SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

SAULT COLLEGE

COURSE OUTLINE

COURSE TITLE: Introduction to ArcGIS

CODE NO. : GIS426   **SEMESTER:** ONE

PROGRAM: Geographic Information Systems Applications Specialist

AUTHOR: Heath Bishop

DATE: September 2015   **PREVIOUS OUTLINE DATED:** September 2014

APPROVED: *"Colin Kirkwood"*

               DEAN

TOTAL CREDITS: 4

PREREQUISITE(S): None

HOURS/WEEK: 5

I.   COURSE DESCRIPTION:

As a foundational course in the program, this course provides much more than just an introduction to GIS theory and concepts. Through hands-on application of the industry leading ArcGIS software, students will learn how the various components of the software can be used together to solve complex spatial problems. Specific attention will be paid to the following topics: the ArcGIS interface, data management and geoprocessing, presenting data, manipulating, editing and creating data, attribute and spatial queries, raster analysis and coordinate systems.

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

2.   *Coordinate Systems*

Potential Elements of the Performance:
- Understand the fundamental concepts of geodesy, datums, geographic and projected and coordinate systems
- Learn how to define and project coordinate systems properly
- Troubleshoot coordinate system errors

3.   *Query and 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

4. ***Geoprocessing***

Potential Elements of the Performance:
- Perform geoprocessing tasks within ArcGIS
- Use problem solving to determine efficient methods of geoprocessing
- Use ArcToolbox as means to perform geoprocessing

5. ***Cartography***

Potential Elements of the Performance:
- Apply cartographic design through map creation
- Apply appropriate space, colour and balance to maps
- Understand how to use proper symbology
- Apply labeling and annotation

6. ***Joining Data***

Potential Elements of the Performance:
- Perform spatial and attribute joins to GIS data
- Understand relationship cardinality

7. ***Editing Data***

Potential Elements of the Performance:
- Perform data creation
- Edit existing spatial data using snapping functionality
- Edit and create attribute dat

8. ***Raster Data***

Potential Elements of the Performance:
- Understand basic raster principles
- Work with raster data to solve problems
- Perform site selection analyses

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. Coordinate Systems
   - Datums and Spheroids
   - Projecting on the fly
   - Projecting Data
   - Defining Projections
   - Troubleshooting Coordinate System Errors

3. Tabular Data
   - 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

4. Geoprocessing
   - Various tools such as clip, erase, buffer, union, intersect

5. Cartography
   - Symbology
   - Cartographic Principles
   - Labelling and Annotation
   - Colour, balance and space

6. Joining Data
   - Spatial joins
   - Distance and inside joins
   - How Coordinate systems affect spatial joins

7. Editing Data
   - Snapping
   - Vertices
   - Tolerance Values
   - Stream and point mode digitizing

8. Raster Data
   - Raster format
   - Advantages and disadvantages
   - Raster attribute tables
   - Raster calculator
   - Processing rasters

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

Price, M. 2015. Mastering ARCGIS, Seventh Edition. McGraw-Hill Education.

V.   EVALUATION PROCESS/GRADING SYSTEM:

Quizzes	10%
Assignments	40%
Midterm Test	25%
Final Test	<u>25%</u>
Total	100%

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

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 learner and the availability of resources.

VI.   COURSE OUTLINE ADDENDUM:

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