FACULTY OF SCIENCE

School of BEES

GEOS2821

Introduction to GIS and Remote Sensing

Term 2, 2022

Table of Contents

1 Information about the Course 3
2 Staff Involved in the Course.....3
3 Course Details 4
4 Rationale and Strategies Underpin] TJETQq0s71 0 595.32 842.04 reW* nBT/F1 12 Tf1 0 0

Faculty of Science - Course Outline

1 Information about the Course

3 Course Details

Course Description[2] (Handbook Entry)	There has been a rapid growth in the use of digital spatial data in many areas of resource management and the environmental sciences. The aim of this course is to provide both a solid theoretical understanding and a comprehensive practical introduction to the use of geographic information systems and remote sensing in the analysis of digital spatial data, simple modelling using digital spatial data, and in decision support using commercially available software. Topics covered in the course provide an overview of the use of digital geographic information and earth-resource imagery for a wide range of environmental applications including geology, vegetation and forestry, agriculture, oceanographic and regional and urban analysis.
Course Aims	The main objective of this course is to provide students with the principles of how to manage and use GIS and Remote Sensing to work with real world issues. This is both to aid in the management of those issues, and also to gain a better understanding of them.
Student Learning Outcomes	By the end of this course you will be expected to understand how and why it is that geographic data are input, stored and manipulated using a GIS, and how to obtain, process and analyse remotely sensed -15(ap)4e97.11 397.39 114.8 684(en)4(s)-5(e)-9(d

Graduate Attributes Developed in this Course	
Science Graduate Attributes[5]	

6 Assessment Tasks

Task	

7 Additional Resources and Support

Text Books	These will not be used as standard textbooks we follow in the course. They are reference texts to begin a search across the broader literature. **Primary references:** **Burrough, P.A., McDonnell, R.A. and Lloyd, C, 2015.** Principles of Geographical Information Systems, 3rd edn. Oxford University Press. **Delaney, J. and Van Niel, K.P., 2007.** Geographical Information Systems, An Introduction, 2nd edition. Oxford University Press. **CRCSI (2017)** Earth Observation: Data, Processing and Applications. (Eds: Harrison, B.A., Jupp, D.L.B., Lewis, M.M., Forster, B.C., Mueller, N., Phinn, S., Coppa, I., Hudson, D., Smith, C., Grant, I., Anstee, J., Dekker, A.G., Ong, C., and Lau, I.) CRCSI, Melbourne. Open source, online. https://www.eoa.org.au/earth-observation-textbooks. We will use: selected sections of Volume 1A, Volume 1B, volume 2A, 2C, 2D. **Other references:** **Longley, P.A., Goodchild, M.F., Maguire, D.J. and Rhind, D.W., 2015.** Geographic Information Systems and Science, 4th edn. Wiley. **Krygier, J. and Wood, D., 2016.** Making maps A visual guide to map design for GIS, 3rd edn. The Guilford Press. **Khorram, Siamak, van der Wiele, Cynthia F, Koch, Frank H, Nelson, Stacy A. C & Potts, Matthew D 2016,** Principles of Applied Remote Sensing, Springer International Publishing AG, Cham. E-book access through UNSW library
Course Manual	Lab instructions and course notes will be made available on Moodle.
Readings	These are listed in the lecture notes and on the course web site on Moodle. Others are available, or will be made available, through the

10 Administrati

13 **Marking criteria for the Software Training**

The online courses can be accessed through https://www.esri.com/training/catalog/search/ . You will be given a login to the arcgis.com system that will enable access.

You must use the account you are sent, even for the free-to-access courses. We cannot assess completions for personal accounts, and therefore cannot award any marks.

The links below should work, but if not then s
GIS Pro This will reduce the number of courses to select from.

The courses to enrol in, and the order in which they are to be completed, are:

1. ArcGIS Pro Basics
2. Processing Raster Data Using ArcGIS Pro
3. Building Geoprocessing Models Using ArcGIS Pro

The training includes multiple choice quizzes at the end of each component.

Marks will be assigned based on completion by the assessment date in the timetable. For example, if you have successfully completed two of the three components by their respective due dates then you will be awarded 2/3=66.7% of the total marks for this piece of assessment.

And just to reiterate **you must ensure you have logged in using your assigned account when doing these courses, as otherwise we cannot see that you have completed the course**.

If you are not sure of the course completion status then you can check through https://www.esri.com/training/my-activity-record/ . This can also be accessed through the training web site using the link My Academy -> My Learning Activity.

