School of Earth & Environmental Sciences

EESC105: Introductory Geospatial Analysis

Subject Outline
Autumn, 2016
On-Campus
Wollongong

Subject Information
Credit Points: 6
Pre-requisite(s): Nil
Co-requisite(s): Nil
Restrictions: Nil
Contact Hours: 1 x 2hr Lecture; 1 x 4hr Lecture/Practical; 1 x 3hr Practical

Subject Contacts
Subject Coordinator/Lecturer

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dr Alexandru Codilean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Building 41, Room G23</td>
</tr>
<tr>
<td>Telephone:</td>
<td>61 2 4221 3462</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:codilean@uow.edu.au">codilean@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times:</td>
<td>Email for appointment</td>
</tr>
</tbody>
</table>

Student Support and Advice
For general enquiries please contact StudentHub 41:

Location: 41.138B
Telephone: 61 2 4221 3492
Email: smah-students@uow.edu.au
Student Consultation and Communication

University staff receive many emails each day. In order to enable them to respond to your emails appropriately and in a timely fashion, students are asked to observe basic requirements of professional communication:

Please ensure that you include your full name and student number and identify your practical class or tutorial group in your email so that staff know who they are communicating with and can follow-up personally where appropriate.

Consider what the communication is about
- Is your question addressed elsewhere (e.g. in the subject outline or, on the eLearning site)?
- Is it something that is better discussed in person or by telephone? This may be the case if your query requires a lengthy response or a dialogue in order to address. If so, see consultation times above and/or schedule an appointment.
- Are you addressing your request to the most appropriate person?

Specific email subject title to enable easy identification of issue
- Identify the subject code of the subject you are enquiring about (as staff may be involved in more than one subject) put this in the email subject heading. Add a brief, specific query reference after the subject code where appropriate.

Professional courtesy
- Address the staff member appropriately by name (and formal title if you do not yet know them).
- Use full words (avoid ‘text-speak’ abbreviations), correct grammar and correct spelling.
- Be respectful and courteous.
- Allow 3 – 4 working days for a response before following up. If the matter is legitimately urgent, you may wish to try telephoning the staff member (and leaving a voicemail message if necessary) or inquiring at the School Office.
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Section A: General Information

Subject Learning Outcomes

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<thead>
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<th>On completion of this subject, students should be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the fundamental principles underpinning the components of geographic information systems and critically evaluate their application for a range of different purposes.</td>
</tr>
<tr>
<td>2. Apply tools in geographic information systems and key allied technologies, such as global positioning systems and remote sensing to undertake basic geospatial analysis.</td>
</tr>
<tr>
<td>3. Apply appropriate geospatial analysis to identify solutions to real-world problems.</td>
</tr>
<tr>
<td>4. Communicate spatial perspectives and knowledge effectively using a range of communication styles and technologies clearly and coherently to a range of audiences.</td>
</tr>
<tr>
<td>5. Demonstrate ethical and professional conduct by participating constructively in decision making within the context of geospatial analysis.</td>
</tr>
<tr>
<td>6. Reflect on and direct intellectual and professional development on what it means to work in a geographical context.</td>
</tr>
</tbody>
</table>

Subject Description

This subject provides a comprehensive introduction to the theory and practice of Geographic Information Systems (GIS) and geospatial analysis, and aims to equip students with core skills that will enable solving simple geospatial problems. The subject is comprised of two parts. Part one, follows a classical lecture/practical format where students learn the foundations of geospatial analysis. Part two follows a problem-based approach enabling students to apply the core geo-analytical skills to solving a simple real-world practical problem by working in groups and using industry standard tools and technologies.

eLearning Space

This subject has materials and activities available via eLearning. To access eLearning you must have a UOW user account name and password, and be enrolled in the subject. eLearning is accessed via SOLS (student online services). Log on to SOLS and then click on the eLearning link in the menu column. For information regarding the eLearning spaces please use the following link:
http://uowblogs.com/moodlelab/files/2013/05/Moodle_StudentGuide-1petpo7.pdf

Lecture, Tutorial, Laboratory Times

All timetable information is subject to variation. Check latest timetabling information on the 'Current Student' webpage on UOW website or log into SOLS to view your personal timetable prior to attending classes.

Timetable information can be accessed from

Key University Dates can be accessed from

Readings, References and Materials

Textbooks

The following text(s) will need to be purchased by students enrolled in this class.

Prescribed Readings (includes eReadings):
The following readings are prescribed for this subject, but students are not expected to purchase these. They are available to students through the library on the subject’s eLearning site.

Nil.

Materials:
Nil.

