positioning indoors/outdoors using sensors and short-range radio frequency signals in smartphones. These sensors will include a GNSS receiver, an accelerometer, a gyroscope, a magnetometer, a barometer, and a camera, why short-range RF signals will include WiFi and Bluetooth signals. The course will concentrate on various positioning algorithms for fusing sensor measurements and RF signal measurements.

Prerequisite: GSCS 5321.

GSCS 6390 Special Topics

3 Semester Credit Hours (3 Lecture Hours)

Variable content study of specific areas of geospatial computing science. May be repeated for credit when topics vary. Offered on sufficient demand.

GSCS 6996 Research

1-9 Semester Credit Hours

Independent research conducted under supervision of an advisor. Open to Geospatial Computing Science students who have not yet passed the qualifying exam and with consent of their graduate advisor. The course is graded with an S or U, and may be repeated.

GSCS 6998 Dissertation Research

1-9 Semester Credit Hours

Research related to PhD dissertation. Open only to degree candidates having passed the qualifying exam in Geospatial Computing Science with consent of their graduate advisor. The course is graded with an S or U, and may be repeated.

GSCS 6999 Dissertation Defense

1-9 Semester Credit Hours

Open only to degree candidates in Geospatial Computing Science with consent of their graduate advisor. Students should enroll in this course during their last semester of the GSCS PhD program. To successfully complete this course the student must pass the dissertation defense as well as have a final copy of the dissertation signed by the full graduate committee and approved for binding and distribution. A grade of Credit/No Credit will be assigned for the class with the possibility to assign the grade of IP or In Progress. If a grade of IP is assigned, the course must be repeated the following semester(s) until the course is passed.