Course Objectives & Outcomes
College of Science & Engineering

Department: Geosciences
Course Number: GEOL 5527
Course Name: Information technology for geographic information systems (IT4GIS)

Objective 1) Comprehend and apply knowledge of computer servers, networks, and system administration to geographic information systems design.

Outcomes:
1. Students can identify functional roles of servers relative to GIS.
2. Students can identify security issues in a GIS design or deployment.
3. Students can apply return on investment and total cost of ownership metrics to GIS designs or deployments.

Assignments that demonstrate accomplishment of this outcome:
1. Correct solution and successful completion of three week exercises involving the listed outcomes.
2. Satisfactory completion of exam questions related to Objective 1 (outcomes 1-3).
3. Successful completion of subsequent exercises where fundamental concepts from object 1 are revisited throughout the remainder of the semester.
4. Final project paper should include a clear comprehension of fundamental information technology concepts.

Objective 2) Comprehend and apply knowledge of relational databases and object-relational databases

Outcomes
1. Students understand relational database development as a client-centric paradigm.
2. Students understand data types, data modeling, and database design.
3. Students understand object oriented design and its application to object-relational databases.
4. Students understand enterprise workflows including versioning and disconnected editing of geospatial data.

Assignments that demonstrate accomplishment of this outcome:
1. Correct solution of laboratory exercises requiring the student to identify appropriate data types, normalize non-normal data tables, and calculate an effective data modeling process.
2. Correct solution to laboratory exercises requiring the student to use server-based database software to create a spatially enabled database, apply spatial SQL to solve spatial questions, and monitor the status of the database.
3. Correct solution of laboratory exercises requiring the student to identify and apply client-centric (top down) database design through the critical review of a business problem statement and development of a preliminary entity relationship model.
4. Correct solution of laboratory exercises requiring the student to create a spatially enabled database using MS SQL Server, replicate the database, edit feature classes and complete the workflow using synchronization, reconciliation, and posting appropriately.
5. Satisfactory completion of exam questions (both computer based and concept based) related to the concepts and application of both relational and object-relational databases.
6. Final project paper should exemplify knowledge of databases and their appropriate application relative to current information technology.

Objective 3) Comprehend and apply web GIS services using object-relational databases (geodatabases).

Outcomes
1. Students understand and create web services and web map applications.
2. Students understand customization practices to enhance the end-user experience of their web map applications.
Assignments that demonstrate accomplishment of this outcome:

1. Correctly develop web services and map services and complete related exercise materials.
2. Correctly develop a customized web map application that enhanced end-user experiences.
3. Satisfactory completion of exam questions related to objective 3 (outcomes 1 and 2).
4. Final project paper should exhibit knowledge of correct application of web services and development of the geoweb.