CIEE Perth, Australia

Course title:	GIS for Conservation
Course code:	GEOG 3001 PEAU
Programs offering course:	Biology and Ecology Field Studies
Language of instruction:	English
U.S. semester credits:	4
Contact hours:	60
Term:	Fall 2020

Course Description

This course will provide students with a hands-on introduction to geographical information systems (GIS) and remote sensing as used in conservation biology. The course encourages spatial thinking and understanding of the environment, explores geographic data sources, and focuses on basic skills in spatial data analysis. Course topics include data sources, map projections and reference systems, spatial data analysis, map construction and raster analysis. Practical exercises allow students to use important techniques in real-world applications.

Learning Objectives

By completing this course, students will:

- Have an operational familiarity with GIS and remote sensing having worked through several example exercises.
- Use your skill and understanding of the subject to undertake modest projects using GIS and remote sensing.

Course Prerequisites

No prerequisites are required

Methods of Instruction

This course will be taught through a series of lectures, prelab sessions and hands-on practical exercises using GIS software.

Course schedule is subject to change due to study tours, excursions, and local holidays. Final schedules will be included in the final syllabus provided to students on site.

Assessment and Final Grade

1.	GIS 1	10%
2.	GIS 2	15%
3.	GIS 3	40%
4.	Exam	35%
	TOTAL	100%

Course Requirements

GIS 1

Ex 1-2

GIS 2

Ex 3-6

GIS 1 & 2: These consist of questions based on the set of guided exercises. Some answers draw on the understanding of theory, while other questions may require making a map or tabular summary of your results. We recommend that you record your progress by keeping a laboratory notebook. GIS practitioners develop this habit of noting down how to achieve outcomes. In the long term this saves time as the process is clearly set out. They can refer to the notes and not have to relearn by trial and error. Your lab notebook will also be an excellent resource for the practical test. As well, it can take time to learn and feel comfortable with a new skill. We recommend maintaining steady progress throughout the term.

For each exercise you should submit:

a) A brief introduction and description of the methods.

b) A table detailing any new modules/functions (i.e. not used before in other exercise). You should list in the left hand column the name of the module and in the right hand column an explanation of the purpose of the module, in your own words. (The marks will vary between exercises, up to a maximum of 2 marks.) This is a great way to summarise your work.

c) Answers to questions listed in the lab manual for each exercise (the marks vary for each exercise and question). These answers should be fairly comprehensive and you should demonstrate your understanding of the principles behind the techniques we will be exploring. You may choose to illustrate your answers by inserting images or tables. Simple: ”yes, no” or a listing of numerical values will not be accepted as satisfactory answers. In addition, think strategically about what style of figure or table organization will most effectively convey the answers to the questions.

d) The GIS1-2 exercises vary in the complexity and in the effort required to complete them. The marks employ a weighting system that gives proportionally more “points” for more difficult or time-consuming questions.

GIS 3

Ex 7 & 8

Exercise 7 and 8 are partially guided and contain a set of problems and questions you need to address in your submission. All data required for these exercises have been either provided or you will create them using data supplied. Unlike exercises 1-6 which are very structured, you will have a lot more flexibility in the way you approach problem solving and presenting your final results for these two exercises. Again, you will need to submit a summary of modules used, brief introduction and methods section as well as address the questions and tasks as described in the notes.

For exercise 8 you will also prepare a 10 slide power point presentation. More information on the content and questions is included within the document about exercise 8.

Power Point Presentation:

Annotated PowerPoint file. This must be:

- Ten (10) PowerPoint slides (you will present it during last week of teaching (week 3) and submit them for assessment).
- The slides must be in Landscape (not Portrait) mode.
- The slides need to be explained with succinct PowerPoint notes below each slide. Refer to Figure 1 to see where you must write your notes.

