

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE:	GIS Applications	
CODE NO. :	GIS427	SEMESTER: 17W
PROGRAM:	Geographic Information Systems Applications Specialist	
AUTHOR:	Heath Bishop	
DATE:	Dec. 2016	PREVIOUS OUTLINE DATED: Dec. 2015
APPROVED:	Corey Meunier	Jan '17
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	Chair	DATE
TOTAL CREDITS:	5	
PREREQUISITE(S):	GIS426	
HOURS/WEEK:	4	

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I. COURSE DESCRIPTION:

This course builds upon the students' previously developed abilities in ArcGIS. The primary component of the course focuses on applying the students' knowledge to everyday projects that are performed in the work world. Through undertaking these types of projects, the students gain an understanding of not only how to use the software extensions, but also how they can be applied in an everyday work setting in various fields. Course work continue to develop problem solving skills through the use of geodatabase functionality, Modelbuilder, Spatial Analyst, Network Analyst and geocoding.

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:

- Basic Geodatabase concepts and functionality
- Geodatabase Topology Rules and validation

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. Perform Geocoding

Potential Elements of the Performance:

- Understand the concepts involved with geocoding
- Create Address Locators
- Perform geocoding

6. Understand Health GIS

Potential Elements of the Performance:

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

7. Modelbuilder

Potential Elements of the Performance:

- Understand the basic concepts of ArcGIS Modelbuilder
- Appreciate the purpose and usefulness of models
- Be able to create and successfully run a model

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
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 - 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. Geocoding
- Address locators
 - Geocoding process
6. Health and Human Services 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
7. Modelbuilder
- Investigate the purpose of models as well as their functionality
 - Create models to more efficiently perform workflow

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Price, M. 2014. Mastering ARCGIS, Seventh Edition. McGraw-Hill.

V. EVALUATION PROCESS/GRADING SYSTEM:

Quizzes	10%
Labs	40%
Tests (2)	<u>50%</u>
Total	100%

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

Note: All assignments are due at the beginning of class on the scheduled due date, or may be subject to a 10% penalty. Each subsequent day that the assignment is not handed in by 9:30am may be an additional 10% deduction.

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	
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:Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

Course Outline:

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.

VI. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.