GEOG 214 **Winter 2004**
DIGITAL GEOMATICS

Instructor

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Course Description

The course introduces students to the basics of digital geomatics including geographic information systems and digital remote sensing.

Learning Outcomes

On completion of the course students should be able to:

- demonstrate an understanding of the basic concepts in digital geomatics, including concepts in GIS, digital mapping and database systems, and digital remote sensing
- demonstrate an ability to handle spatial data through the application of GIS and remote sensing software

Text

The following two texts are available in the college bookstore.
Ian Heywood, An Introduction to Geographical Information Systems. 2002. Prentice Hall

Geography 214 Digital Geomatics: Course Manual

In addition, the Canada Centre for Remote Sensing (CCRS) has an on-line tutorial *Fundamentals of Remote Sensing*
http://www.ccrs.nrcan.gc.ca/ccrs/learn/tutorials/fundam/fundam_e.html
Several chapters from the tutorial form the basis of the remote sensing material discussed in the course.

Text Support

The Heywood text provides a set of multiple choice questions for each chapter at the website www.booksites.net/heywood. Click *An Introduction to Geographical Information Systems second edition,* click *Student Resources*. Students are strongly encouraged to use these questions to test their understanding of the concepts introduced in each chapter. Many of these questions will form part of the in-class tests.

Evaluation

Evaluation is based on a series of tests, lab and class exercises and a project.
Tests. Thre is a mid-term (20%) and a final test (30%). The format of the two tests will be discussed in class.

Lab and class exercises. All lab and class exercises are due the following week at Thursday's class.
Definitions exercise. Students prepare a crossword based on remote sensing and GIS definitions. There are several internet sites offering crossword facilities, e.g., http://puzzlemaker.school.discovery.com/; www.eclipsecrossword.com
Assignment due in class on April 8.
Project. Students use GIS and remote sensing software in problem solving.

Assignments handed in late will have a **10% penalty** and assignments over one week late will not be accepted.

Evaluation summary

Tests I and II	50%
Lab and class exercises	40%
Final project	10%

Topic Outline

Week of

Jan 5
Introduction to the course
What is digital geomatics?
What is GIS?
Heywood, Ch. 1

GIS Lab 1: Creating an ArcView Project

Jan 12
Spatial data I
Heywood, Ch. 2

GIS Lab 2: Projections

Jan 19
Spatial data II
Collecting spatial data: GPS data, Census data
Heywood, Ch. 2

GIS Lab 3: Spatial data

Jan 26
Spatial data III: Remotely sensed data
Introduction to remote sensing science
Satellites and sensors
Handling remotely sensed images

CCRS, Ch. 1 Introduction; Ch. 2 Sensors

Remote sensing Exercises 1, 2, and 3

Feb 2	Spatial data modelling: vector data Heywood, Ch. 3 GIS Lab 4: Vector Data
Feb 9	Spatial data modelling: raster data READING BREAK (No class Feb 13)
Feb 16	**Test** GIS Lab 5: Raster Data
Feb 23	Attribute data management Heywood, Ch. 4 GIS Lab 6: Working with attribute data
March 1	Data input and editing Introduction to Project Heywood, Ch. 5 GIS Lab 7: Data input
March 8	Data analysis Heywood, Ch. 6 GIS Lab 8: Raster analysis
March 15	Data analysis Heywood, Ch. 6 GIS Lab 9: Vector analysis
March 22	Image analysis Image georectification: preprocessing images for analysis CCRS, Ch. 4 Image Analysis Remote sensing Exercise 5 and 6 Image enhancement and classification The concept of spectral similarity and the use of categorization and post-categorization enhancement in multispectral imagery Remote sensing manual Exercises 6 and 8 **Remote sensing project** Analyzing ozone damage to milkweed plants

March 29 Image analysis
Image transformation
The use of spectral ratioing (vegetation index) and image subtraction (temporal change)

CCRS, Ch. 4 Image Analysis; Ch.5 Applications

Remote sensing Exercises 7 and 9

Remote sensing project
Analyzing stress in soybean crop

April 5 Output: from new maps to enhanced decisions
Heywood, Ch. 8
GIS Lab 10: Spatial analysis

GIS project
Analyzing neighbourhood demographics in Victoria
Analyzing temperature patterns in BC

GRADING SYSTEM

95 -100% A+	
90 - 94% A	Superior levels of achievement
85 - 89% A-	
80 - 84% B+	
75 - 79% B	High levels of achievement
70 - 74% B-	
65 - 69% C+	Satisfactory level of achievement
60 - 64% C	Sufficient level of achievement
50 - 59% D	Minimum level of achievement
0 - 49% F	Minimum level is not achieved