Course Objectives
This course is designed to introduce graduate students to fundamental concepts and techniques of Geographic Information Systems (GIS). Specific objectives are:
1) to understand the concepts and theory of commonly used GIS spatial analysis functionality;
2) to gain hands-on experience using GIS software and other spatial techniques, and to develop problem solving skills;
3) to complete a GIS project, including data collection, georeferencing, data analysis and output, oral presentation, and report writing.

Course Description
Geographic Information Systems play important roles for many academic disciplines, government organizations and commercial enterprises. GIS applications cover a very wide variety of subject matter ranging from social sciences to environmental sciences, including urban and regional planning, civil engineering, resource management, agriculture, forestry, geology, environmental monitoring, waste management and business.

A GIS is a combination of the computer hardware, software, data, methods and people which provides input, management, retrieval, analysis, and presentation of spatially referenced information. By linking attribute data with maps, a GIS can reveal relationships not apparent using traditional paper maps and item-reference information systems. A GIS provides a powerful tool for spatial analysis, mapping, visualization and communication of information.

This course will cover a variety of topics of interest, including geographic information representation and spatial data entry, spatial analysis functions such as database query, overlay and buffering, multicriteria evaluation, spatial interpolation methods, and geographic database implementation.

By the end of the course, the students should be able to apply what they have learned to their own GIS related research, to solve problems on their own, to learn new functions and to be prepared to continue with more advanced GIS courses.

The course will comprise of a lecture and lab each week. See attached Graphic Course Outline and Schedule. Students will demonstrate grasp of concepts and theory in Home Readings tests. Practical skills will be developed through the use of ArcGIS and extensions. Students may choose to use other GIS software for the project if they wish (e.g. QGIS).
Course Prerequisites
There are no formal prerequisites. Familiarity with Windows environment is required. A general understanding of geography is helpful, but no geography courses are required.

Required Text (available in the bookstore):

Recommended Readings (Will be Provided):
Listed in Appendix A below.

Method of Evaluation:
- Lab Assignments (Five) 35%
- Home Readings Tests (Four) 20%
- Project Proposal 5%
- Project Presentation 10%
- Project Paper 30%

Other requirements
Computer accounts:
You need a computer account to log on the computers in the two computer labs (GISci & Lab – SSC 1316A and/or SDAL lab – SSC 1425). You have 24-hour access to both labs. Please contact Mary Van de Ven in SSC 1008 if you have problems with your computer account.

Computer storage devices:
One USB memory key or other portable storage device for storing your data and results. A CD or DVD disk to submit your final project. *** Make sure to always store and back up your assignment and GIS project folders and files. ***

Print credits:
You will be given some print credits for this course. If you have used all your credits, you may purchase print credits for printing using the B/W laser printer(s) and colour laser(s) printer in the GISci lab.

Late penalty:
Late labs and projects have a penalty of 2% per day. Labs/projects submitted more than 1 week late will not be accepted.

Attendance:
You should study the weekly readings and attend all the lectures and labs. Active participation in lectures and labs, e.g. via questions and discussion, is encouraged.

GIS Project:
*Step 1: Selection of a topic (Feb. 4th, 2015)*

*Step 2: Preparation of the data base*
If data are already in digital format, you need to import data, do proper format conversion and georeference your data. In other cases, you will have to digitize your maps, or collect field data.

*Step 3: Project proposal (Due March 4th, 2015)*
The proposal should include: (1) the title; (2) brief introduction; (3) description of data sources; (4) what methods do you plan to use; and (5) what are the expected results.

*Step 4: Oral Presentations (April 6th & 8th, 2015)*
Step 5: Project report (Due Apr. 8th, 2015)
Submit a written report of your project along with the results you have produced. The written report must be typed, double space, around 10 pages plus figures and tables. It should include the following:
• A title (Followed by your name, affiliation and date)
• Introduction (including statement of project objectives and a brief literature review).
• Data description (including discussion of the data used, rationale for selecting the variables for input to GIS, sources of data, and any problems /limitations of the data/data sources used, description of data format, any conversion between data format involved and why this is necessary)
• Methods (including the procedures of the project, description of GIS functions used in the project and the principles behind them)
• Data analysis and interpretation of the results
• Conclusions
• Acknowledgement if applicable
• References

