SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Advanced Geographic Information Systems (GIS)

CODE NO. : NET303 **SEMESTER:** 16W

PROGRAM: Natural Environment & Outdoor Studies

AUTHOR: Gerard Lavoie / Heath Bishop

DATE: Dec, 2015 **PREVIOUS OUTLINE DATED:** Dec, 2014

APPROVED:

Colin Kirkwood — 1st Dec '15

Dean — **DATE**

TOTAL CREDITS: 3

PREREQUISITE(S): NET108

HOURS/WEEK: 3

For additional information, please contact Colin Kirkwood, Dean
Environment, Design and Business
(705) 759-2554, Ext. 2688

I. COURSE DESCRIPTION:

This course builds on introductory GIS skills already obtained in previous courses (NET108). Focus is on effective data creation, collection, management and analysis. Topics covered include: efficient data capture methodology; creating & managing geodatabases; performing spatial analysis; performing 3D analysis; image georeferencing; advanced spatial queries; data manipulation; image processing; raster analysis; vector editing & GPS integration.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Apply knowledge of natural environment practices to plan, create & manage GIS data.

Potential Elements of the Performance:

- Effective geodatabase planning & creation.
- Solve natural environment/management problems using GIS.

2. Use the ESRI ArcMap and ArcCatalog interface effectively

Potential Elements of the Performance:

- Load multiple vector and raster layers.
- Maintain existing ArcMap projects used for data update.
- Perform geoprocessing operations
- Use ArcCatalog to interchange and convert file formats.
- Customize toolbars for efficient usage.

3. Manipulate attribute tables and perform tabular operations.

Potential Elements of the Performance:

- Populate attribute tables
- Add, delete and calculate field records.
- Perform table editing using the Field Calculator

4. Create and print effective layouts and digital presentations.

Potential Elements of the Performance:

- Manipulate layout properties and operations.
- Export layouts to .pdf, or .tif formats for digital storage.
- Cartographic principles exposure.

5. Use ArcToolbox to perform geoprocessing tasks.

Potential Elements of the Performance:

- Analyze spatial data by buffering features, overlaying data and calculating attribute values.
- Merge, dissolve, clip, union, erase, intersect and calculate areas tools to manipulate layers & evaluate results.
- Reproject data for use with GPS units, and also to view within different UTM zones.

6. Integrating GPS field data with GIS Analysis

Potential Elements of the Performance:

- Upload and download waypoints & tracks using DNR Garmin.
- Incorporate GPS data into ArcGIS and Google Earth

7. Georeferencing

Potential Elements of the Performance:

- Understand the theory underlying geroreferencing
- Collect GCPs using appropriate methods
- Create world files
- Rectify imagery

8. Raster Processing

Potential Elements of the Performance:

- Understand the theory underlying the raster datatype
- Perform geoprocessing tasks using rasters
- Perform raster site selection analysis

III. TOPICS:

1. Re-introduction to ArcGIS desktop
2. Customizing ArcMap toolbars
3. Effective geodatabase planning & creation.
4. Symbolizing features and rasters
5. Classifying features and rasters, labeling features
6. Querying data, joining tables
7. Selecting features by location, preparing data for analysis
8. Analyzing spatial data, projecting data in ArcMap
9. Editing features and attributes
10. Geoprocessing using ArcToolbox
11. Making maps for presentation
12. Integrating GPS with GIS
13. Georeference imagery
14. Raster processing and analysis

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Students will receive appropriate handouts covering the course material when necessary.

V. EVALUATION PROCESS/GRADING SYSTEM:

Evaluation will be based on practical tests, a project presentation and assignments.

Quizzes	10%
Practical Tests 2 @ 20%	40%
Exercises/Assignments	40%
Attendance	10%
	100**%**

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

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.

Course Outline:
The Professor reserves the right to change the information contained in this course outline depending on the needs of the learners and the availability of resources.

VII. COURSE OUTLINE ADDENDUM:

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