THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY · 2052 · AUSTRALIA

SCHOOL OF SURVEYING & SPATIAL INFORMATION SYSTEMS

GMAT 2210

Geographic Information Systems II

Course Outline – Session 2, 2009

Version: 3/07/2009

This document, and other material, is available at the Course Website:
http://www.gmat.unsw.edu.au/gmat2210

(User name and password supplied in class)

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1. Staff involved in the Course and their Contact Details

1.1 Lecturer: Dr Samsung Lim

Office: EE406 (by appointment)
Email: s.lim@unsw.edu.au Phone: 9385 4505

1.2 Lab Supervisor: Ms Stesha Doku

Office: EE414
Email: s.doku@unsw.edu.au Phone: 9385 4190

1.3 Staff absences during session:

In Week 7, there will be a mid-term quiz run by the lab supervisor while the lecturer is away for the IAG conference. In the circumstances of absences the lecturer can be contacted by email at the above email address. Also, on campus assistance with this course can be obtained from the lab supervisor during the period.

2. Educational Aspects of the Course

2.1 How this course relates to others in the program

GMAT 2210 is intended to introduce basic-level GIS skills to students. GIS is a multidisciplinary and interdisciplinary field built out of knowledge from geography, cartography, computer science, and mathematics. The basics of cartography, geodesy, and computer programming will be covered in the classroom to help students to build up the foundations of GI-Science. Study of spatial representation, georeferencing, data accuracy, data models, data structures and data processing are necessary for students to investigate further the advanced areas of GIS in their future career.

More advanced topics will be further discussed in GMAT 3210 where generic algorithms and fundamental theories as well as techniques and practical applications in GI-Science will be studied.

2.2 Aim of the Course

This course aims to provide the practical training that needs to be understood to work effectively and critically with GIS. Concepts and definitions of spatial information systems, coordinate systems, mapping and spatial issues, data structures including vector, raster and surface odeling. Inputting both spatial and attribute data to the GIS. Transformation of data between coordinate systems, re-projection of map coordinates. GPS-based image registration. Geo-databases. Editing data and creating topologically clean data. Tagging spatial data with attributes, linking spatial data to attribute databases. Use of basic analysis functions: spatial selection, attribute selection, making reports of spatial and attribute data, interfacing to the system using a high level language. Use of the World Wide Web to disseminate information.

2.3 Learning Outcomes

By the end of this session students should be able to develop simple data models for use in many GIS applications. Learning outcomes include 1) an understanding of the concepts and definitions of spatial systems, coordinate systems, mapping and spatial issues with maps, data structures including vector, raster and surface modelling, 2) capability to build geo-databases and analyse spatial data, 3) ability to design a Web-based GIS.

2.4 Teaching Strategies

This course is based on a 1-hour lecture plus 3-hour lab per week. Lectures are designed to learn generic algorithms and fundamental theories, and lab exercises are to learn basic techniques and practical applications.

2.5 Suggested Learning Methods

This course requires computer skills (ArcGIS, Visual Basic, Web-programming, etc.) Students should strengthen their knowledge in these fields by themselves beforehand.

2.6 UNSW Graduate Attributes

This course provides an environment that fosters in our students the following attributes is listed:

the skills involved in scholarly enquiry	Significant
an in-depth engagement with relevant disciplinary knowledge in its interdisciplinary context	Significant
the capacity for analytical and critical thinking and for creative problem solving	Significant
the ability to engage in independent and reflective learning	Some
the skills to locate, evaluate and use relevant information (Information Literacy)	Some
the capacity for enterprise, initiative and creativity	Some
an appreciation of and respect for, diversity	Some
a capacity to contribute to, and work within, the international community	Some
the skills required for collaborative and multidisciplinary work	Some
an appreciation of, and a responsiveness to, change	Some
a respect for ethical practice and social responsibility	Significant

3. Proposed Course Schedule (3/7/2009)

Any changes will be notified in the class and at the course website. *Lab exercise for assessment.

Week No.	Lecture (Monday 11-12) Quadrangle G046	Lab (Monday 2-5pm) EE401A	Assignment
1 20/7	Introduction to GIS	Introduction to ArcGIS: ArcMap, ArcCatalog, ArcToolbox	
2 27/7	Georeferencing	*Map Projections	
3 3/8	Vector vs. Raster	*Image Registration	
4 10/8	Database	*Tables, Relationships and Queries	
5 17/8	Data Acquisition	*Digitise, Edit & Clean	
6 24/8	GIS & Web-GIS Programming I	*Visual Basic and ArcObjects	Term Project: Developing a GIS application using ArcObjects or Web-GIS APIs Due: 4pm Friday 9 October 2009 (Week 11).
7 31/8	Mid-term Quiz	*HTML, XHTML, JavaScript, and XML	
8 14/9	GIS & Web-GIS Programming II	*Google Earth, Google Maps and Virtual Earth	
9 21/9	Surface Modelling	*Surface Modelling	
10 28/9	No Lecture	*Topographic Representation and Modelling	
11 5/10	Labour Day	Labour Day	
12 12/10	Spatial Analysis	*Spatial Analysis	
13 19/10	Course Summary Sample final exams	Term Project Presentation	