Recommended Readings:
The following references complement the prescribed readings and textbooks:

The textbook is your main reading source. Additional readings will relate to your essay topics and be made available via eLearning throughout the semester, and notification of their availability will be given in lectures.

Recommended readings are not intended as an exhaustive list, students should use the Library catalogue and databases to locate additional resources.

Recent Changes to this Subject
  i. This is a new subject
# Schedule of Learning*

<table>
<thead>
<tr>
<th>Week</th>
<th>Week Commencing</th>
<th>Lecture</th>
<th>Tutorial</th>
<th>Demonstration/Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29/02/2016</td>
<td>Introduction to subject (1 hr)</td>
<td>Introduction to Assessment 1 (1 hr)</td>
<td>No Practical</td>
</tr>
<tr>
<td>2</td>
<td>07/03/2016</td>
<td>Fundamentals of Spatial Data (2 hrs)</td>
<td>No Tutorial</td>
<td>Introduction to ArcGIS and mapping (3 hrs)</td>
</tr>
<tr>
<td>3</td>
<td>14/03/2016</td>
<td>Geospatial Analyses on Vector Data (2 hrs)</td>
<td>No Tutorial</td>
<td>Introduction to data input and manipulation (3 hrs)</td>
</tr>
<tr>
<td>4</td>
<td>21/03/2016</td>
<td>Interpolation Techniques (2 hrs)</td>
<td>No Tutorial</td>
<td>Introduction to geospatial analyses on vector data (3 hrs)</td>
</tr>
<tr>
<td>5</td>
<td>28/03/2016</td>
<td>Geospatial Analyses on Raster Data (2 hrs)</td>
<td>No Tutorial</td>
<td>Introduction to geospatial analyses on raster data – focus on data interpolation (3 hrs)</td>
</tr>
<tr>
<td>6</td>
<td>04/04/2016</td>
<td>Introduction to GIS-based Modelling (2 hrs)</td>
<td>No Tutorial</td>
<td>Introduction to geospatial analyses on raster data – focus on topographic analysis (3 hrs)</td>
</tr>
<tr>
<td>7</td>
<td>11/04/2016</td>
<td>No Lecture</td>
<td>Introduction to Project and Project Proposal (1 hr x 2)</td>
<td>Work on project proposal (3 hrs)</td>
</tr>
<tr>
<td>8</td>
<td>18/04/2016</td>
<td>No Lecture</td>
<td>No Tutorial</td>
<td>Work on project proposal (4 hrs)</td>
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<tr>
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</thead>
<tbody>
<tr>
<td><strong>Mid-Session Recess 25th April-29th April</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>02/05/2016</td>
<td>No Lecture</td>
<td>Feedback on Project Proposal (1 hr x 2)</td>
</tr>
<tr>
<td>10</td>
<td>09/05/2016</td>
<td>No Lecture</td>
<td>No Tutorial</td>
</tr>
<tr>
<td>11</td>
<td>16/05/2016</td>
<td>No Lecture</td>
<td>Feedback on Progress Report (1 hr x 2)</td>
</tr>
<tr>
<td>12</td>
<td>23/05/2016</td>
<td>No Lecture</td>
<td>No Tutorial</td>
</tr>
<tr>
<td>13</td>
<td>30/05/2016</td>
<td>No Lecture</td>
<td>Feedback on Project Deliverables (1 hr x 2)</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
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<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Recess 6th June-10th June</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>UOW Exam Period 11th June-23 June</strong></td>
<td></td>
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</tr>
</tbody>
</table>

*The above timetable should be used as a guide only, as it is subject to change. Students will be advised of any changes as they become known.
Section B: Assessment

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Form of Assessment</th>
<th>Due Date</th>
<th>Return/Feedback Due Dates</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>Critical reflection on GIS in society</td>
<td>11 March</td>
<td>18 March</td>
<td>10%</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Thought questions and computer based exercises</td>
<td>Practices in weeks 3-6</td>
<td>Weeks 3-6</td>
<td>35%</td>
</tr>
<tr>
<td>Assessment 3A</td>
<td>Guided independent study: Project proposal</td>
<td>22 April</td>
<td>29 April and tutorial in week 9</td>
<td>10%</td>
</tr>
<tr>
<td>Assessment 3B</td>
<td>Guided independent study: Progress report</td>
<td>Practical in week 10</td>
<td>Tutorial in week 11 and 20 May</td>
<td>15%</td>
</tr>
<tr>
<td>Assessment 3C</td>
<td>Guided independent study: Project deliverables</td>
<td>Practical in week 12</td>
<td>Tutorial in week 13 and 3 June</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 3D</td>
<td>Guided independent study: Critical reflection</td>
<td>6 June</td>
<td>10 June</td>
<td>10%</td>
</tr>
<tr>
<td>Total Marks</td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Details of Assessment Tasks

Assessment tasks will be marked using explicit criteria that are provided below to students prior to submission.