SCHOLASTIC DISCIPLINE FOR GRADUATE STUDENTS
SCHOLASTIC OFFENCES
Members of the University Community accept a commitment to maintain and uphold the purposes of the University and, in particular, its standards of scholarship. It follows, therefore, that acts of a nature that prejudice the academic standards of the University are offences subject to discipline. Any form of academic dishonesty that undermines the evaluation process, also undermines the integrity of the University’s degrees. The University will take all appropriate measures to promote academic integrity and deal appropriately with scholastic offences.
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

See Graphic Course Outline and Schedule
<table>
<thead>
<tr>
<th>Term Week</th>
<th>Lecture Period</th>
<th>Assigned Readings (Chapter Headings)</th>
<th>Lab</th>
<th>Deliverable Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jan 5-11</td>
<td>Introduction to the Course</td>
<td>1 Introduction</td>
<td>Assignment 1 Brief</td>
<td></td>
</tr>
<tr>
<td>2 Jan 12-18</td>
<td>Introduction to GIS</td>
<td>2 Coordinate Systems, GIS Data Models</td>
<td>Lab Clinic</td>
<td>Assignment 1</td>
</tr>
<tr>
<td>3 Jan 19-25</td>
<td>Coordinate Systems, GIS Data Models</td>
<td>3 Vector Data Model, 4 Raster Data Model</td>
<td>Assignment 2 Brief</td>
<td></td>
</tr>
<tr>
<td>4 Jan 26-Feb 1</td>
<td>Spatial Data Input, Project Topic Brief</td>
<td>5 GIS Data Acquisition, 6 Geometric Transformation</td>
<td>Assignment 3 Brief</td>
<td>Assignment 2</td>
</tr>
<tr>
<td>5 Feb 2-8</td>
<td>Attribute Data Input and Vector Analysis</td>
<td>8 Attribute Data Management, 11 Vector Data Analysis</td>
<td>Assignment 4 Brief</td>
<td>Project Topic</td>
</tr>
<tr>
<td>4 Feb 9-15</td>
<td>Raster Analysis</td>
<td>12 Raster Data Analysis</td>
<td>Project Proposal Brief</td>
<td></td>
</tr>
<tr>
<td>7 Feb 16-22</td>
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<td></td>
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<tr>
<td>8 Feb 23-Mar 1</td>
<td>Cartography, Geovisualization, Graphic Design</td>
<td>9 Data Display and Cartography</td>
<td>Assignment 4 Brief</td>
<td>Assignment 3</td>
</tr>
<tr>
<td>9 Mar 2-Mar 8</td>
<td>Exploratory Data Analysis and Related Methods</td>
<td>10 Data Exploration</td>
<td>Assignment 5 Brief</td>
<td>Assignment 4</td>
</tr>
<tr>
<td>10 Mar 9-15</td>
<td>Terrain Modeling</td>
<td>13 Terrain Mapping and Analysis</td>
<td>Project Clinic: Counseling and Supervised Lab Work</td>
<td>Assignment 5</td>
</tr>
<tr>
<td>11 Mar 16-22</td>
<td>Problem Solving and Modeling</td>
<td>18 GIS Models and Modeling</td>
<td>Project Clinic: Counseling and Supervised Lab Work</td>
<td></td>
</tr>
<tr>
<td>12 Mar 23-Mar 29</td>
<td>Special Topics, e.g. Interpolation, Network, Watershed, Watershed Analysis, etc.</td>
<td>15 Spatial Interpolation, 17 Least-Cost Path Analysis and Network Analysis</td>
<td>Project Clinic: Counseling and Supervised Lab Work</td>
<td></td>
</tr>
<tr>
<td>13 Mar 30-Apr 5</td>
<td>Topics from External Readings</td>
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<tr>
<td>14 Apr 6-12</td>
<td>Student Project Presentations</td>
<td>Course Wrap-Up</td>
<td>Student Project Presentations</td>
<td>Final Project: Paper, PPT and SDB</td>
</tr>
</tbody>
</table>

Spring Break

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Appendix A: Recommended Readings (Will be Provided):


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