Any components not completed by their due dates must still be completed by the end of term.

Access to the training will be allocated via an invitation to the UNSW organisation on the arcgis.com system, after which you can self

14 Marking criteria for the Remote Sensing Image Analysis Report

Details will be provided on Moodle.

15 Marking Criteria for the Major Report

Guidelines for structuring and writing the report are available on Moodle, as is the consultancy brief document.

The approach used in marking is based on Biggs' (2003) Structure of the Observed Learning Outcome (SOLO) taxonomy (table 1). There is also a set of words that describe the grades and marks (table 2). Reading these tables should aid your understanding of what I am looking for in your projects in relation to the specific marking criteria.

Table 1. Biggs' SOLO taxonomy. This is a hierarchical taxonomy, listed from lowest to highest level. Achieving a higher level implies exceeding the lower levels. There is also no direct translation between grades and SOLO levels, as it depends on the level of the course and the nature of the assignment.

Level	*Verb examples*
Prestructural	Misses the point
Unistructural	Identify, do simple procedure
Multistructural	Enumerate, describe, list, combine, do algorithms
Relational	Compare/contrast, explain causes, analyse, relate, apply
Extended abstract	Theorise, generalise, hypothesise, reflect

Table 2. Grade and mark interpretation

Grade	*Mark*	*Description*
High Distinction	85+	Work of exceptional quality showing clear understanding of the subject matter and appreciation of issues; well formulated; arguments sustained; maps and diagrams where relevant; relevant literature referenced; marked evidence of creative ability; solid intellectual work.
Distinction	75-84	Work of very high quality showing strong grasp of subject matter and appreciation of dominant issues, though not necessarily of the finer points; arguments clearly developed; relevant literature referenced; evidence of creative ability; solid intellectual work.
Credit	65-74	Work of solid quality showing competent understanding of subject matter and appreciation of main issues, though possibly with some lapses and inadequacies; arguments clearly developed and supported by references, though possibly with minor red herrings and loose ends; some evidence of creative ability; well prepared and presented.
Pass	50-64	Adequate answers; reasonably relevant and accurate. Sufficient to merit a bare pass to safe pass mark.
Fail	<50	

References

Biggs, J. (2003) *Teaching for Quality Learning at University*, second edition. Society for Research into Higher Education & Open University Press, Buckingham, UK.

Multistructural. More generally, to achieve a pass you must implement the models as instructed and show that you understand what you have done. To achieve a High Distinction you must have implemented some innovations of your own (gone beyond the instructions). Very well written reports that clearly show an understanding of what has been done, but that contain no innovations, will receive a maximum grade of Distinction.

Throughout your project report you are expected to demonstrate an understanding of:

1. the meaning of your results,
2. the rationale for doing it,
3. potential sources of error and their impact on your conclusions.

I will also be looking for:

1. *Clarity*

   Clear, simple, grammatical language used. All terms are explained.

2. *Argument and structure*

   Is the argument clearly and logically developed through the report? Are the points in the appropriate sequence (do your points build on previous points presented)?

3. *The wider scope*

   Do you place your work in the context of the broader, peer reviewed, literature? *You should have no fewer than ten peer reviewed references*. More than this number is provided to you in the lab notes so it is a simple target to achieve.

4. *Map composition and diagrams*

   Are they clear and do they display the desired information? Are they used to support your arguments and not purely as decorative material? Do your maps have a scale bar, north pointer and legend? Are appropriate and consistent colour schemes used?

5.

https://www.it.unsw.edu.au/students/software/index.html. Learning how to use this software will make writing assignments much easier, and will solve most of your problems with referencing formats (so long as your database is correct). Most online databases now allow you to export references directly into EndNote, so constructing a database is reasonably simple.

Be careful when using web sites as a source of information. If they summarise another piece of work, then you should read and cite the original piece of work (the primary reference). This applies to lecture notes DO NOT USE LECTURE NOTES AS REFERENCES. Use the references provided in them. In general, you should not use web sites unless they are an official publication. Wikipedia is a good example here. It is a very useful resource for locating further information, but it is not a primary reference. The same principle applies to any printed encyclopaedia.

16 Useful Journals and Conference Proceedings

GIS is a rapidly developing field, and so many useful references are available in journals and conference proceedings. Fortunately for you, these are typically on the web. Most lectures will have references in the notes.

This is not a complete list, and you should search for other references using databases like Scopus