**Assessment 1**

- Critical reflection on the role of GIS in today’s society and daily life
- Due date: 11 March
- Weighting: 10%
- Submission: Submit an electronic copy of your assessment via upload to eLearning
- Type of Collaboration: Individual Assessment
- Length: 1000 words
- Details: This assessment asks students to reflect critically on the omnipresence of geospatial technologies – known as geographic information systems (GIS) – in today’s society. From the systems that monitor and map our supplies of electricity and drinking water, to Google Maps and Street View and the wearable technologies that monitor our health and fitness, GIS is ubiquitous. Students will be asked to reflect on what are the implications, advantages, and disadvantages of this omnipresence.
- Style and format: Critical Reflection
- Subject Learning Outcomes: 1, 4 and 6
- Marking Criteria: The marking criteria will be made available on your eLearning site by week 1 of session. There will also be a one hour tutorial dedicated to introduction and discussing this assessment task, also in week 1.

**Assessment 2**

- Thought questions and computer based exercises
- Due date: Practical classes in weeks 3, 4, 5 and 6
- Weighting: 35%
- Submission: Submit an electronic copy of your assessment via upload to eLearning
- Type of Collaboration: Individual Assessment
- Length: n/a
### Details

Each practical in weeks 3 to 6 will introduce a key geospatial analysis topic via short computer based exercises. At the end of each practical class in these weeks, you will be asked to submit your completed exercise results. Each submission is worth 5%. In addition, at the end of the practicals in weeks 4, 5 and 6 you will also undertake a short computer based test comprised of thought questions related to the topic of each practical. Each test is worth 5% and students will be allowed multiple attempts.

You are required to obtain a minimum cumulative score of 80% for Assessment 2 in order to be allowed to complete Assessment 3.

### Style and format

In class exercises and in class computer based test

### Subject Learning Outcomes

1 and 2

### Marking Criteria

The marking criteria will be made available on your eLearning site by week 1 of session.

### Assessment 3

Guided independent study

<table>
<thead>
<tr>
<th>Due date</th>
<th>22 April, practical classes in Weeks 10 and 12 and 6 June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighting</td>
<td>55% (10 + 15 + 20 + 10)</td>
</tr>
<tr>
<td>Submission</td>
<td>Submit an electronic copy of your assessment via upload to eLearning</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment and Group Project</td>
</tr>
<tr>
<td>Length</td>
<td>n/a</td>
</tr>
</tbody>
</table>

This assessment item is composed of four interconnected parts. Students are presented with a series of real-world geospatial problems and by working in groups will aim to solve one of these problems. For the final task, all groups come together and discuss how the various case studies fit together and how the work of each group can potentially inform and be informed by that of the others working on a different case study.

**Part A (10%) – Project Proposal**

Working in groups, students will need to write a 1000 word project proposal outlining how they will go ahead with tackling their case study. The proposal must accurately identify data sources and methodology, and must include a flow diagram detailing the proposed work. The proposal should also identify and discuss any limitations.

**Part B (15%) – Progress Report**

Based on feedback received on Part A, each group must revise their project proposal and resubmit this along with all relevant geospatial data files generated to date as an attachment (5%). In addition, each group will also be asked to prepare a poster presentation summarising analyses and results to date (10%). Each group will be required to solicit feedback on their poster from other groups.

**Part C (20%) – Project Deliverables**

Based on feedback obtained from other groups in Part B, each group must complete their case study and submit a project portfolio consisting of (1) a maximum 1000 word document that summarises the work and its results, and (2) all relevant geospatial data files (10%). Both the document and data files must document all key analysis steps and be in a form that is readily usable by others. In addition to the above, each group will summarise the case study and its results to the rest of the class in the form of a 5-minute presentation (10%). Students are encouraged to re-use and adapt material prepared for Parts A and B. A presentation template will be provided.
Part D (10%) – Critical Reflection

Working individually, students must submit a maximum 500 word reflective piece that discusses (1) how the opportunity to solicit feedback at specific stages of the case study and (2) how the final discussion, have improved your work as well as your broader understanding of the topics being studied.