4. Assessment in the Course

- Lab assessment (3% each x 10) 30% Each Week except Weeks 1, 11 & 13.
- Mid-term Quiz 10% Week 7
- Term Project: ArcObjects/Web-GIS 30% Due 4pm Friday 9 October 2009 (Week 11)
  (written presentation 10% + quality of the work 10% + oral presentation 10%)
- Final Exam 30% Will be formally arranged by Exam Section

4.1 Term Project

This project aims to develop a prototype GIS using ArcObjects or/and Web-GIS APIs such as Google Maps. The project is designed for group work of two students, but individual work is also acceptable. Students should form their group on their own. Sample topics about using GIS to understand real world problems are: global warming, biodiversity, biomass, bush fire, traffic information, air pollution, health, etc.

The report should include the title of the project, introduction, objectives, work scope, methodology, results, significance, social impact, concluding remarks and references. The report is expected to contain 25-30 pages. It is recommended to make a flow diagram containing data, data conversion, methodology, analysis, software, output, etc.

All assignments and assessment items should be submitted with a signed Assessment Cover Sheet:

I declare that this assessment item is my own work, except where acknowledged, and has not been submitted for academic credit elsewhere, and acknowledge that the assessor of this item may, for the purpose of assessing this item:

Reproduce this assessment item and provide a copy to another member of the University; and/or,

Communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the assessment item on its database for the purpose of future plagiarism checking).

I certify that I have read and understood the University Rules in respect of Student Academic Misconduct.

Signed: .....date: ☐☐ ☐☐ ☐☐

5. Course Resources

5.1 Lecture Material (check the course website):

http://www.gmat.unsw.edu.au/gmat2210

The Powerpoint lecture slides are available for download as PDF files at the course website.

5.2 Text and Reference Books

Keith C. Clarke, 2003. Getting Started with Geographic Information Systems, Prentice Hall
Bernardsen, Tor, 2002. Geographic Information Systems: An Introduction, Wiley

5.3 Computational Aids

Computer software relevant to this course and available in the School's computer lab EE401A, includes: ArcGIS, ArcView, and Visual Basic.

6. Administrative Matters

6.1 Expected work load

At UNSW, the normal workload expectations of a student are 25-30 hours per session for each unit of credit, including class contact hours, preparation and time spent on all assessable work.

To assist students with the organisation of their studies, the expected workloads of the various components of the course are listed below. It is strongly suggested that students use the listed hours to plan their work during session.

Lectures (12 x 1hr)	12hr
Labs & tutorials (12 x 3hr)	36hr
Assignment (1 x 40hr)	40hr
Quiz	2hr
Field exercises & demos	0hr
Revision of Lectures, preparation of practical/tutorial reports, background reading (approximately 5hr x 12wk)	60hr
Total	150hr

6.2 Rules

Students should read the University Calendar or Student Guide for details of University Rules and special considerations.

Students are reminded that the University regards academic misconduct as a very serious matter. Unauthorised material must not be taken into a test or examination. The penalty for any suspected academic misconduct ranges from zero mark for the assignment or exam involved, through failure of the subject, to expulsion from the University. If absent from an examination, class test or practical, students must submit written documentation to the University, via the Student Centre in the Chancellery.

All lab/tutorial assignments are compulsory parts of the course and must be handed in by the due date. A mark of zero will be given for any submission which violates this rule.

If a student is unable to submit on time due to illness or other legitimate reason, then a brief written explanation must be given to the lecturer for consideration as soon as is feasible. In some cases the lecturer may grant an extension to the submission date provided he has been contacted before the due date.

Further assessment may be granted in this course at the lecturer's discretion. If further assessment is granted then performance in tutorials may be considered as well as an oral exam including use of a computer.

If students attend less than 80% of their possible classes they may be refused final assessment.

6.3 Plagiarism

Plagiarism is the presentation of the thoughts or work of another as one's own.*

Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or

concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;

- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and,
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism. Knowingly permitting your work to be copied by another student may also be considered to be plagiarism. An assessment item produced in oral, not written form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty. It can be located at:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.
Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle.
† Adapted with kind permission from the University of Melbourne.

Please visit the School's Plagiarism Statement:
http://www.gmat.unsw.edu.au/currentstudents/general/plagiarism.htm for the key information on the new plagiarism policy. From the page the students can download the policy document (as a PDF), and the assessment cover sheets (as DOC or PDF).

6.4 Grievances

In the first instance all grievances should be discussed with the lecturer involved. If the problem cannot be resolved, students should contact the School's Grievance Officer in writing.