The content should cover the following:

- Your name and unit code included on the first slide.
- The research question or hypothesis.
- Methods and data used.
- Results.
- Discussion and conclusions.
- Any difficulties or limitations of the study.
- The final slide (10th) must be a poster. It should include a title, a summary of the main points made in the other nine slides, at least one GIS generated map, a conclusion, and your name and the date.
- Posters should be standalone. In other words, someone who has only seen the poster should still have a fairly complete understanding of the project.
- The notes section of the poster slide should contain a short, informal paragraph reflecting on your learning experience and accomplishments in the course. Think back to your knowledge of GIS and remote sensing at the beginning of the teaching week, contrast it with your levels of skill and understanding now at the completion of your final project, and consider the learning strategies you pursued along the way. You can use the following questions to guide your reflective paragraph:
- What was your biggest accomplishment in the course? How did the exercises and other course elements help you reach it?
- What challenges did you face in completing the project? How did you address them?
- How does the project illustrate your intellectual development in this course and growing mastery of GIS and remote sensing?
- Describe your learning process throughout the course and what it felt like at different stages until you mastered certain skills. Discuss the skills you are still developing. What changes to your learning process might have helped you to gain these skills more smoothly?

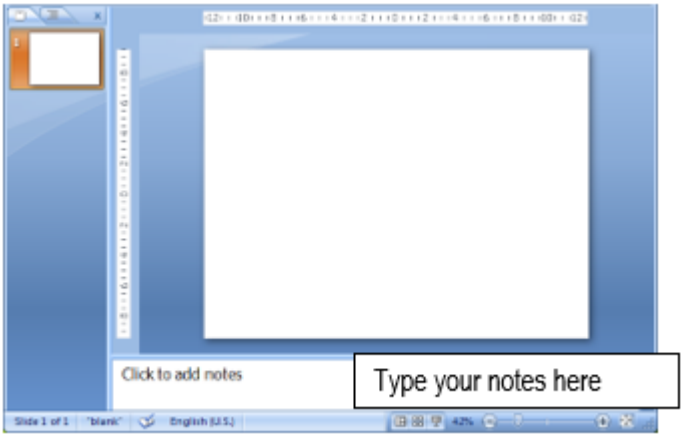

Figure 1: Notes for your PowerPoint slides are made below the slide when you are in Normal view.

Exam

You need to pass this component.

The final exam is a closed book written paper of 2 h duration and 10 minute reading time. It is based on the material presented during the lectures, lab session and readings detailed in the teaching materials. Its primary focus is on the theory rather than practical use of the software.

Attendance

Weekly Schedule

Week 1

Class 1.1 .

Introduction to GIS – theory and concepts

(De Smith, Goodchild, and Longley, 2015)

Class 1.2 .

GIS data models, data formats and types

(De Smith, Goodchild, and Longley, 2015)

Class 1.3 .

Coordinate systems and georeferencing, simple data analyses.

(De Smith, Goodchild, and Longley, 2015)

Assessment due: GIS 1 assignment

Week 2

Class 2.1 .

GIS data analysis,

(MacLeod, CD, 2015)

Class 2.2 .

GIS interpolation

(MacLeod, CD, 2015)

Class 2.3 .

Introductory remote sensing

(MacLeod, CD, 2015)

Assessment Due: GIS 2

Week 3

Class 3.1 .

GIS for sampling design using marine habitat example

(Schmandt, 2009)

Class 3.2 .

Investigation of terrestrial habitat for small marsupial using vector and raster data including satellite imagery

(Schmandt, 2009)

Class 3.3 .

Investigation of terrestrial habitat for small marsupial using vector and raster data including satellite imagery

(Schmandt, 2009)

Assessment Due: Complete exercise 7

Week 4

Class 4.1 .

Revision and reflection. Oral presentation of exercise 8 using Power Point slides.

Assessment Due: Complete GIS 3 exercise 8 Oral Presentation

Course Materials

Readings

De Smith, MJ, Goodchild, MF and Longley PA, 2015 Geospatial analysis, a comprehensive guide to principles, techniques and software tools http://www.spatialanalysisonline.com/HTML/index.html

MacLeod, CD, 2015 GIS for Biologists: A Practical Introduction for Undergraduates. Pictish Beast Publications.

Schmandt, M, 2009 GIS Commons: An Introductory Textbook to Geographic Information Systems. (http://giscommons.org/)