**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY**
**SAULT STE MARIE, ON**

# COURSE OUTLINE

**Course Title: Advanced Analyses in GIS**

**Code No.: GIS 408-4** **Semester: 2**

**Program: Geographic Information Systems (GIS Specialist)**

**Author: Zbigniew Brodzik/Harvey Robbins**

**Date: March 1999** **Previous Outline Date: New**

**Approved:** L. DeRosario — Mar 24/99
**Dean** **Date**

**Total Credits: 4** **Prerequisite(s): none**
**Length of Course: 5hrs x 6 weeks Total Credit Hours: 60**

COURSE NAME | COURSE NUMBER

## I. COURSE DESCRIPTION:

**This course will address a number of advanced issues in GIS. Specifically, the following topics may be covered; point pattern analysis, digital elevation modeling and 3D display, trend surface analysis, spatial interpolation, proximity analysis, and adjacency, neighbourhood, cluster and other analyses. The ARC/INFO modules GRID and TIN will be employed.**

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

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

1) Describe data structure and use functions of GRID and TIN.

Potential Elements of the Performance:

- Describe and use the basic ARC and AP commands to support GRID data
- Describe the functionalities of GRID and TIN and their relationship with the rest of the ARC/INFO software
- Describe the data structures of GRID and TIN
- Convert data into grid format and convert grids to other formats

2) Display data and query topological and non-topological data structure.

Potential Elements of the Performance:

- Use GRID and ARCPLOT commands to display TIN, GRID and image data and to control colour display
- Use the appropriate commands to set the grid environment and to perform data queries

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## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE (Continued)

3) Use introductory GRID Map Algebra

Potential Elements of the Performance

- Describe Map Algebra concepts and syntax
- Perform procedures using GRID operators
- Do conditional processing of grids
- Describe functions at the local, focal, zonal and global levels

4) Perform introductory manipulation and analysis of surface data.

Potential Elements of the Performance:

- Create three-dimensional surfaces
- Use tools that derive drainage networks from elevation grids
- Describe the use of surface generation point interpolation functions

5) Perform introductory analyses to solve spatial problems.

Potential Elements of the Performance:

- Perform a variety of interpolation techniques
- Describe the use of proximity, adjacency and neighbourhood analyses
- Describe selected multivariate methods such as cluster analysis

## III. TOPICS:

1) GRID and TIN features and capabilities 10 hrs.

- GRID and TIN products
- Raster concepts
- Data types
- Data structure
- Data conversion

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2) GRID and TIN basic functions — 10 hrs.

- Managing a session
- TIN, GRID and image display
- Colour control
- Data queries

3) Map Algebra — 6 hrs.

- Map Algebra
- The analysis environment
- Map Algebra operators
- Map Algebra functions

4) Analysis of surface data — 7 hrs.

- Techniques to create 3D surface
- Surface hydrology tools
  -flow direction
  -flow accumulation
  -basin delineation
  -stream delineation

5) Spatial analysis — 7 hrs.

- interpolation techniques
- multivariate analysis
- univariate analysis

## IV. REFERENCE RESOURCES/TEXTS/MATERIALS:

1. Cell-based Modeling with GRID -ESRI
2. GRID Commands -ESRI
3. Surface Modeling with TIN -ESRI

COURSE NAME _____ COURSE NUMBER _____

## V. EVALUATION PROCESS/GRADING SYSTEM

Assignments -70%
Test - 30%

Grading:
A+ >90%
A 80-89%
B 70-79%
C 60-69%
R <60%

## VI. SPECIAL NOTES:

- Special Needs
  If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 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 post-secondary institutions.

- Disclaimer for Meeting the Needs of the Learners

- Substitute Course Information is available at the Registrar's Office.

- Any Other Special Notes appropriate to your course.

## VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following: