

I. COURSE DESCRIPTION:

This course is designed to put into practice many of the skills the student gained in the prerequisite GIS417 course. The primary software for the course is ArcGIS as well as many of its extensions. The course will explore extensions such as spatial analyst, 3D analyst and network analyst.

A growing area of GIS is dealing with the Health sector. A significant portion of this course will deal with Health GIS and explore some of the rapidly developing advancements in Health Informatics.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Develop GIS applications using a Geodatabase

Potential Elements of the Performance:

- Describe and design a Geodatabase
- Construct and edit a Geodatabase using ArcCatalog
- Explore the relational database behind a Geodatabase
- Understand the geometry inherent in a Geodatabase
- Import and export other GIS formats to a Geodatabase

2. Perform raster GIS analysis

Potential Elements of the Performance:

- Use the ArcGIS Spatial Analyst extension
- Describe the sources, formats, data types and structures of raster GIS data
- Describe potential raster GIS analyses
- Use Map Algebra to perform complex spatial analyses
- Ability to use Model Builder for spatial modeling / analysis
- Exposure to the geostatistical analyst extension

3. Perform 3-Dimensional Analysis

Potential Elements of the Performance:

- Use the ArcGIS 3-D Analyst extension
- Describe TIN and Lattice data structures, data sources and surface concepts
- Perform slope, aspect, analytical hillshading, visibility and surface profiling analyses

- Perform 3-D surface area and volumetric analyses

4. Perform Network Analysis

Potential Elements of the Performance:

- Use the ArcGIS Network Analyst extension
- Describe network analysis theory
- Perform network analysis (e.g., fastest route, service areas)

5. Health GIS

Potential Elements of the Performance:

- Look into the rapidly growing field of how GIS can be applied to the Health sector
- Study the theory and practical applications in this area

III. TOPICS:

1. Geodatabases

- Geodatabase theory
- Designing a Geodatabase
- Geodatabase geometry and topology
- Relational databases and geodatabases
- Coverage, shapefile and projection import and export

2. Raster GIS Analysis

- Raster GIS theory
- Map algebra and spatial modeling
- Topographic analysis
- Density rasters
- Model Builder
- Surface hydrology tools (flow direction and accumulation, basin and stream delineation)
- Creating a raster, importing and exporting rasters
- ArcGIS Spatial Analyst and Geostatistical analyst extensions

3. 3-Dimensional Analysis

- Triangular irregular network (TIN) theory
- ArcGIS 3-D analyst extension
- Creating a TIN, importing and exporting elevation data
- Elevation and viewshed modeling
- Surface profiling

- Creating lake bathymetry surfaces
4. Network analysis
 - ArcGIS Network Analyst Extension
 - Network analysis Perform network analysis (e.g., fastest route, service areas)
 5. Health GIS
 - Examine how GIS is being applied in the health field
 - Look into epidemiology and how it can be mapped
 - Perform health GIS studies on a community/regional scale

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Price, M. 2008. Mastering ARCGIS, Third Edition. McGraw-Hill.

V. EVALUATION PROCESS/GRADING SYSTEM:

Lab 1 - Networks	5%
Lab 2 – Raster Analysis	5%
Lab 3 - Geodatabases	10%
Lab 4 - Spatial and 3D Analysis	15%
Lab 5 - Network Analysis	10%
Lab 6 – Health GIS	15%
Theory and Practical Test 1 – Networks, Rasters and GDBs	20%
Theory and Practical Test 2 - 3D Analysis, Health GIS	<u>20%</u>
Total	100%

Note: Students must achieve a mark of at least 50% on the Test components to pass the course.

The following semester grades will be assigned to students:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI. SPECIAL NOTES:

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit Form from the program coordinator (for course-specific courses), or the course coordinator (for general education courses), or the program's academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.