Course Content and Topics:
The course provides an introduction to Geographic Information Systems (GIS). Topics include:
- Overview of GIS concepts and capabilities
- Vector and raster data models
- Data input and output; map digitizing
- Spatial data structures and formats
- Spatial data queries, manipulation and management
- GIS analysis and modelling functions
- Spatial interpolation and digital elevation models
- Applications and implementation of GIS
- Error assessment and data quality issues

Approach
The course involves lectures and laboratory exercises. Lectures focus on concepts, theory and principles, while lab exercises emphasis the practical application of GIS.

    Lectures (Room 121 MCKN): 12:30 pm – 1:20 pm  M, W
    Labs (Room 231 Hutt): 
      1. 7:00 pm – 9:50 pm Monday
      2. 7:00 pm – 9:50 pm Tuesday
      3. 7:00 pm – 9:50 pm Wednesday
      4. 7:00 pm – 9:50 pm Thursday

Learning Objectives:
By the end of the course, you will have acquired the following:
- a basic understanding of the encoding, manipulation and analysis of spatial data
- knowledge of the primary capabilities and applications of GIS in the context of spatial problem-solving and decision-making.
- familiarity with the ArcGIS software program and a range of analytical functions.
- the background necessary to critically assess GIS analyses encountered in employment or research situations.

Text Book:
An Introduction to Geographical Information Systems by Ian Heywood, Sarah Cornelius and Steve Carver. 2011 (4th edition). Note: the 3rd edition is fine too, if you can get a used one. Required.
The following free online resource is also useful:
**Prerequisite**
GEOG*2480 (Mapping & GIS) is a required prerequisite for this course. If your ArcGIS skills feel a little rusty, please take the time to review the first chapters of the *Introduction to ArcGIS* tutorial book which were covered in GEOG*2480.

**Method of Evaluation**
- Five lab exercises 50%
- Midterm Test (Mon., Oct 23, 2017) 20%
- Final Exam 30%
- 100%

**Mid-Term and Final Examination**
The mid-term test and final examination cover all of the course material up to the date on which they occur. This includes lectures, labs and all assigned readings.

**Laboratory Exercises**
The labs are designed to introduce basic GIS operations and to teach problem-solving skills. The labs require solving a variety of spatial problems using the ArcGIS software program and its extension, Spatial Analyst. By completing the labs, students will gain practical experience in using these programs to create and edit data sets, manipulate and analyze data, and generate maps that communicate spatial information effectively. At the same time, you will lay the foundation for learning any other GIS software.

All of the labs require that you submit your own work. It’s OK to lean the program with a classmate, or ask other people for help when you run in to trouble – in fact, that is a good way to learn. However, **the labs that you submit must be the product of your own effort**. You’re required to keep back-up copies, usually on the departmental file server (you will be shown how to do this), as dated proof of your own work.

Depending on your experience, you will have to invest time into learning ArcGIS, using the course manuals as guides. Problems in labs often occur because students are unfamiliar not only with ArcGIS, but with the computer operating system. Please take the time you need early in the course to learn to properly load, save and copy your files. It will save you hours later on!

Once you completed the tutorials and know the software, you should be able to complete the labs in 4 to 6 hours each. However, it may take you much longer if you combine learning the program with doing the labs. **Therefore, until you are comfortable using the computer and the software, you should plan on spending a lot of time learning the basics.** You are given two weeks to complete the labs; don't make the mistake of only beginning the lab in the second week!

**Lab Periods and Office Hours**
Teaching Assistants (TAs) will be available for help during your assigned lab time and during their scheduled office hours. You are expected to regularly attend your assigned section but feel free to visit any of the TAs for help during their office hours.
The labs take place in Room 231 of the Hutt building. The facilities will be available outside regular lab times on a first-come, first-served basis. A schedule will be posted on the door of Room 231. After the first week of classes the labs will be open from 12 noon to 5:00 pm on weekends. Note that the computers in Room 236 are set up in a similar fashion to those in Room 231 and may be used if that room does not have a schedule lab in progress.

You must attend your assigned lab period. If you miss your lab for a valid reason, attend another session and let the TAs know about the temporary switch. Always hand your finished labs in to the same TA. Once the course is full, you may not change your lab period without permission of the instructor.

**Late Labs:**
Lab exercises are due at the beginning of the lab period during the week indicated on the lab schedule. Late labs will be penalized at the rate of 10 percent of the assignment’s value per day, including Saturday and Sunday. Students whose assignments are late because of a valid medical reason, family emergency, or other reason accepted by the instructor will not be penalized. **Late labs must be handed personally to the TA or instructor.**

**Lab Fee:**
There is a $30.00 lab fee associated with this course. This covers the cost of two lab manuals ($10 each) and colour printing. When you pay your lab fee, a printing account will be set up for you with a $10.00 printing credit. Printing charges will be deducted at a rate of 15¢ per page. This is intended to cover the printing that will be required for this course only. Students must provide their own memory stick to back up their work, although space on the departmental network will be provided for this purpose as well.
<table>
<thead>
<tr>
<th>Lab</th>
<th>Title</th>
<th>Handout</th>
<th>Due</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab 1</td>
<td>Spatial Queries and Data Manipulation</td>
<td>Sept 18</td>
<td>Oct 2</td>
<td>ArcGIS</td>
</tr>
<tr>
<td>Lab 2</td>
<td>Spatial Analysis in a Vector Environment</td>
<td>Oct 2</td>
<td>Oct 16</td>
<td>ArcGIS</td>
</tr>
<tr>
<td>Lab 3</td>
<td>Map Digitizing and Digital Elevation Models</td>
<td>Oct 16</td>
<td>Oct 30</td>
<td>ArcGIS and Spatial Analyst</td>
</tr>
<tr>
<td>Lab 4</td>
<td>Spatial Analysis in a Raster Environment</td>
<td>Oct 30</td>
<td>Nov 13</td>
<td>ArcGIS and Spatial Analyst</td>
</tr>
<tr>
<td>Lab 5</td>
<td>Advanced Spatial Analysis</td>
<td>Nov 13</td>
<td>Nov 27</td>
<td>ArcGIS and Spatial Analyst</td>
</tr>
</tbody>
</table>
University of Guelph Policy Statements:

**E-mail Communication**
As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

**When You Cannot Meet a Course Requirement**
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

**Drop Date**
The last date to drop one-semester courses, without academic penalty, is November 3rd, 2017. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar.

**Copies of out-of-class assignments**
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

**Accessibility**
The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/

**Academic Misconduct**
The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar.

**Recording of Materials**
Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

**Resources**
The Academic Calendars are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

An example of academic misconduct that might occur in this course is to copy an answer, on an exam or lab exercise, from another student. Each student must create their own digital files for computer-based exercises.