

# GGG 773-001 Interoperability of Geographic Information Systems

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Office Hours: Tuesday 2-5 pm

Spring 2018, Tuesday 7:20-10:00pm, Exploratory Hall 2310

## ***Course Overview***

This is an advanced course designed for students who are interested in theory, standards, and implementation of Web-based interoperable geographic information systems for on-line data and information services. Students registered to this class should have some knowledge of Geographic Information Systems and geospatial data.

***Prerequisite:*** General knowledge of GIS and remote sensing. Prefer to have taken either GGS 553 or GGS 754.

***Textbook:*** None

***Major References:*** The standards and interoperability specifications discussed in this course can be found in the following websites:

1. Federal Geographic Data Committee (FGDC): <http://www.fgdc.gov>
2. International Organization for Standardization (ISO) TC 211:  
<http://www.iso.org>  
<https://www.iso.org/committee/54904.html>
3. Open Geospatial Consortium (OGC): <http://www.opengeospatial.org>

The instructor will also provide some ISO standards and specifications, which are not available through the ISO website, for reviews and discussions.

***Course Work:*** The work of the semester will consist of readings of selected interoperability standards and specifications. Each student is required to give two presentations of standard or specification reviews, each for about twenty to thirty minutes. There is no mid-term or final exam for this course. However, students are required to turn in a paper of their selected topics related to GIS interoperability and standards at the end of the semester. Grades will be determined from classroom discussions, presentations of standard reviews, and the paper.

***Grading:*** Presentation and classroom discussions: 40%  
Semester paper: 60%

***Syllabus:***

Week 1 (January 23): Introduction of the course; what is Geographic Information Systems; the definition of GIS interoperability

Week 2 (January 30): The needs and level of interoperability; How to make the GIS interoperable (the roles of standards); Types of Geographic Information Standards, their definitions, and roles; Who are the major players in defining federal, national, and international standards on geographic information and what is the relationships among the standards defined by different players.

Week 3 (February 6): Introduction to Federal Geographic Data Committee and their roles; Introduction to FGDC standards on geographic information.

Week 4 (February 13): Information on US national GIS standards; the InterNational Committee on Information Technology Standards (INCITS) Technical Committee L1 and their roles; The ISO TC 211 organization; The ISO 191XX series of standards.

Week 5 (February 20): Introduction to Open Geospatial Consortium, its organization, roles, and activities; OGC SP and IP programs; OGC Abstract Specifications on geographic information; OGC Implementation Specifications; The relationships between geographic information standards; The relationship between ISO standards and OGC specifications. Assign standards to students for review.

Week 6 (February 27): What is metadata? The FGDC Content Standard for Digital Geospatial Metadata; the FGDC Remote Sensing Metadata Extensions; The ISO 19115 Geographic Information—Metadata; ISO 19115-2; the new ISO 19115-1; ISO 19115-3; The relationship between those metadata standards; The ANSI adoption processes of ISO metadata standards.

Week 7 (March 6): ISO 191XX Standards on Imagery, and current ISO TC 211 projects on imagery and gridded data.

Week 8 (March 13): Spring Break

Week 9 (March 20): Presentation of standard reviews by each students and discussions.

Week 10 (March 27): Web-based interoperable Geographic Information Services; OGC Web service architecture and technology; OGC Specifications on Chainable Web Services, semantic geospatial web. Assign OGC specifications to students for review.

Week 11 (April 3): OGC Web Map Service Specification (WMS); OGC Web Coverage Service Specification (WCS); OGC Web Feature Service Specification (WFS); OGC Catalog Service for Web (CS/W).

Week 12 (April 10): Presentation and discussion of specifications reviewed by each student.

Week 13 (April 17): Sensor Web Technology and OGC Sensor Web Enablement (SWE) specifications (Dr. Genong Yu)

Week 14 (April 24): Big data and geospatial cloud; Implementation considerations of the geographic information standards; GeoBrain, CropScape, VegScape, DEM Explorer, RF-CLASS, CyberConnector

Week 15 (May 1): Where are the interoperability technologies heading (Classroom discussions). Also each student should give a short presentation about the topic of his/her semester paper.

The last day for turning in the semester paper: May 15.