SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: Acquiring and Building Spatial Data using ARC/INFO GIS

CODE NO. : GIS4150   **SEMESTER:** F2002

PROGRAM: Geographic Information Systems Applications Specialist

AUTHOR: Kevin Weaver

DATE: Aug., 2002   **PREVIOUS OUTLINE DATED:** June, 2001

APPROVED:

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                   DEAN   **DATE**

TOTAL CREDITS: 5

PREREQUISITE(S): None

LENGTH OF COURSE: 4 hrs x 5 wks, 6 hrs x 10 wks   **TOTAL CREDIT HOURS:** 80

I.   COURSE DESCRIPTION:

This course is designed to develop the student's skills in acquiring and building spatial data and maintaining spatial databases. ARC/INFO GIS software, an industry standard for many basic GIS functions, will be used. Upon completion of the course the student will be able to digitize, convert and edit map data, build topology, perform attribute checks, generate reports and plot output products. Specific attention will be paid to automating GIS tasks using Arc Macro Language (AML).

II.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1.   Use and understand basic ARC/INFO features

Potential Elements of the Performance:
- Navigate through the ARC/INFO environment
- Explain what a coverage is
- Use basic commands for navigation within ARC/INFO
- Use on-line help functions

2.   Demonstrate data capture methods

Potential Elements of the Performance:
- Use ARC commands to display, access, and set the drawing environment
- Prepare digitizers for automation
- Capture features from a map manuscript
- Evaluate the quality of data capture
- Describe alternative data capture methods
- Construct, assess, and modify topology

3.   Bring attribute data into ARC/INFO

Potential Elements of the Performance:
- Create and modify INFO tables
- Link data files to geographic data

4.   Manage databases

Potential Elements of the Performance:
- Describe map projections
- Register maps to real-world coordinates
- Edge match adjacent coverages
- Map network drives and set default directories and links
- Perform routine computer and database maintenance

5.   Perform spatial analyses

Potential Elements of the Performance:
- Prepare data for analyses
- Create buffer zones
- Perform boundary operations and polygon overlays
- Manipulate tabular data

6.   Present ARC/INFO coverages and the results of spatial analyses

Potential Elements of the Performance:
- Determine the purpose of a map
- Design the layout and components of a map
- Use symbols, size and scale effectively
- Create a final map product
- Generate a tabular report

7.   Program macros in ARC/INFO AML

Potential Elements of the Performance:
- Describe ARC/INFO AML programming concepts
- Program macros to perform repetitive ARC/INFO operations
- Use branching and logical expressions, &if and &select directives, DO and WHILE loops and modular and routine programming
- manage character strings, pass data between programs and debug AMLs

8.   Develop ARC/INFO AML menus

Potential Elements of the Performance:
- Program drop-down and form menus
- Link menus and AMLs

III.   TOPICS:

1.   Introduction to Workstation ARC/INFO (6 hours)
- Course overview
- The ARC/INFO environment and commands
- Coverages
- GIS database management, setting default directories and links
- Mapping network drives
- Help sources

2.   Getting spatial data into ARC/INFO (16 hours)
- Setting up the digitizer, digitizer puck buttons
- Setting up the draw environment
- Digitizing and entering tics, arcs, polygons, and label points
- On-screen digitizing and scanning
- Constructing topology, identifying and correcting errors, and reconstructing topology

Theory and practical test #1 – All topics to date

Laboratory #1. Digitizing in ARC/INFO

Laboratory #2. Constructing topology and data editing

3.   Getting attribute data into ARC/INFO (6 hours)
- Creating data files in INFO
- Entering descriptive attributes
- Linking attributes to geographic data

4.   Managing GIS databases (9 hours)
- Registering maps to real-world coordinates
- Edge matching coverages
- GIS database management protocols

Laboratory #3. Adding attribute data and georeferencing coverages

5.   Spatial analysis (6 hours)
- Preparing data for analysis
- Buffer zones and boundary operations
- Performing polygon overlays
- Manipulating tabular data

6.   Creating a map (9 hours)
- Determining the purpose of a map
- Designing the map layout and components
- Defining the size and scale map parameters
- Using symbols and legends effectively
- Creating and plotting a final map
- Generating a tabular report

Laboratory #4.   Spatial analysis and ArcPlot

Theory and practical test #2.   All topics to date

7.   Programming ARC/INFO AML Macros (21 hours)
- Developing an AML
- Variables, functions, directives and system commands
- Accessing programs and menus, creating commands
- Branching and logical expressions
- &IF and &SELECT directives
- DO and WHILE loops
- Character strings
- Passing data between programs
- Routines
- Debugging

8.   ARC/INFO Menus (4 hours)
- Drop-down menu programming
- Linking menus and AMLS

Laboratory #5. AML #1

Laboratory #6. AML #2

Theory and practical test #3 – AML Scripting

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IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

ESRI. 1997. Understanding GIS, The ARC/INFO Method. Version 7.1 for UNIX and Windows NT. Cambridge, Environmental Systems Research Institute, Inc.

Optional:
ESRI. 1997. Arc Macro Language Workbook With CD: for Unix and Windows NT. Cambridge, Environmental Systems Research Institute, Inc.

V.   EVALUATION PROCESS/GRADING SYSTEM:

Grading System:

Laboratories (6)	60%
Theory and practical tests (3)	<u>40%</u>
	100%

The following semester grades will be assigned to students in post-secondary courses:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	3.75
B	70 – 79%	3.00
C	60 – 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see *Policies & Procedures Manual - Deferred Grades and Make-up*).	

NR　　　　　　Grade not reported to Registrar's office.
　　　　　　　　This is used to facilitate transcript
　　　　　　　　preparation when, for extenuating
　　　　　　　　circumstances, it has been impossible for
　　　　　　　　the faculty member to report grades.

VI.　　SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual
impairments, hearing impairments, or learning disabilities), you are
encouraged to discuss required accommodations with your instructor
and/or the Special Needs office. Visit Room E1204 or call Extension 493,
717, or 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.

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

VIII.　DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing)
should obtain a direct credit transfer form from the Dean's secretary.
Students will be required to provide a transcript and course outline related
to the course in question.