# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

## SAULT STE. MARIE, ONTARIO

## COURSE OUTLINE

**COURSE TITLE:** Advanced Analysis in GIS

**CODE NO. :** GIS417 **SEMESTER:** 10F

**PROGRAM:** Geographic Information Systems Applications Specialist

**AUTHOR:** Heath Bishop

**DATE:** May, 2010 **PREVIOUS OUTLINE DATED:** Aug., 2009

**APPROVED:**

"B. Punch"

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**CHAIR** **DATE**

**TOTAL CREDITS:** 4

**PREREQUISITE(S):** None

**HOURS/WEEK:** 4

## I. COURSE DESCRIPTION:

GIS software and applications develop rapidly. The most recent software (ArcGIS 9.3) will be reviewed with attention given to the changed GIS environment. Specifically, the following topics will be covered: the ArcGIS environment, Geodatabases, presenting data, manipulating data, editing and creating data, querying data and geocoding.

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Use ArcMap, ArcCatalog and ArcToolbox (ArcGIS)

   Potential Elements of the Performance:
   - Create map layouts using ArcMap
   - Edit and input data using ArcMap
   - Perform data conversion, projection and analysis operations using ArcToolbox
   - Perform GIS file management using ArcCatalog
   - Work with Coordinate Systems
   - Working with spatial joins

2. 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

3. Create and Edit Spatial Data

   Potential Elements of the Performance:
   - Import and digitize data using on-screen digitizing
   - Learn fundamental aspects of manipulating and creating geographic data
   - Perform advanced editing of spatial data

4. Work with Tabular Data

   Potential Elements of the Performance:
   - Perform queries using attribute data
   - Learn SQL query methods on attribute data
   - Perform table joins and relates in ArcMap
   - Perform locational queries

5. Geocoding / Address Matching

   Potential Elements of the Performance:
   - Describe and perform Geocoding and Address Matching analyses
   - Perform database editing to prepare data for geocoding

## III. TOPICS:

1. ArcGIS – ArcMap, ArcCatalog and Toolbox
   - ArcCatalog - creating a Geodatabase, GIS file management
   - ArcMap – data editing, digitizing, topology and map production
   - ArcToolbox – data conversion, projections and spatial analysis
   - Coordinate systems and projections

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

3. Spatial Data Editing
   - Basic editing process
   - Use of snapping in the editing process
   - Adding features to map layers
   - Using sketching tools and context menus to precisely position features

4. Tabular Data
   - Know types and structures of tables in ArcGIS
   - Creation and modification of tables
   - Editing fields and calculating new values in tables
   - Querying, calculating statistics, creating summaries
   - Creating joins and relationships between tables

5. Geocoding / Address Matching
   - Geocoding locations based on addresses and reference files

## IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Price, M. 2009. Mastering ARCGIS, Fourth Edition. McGraw-Hill.

## V. EVALUATION PROCESS/GRADING SYSTEM:

| | |
|---|---|
| Assignments | 50% |
| Midterm Test | 25% |
| Final Test | 25% |
| Total | 100% |

**Note: Students must achieve a mark of at least 50% on the Test components AND complete all the assignments to an acceptable level in order to pass the course.**

The following semester grades will be assigned to students:

| Grade | Definition | Grade Point Equivalent |
|---|---|---|
| A+ | 90 – 100% | 4.00 |
| A | 80 – 89% | |
| B | 70 - 79% | 3.00 |
| C | 60 - 69% | 2.00 |
| D | 50 – 59% | 1.00 |
| 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:

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.

## VI. COURSE OUTLINE ADDENDUM:

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