

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. : GIS415 **SEMESTER:** F2005

PROGRAM: Geographic Information Systems Applications Specialist

AUTHOR: Kevin Weaver

DATE: June, 2005 **PREVIOUS OUTLINE DATED:** May, 2004

APPROVED:

DEAN

DATE

TOTAL CREDITS: 5

PREREQUISITE(S): None

HOURS/WEEK: 5

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For additional information, please contact C. Kirkwood, Dean

School of Technology, Skilled Trades & Natural Resources

(705) 759-2554, Ext. 688

I. COURSE DESCRIPTION:

This course is designed to develop the student's skills in acquiring and building spatial data and maintaining spatial databases. Industry standard GIS software, ARC/INFO workstation and ArcGIS desktop, 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. Attention will be paid to automating GIS tasks using Arc Macro Language (AML). This course will introduce the student to common GIS tasks in an environment that promotes a greater understanding of processes being performed. This will form the basis for further development in the ArcGIS environment.

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
- Navigate through the structure of ArcGIS

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. Entering and manipulating attribute data

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 ARC/INFO Workstation and ArcGIS Desktop

- The ARC/INFO environment and commands
 - Coverages
 - GIS database management, setting default directories and links
 - Mapping network drives
 - Help sources
 - The ArcGIS environment
2. Getting spatial data into a GIS
- 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
3. Entering and manipulating attribute data
- Creating data files in INFO
 - Entering descriptive attributes
 - Linking attributes to geographic data
 - Working with attributes in ArcGIS
4. Managing GIS databases
- Registering maps to real-world coordinates
 - Edge matching coverages
 - GIS database management protocols
5. Spatial analysis
- Preparing data for analysis
 - Buffer zones and boundary operations
 - Performing polygon overlays
 - Manipulating tabular data

6. Creating a map

- 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

7. Programming ARC/INFO AML Macros

- 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

- Drop-down menu programming
- Linking menus and AMLS

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

ESRI. 1997. Understanding GIS, The ARC/INFO Method. Version 7.2 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:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
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:

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 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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. 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 advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

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.