<table>
<thead>
<tr>
<th>Style and format</th>
<th>Geospatial Data Portfolio and Poster Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Learning Outcomes</td>
<td>2, 3, 4, 5 and 6</td>
</tr>
<tr>
<td>Marking Criteria</td>
<td>The marking criteria will be made available on your eLearning site by week 7 of session.</td>
</tr>
</tbody>
</table>

Minimum Requirements for a Pass in this Subject

To receive a clear pass in this subject a total mark of 50% or more must be achieved. In addition, failure to meet any of the minimum performance requirements is grounds for awarding a Technical Fail (TF) in the subject, even where total marks accumulated are greater than 50%.

The minimum performance requirements for this subject are:

- Attempt all assessment tasks
- Obtain at least 80% for Assessment 2.
- Performance of each assessment task at a level that demonstrates that student has achieved Learning Outcomes of subject.

Minimum Student Attendance and Participation

It is expected that students will allocate 6 hours per week to this subject, including any required class attendance, completion of prescribed readings and assessment tasks.

Student attendance at tutorials and practicals is compulsory. Students may miss a maximum of 3 tutorial or practical classes. Absences will require the submission of an application for Academic Consideration via SOLS and the presentation of suitable documentation, for example a Medical Certificate, to Student Central as soon as practical. For further details about applying for academic consideration visit the Student Central webpage:


Scaling

Scaling may occur in this subject at the end of session by the Unit Assessment Committee and/or Faculty Assessment Committee (FAC). Marks will only be scaled to ensure fairness/parity of marking across groups of students. Scaling will not affect any individual student's rank order within their cohort. For more information refer to Assessment Guidelines – Scaling:


Late Submission

Late submission of an assessment task without an approved extension of the deadline is not acceptable. If you are unable to submit an assessment due to extenuating circumstances (e.g. medical grounds or compassionate grounds), you can make an application for academic consideration. Not all circumstances qualify for academic consideration. For further details about applying for academic consideration visit the Student Central webpage:

Late Submission Penalty

Late submission of an assessment task without an approved extension of the deadline is not acceptable. Marks will be deducted for late submission at the rate of 10% of the total possible marks for that particular assessment task per day. This means that if a piece of work is marked out of 100, then the late penalty will be 10 marks per day (10% of 100 possible marks per day). The formula for calculating the late penalty is the total possible marks x 0.10 x number of days late. For the purposes of this policy a weekend (Saturday and Sunday) will be regarded as two days.

For example:

- Student A submits an assessment which is marked out of 100. The assessment is submitted 4 days late. This means that a late penalty of 40 marks will apply (100 x 0.10 x 4). The assessment is marked as per normal out of 100 and is given a mark of 85/100, and then the late penalty is applied. The result is that the student receives a final mark of 45/100 for the assessment (85 (original mark) – 40 marks (late penalty) = 45/100 (final mark)).
- Student B submits a report which is marked out of 20. The report is submitted three days late. This means that a late penalty of 6 marks will apply ((20 x 0.10 x 3). The report is marked as per normal out of 20 and is given a mark of 15/20, and then the late penalty is applied. The result is that the student receives a final mark of 9/20 for the report (15 (original mark) – 6 marks (late penalty) = 9/20 (final mark)).

No marks will be awarded for work submitted after the assessment has been returned to the students (except where a particular assessment task is undertaken by students at different times throughout the session, but where the assessment is based on experiments or case studies specific to a student). Notwithstanding this, students must complete all assessment tasks to a satisfactory standard and submit them, regardless of lateness or loss of marks, where submission is a condition of satisfactorily completing the subject.

Supplementary Assessments

Supplementary assessment may be offered to students whose performance in this subject is close to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made.

Students can log on to SOLS and click on the link titled “Supplementary Assessment” to view any applicable offers or use the following link;

System of Referencing Used for Written Work

The Author-Date (Harvard) referencing system should, unless otherwise specified for a particular assessment (check Details of Assessment Tasks), be utilised. A summary of the Harvard system can be accessed on the Library website at: http://public01.library.uow.edu.au/refcite/style-guides/html/

Use of Internet Sources

Students are able to use the Internet to access the most current information on relevant topics and information. Internet sources should only be used after careful critical analysis of the currency of the information, the role and standing of the sponsoring institution, reputation and credentials of the author, the clarity of the information and the extent to which the information can be supported or ratified by other authoritative sources and should be referenced appropriately.
Plagiarism
The full policy on Academic Integrity and Plagiarism is found in the Policy Directory on the UOW website.

“The University's Academic Integrity and Plagiarism Policy, Faculty Handbooks and subject guides clearly set out the University's expectation that students submit only their own original work for assessment and avoid plagiarising the work of others or cheating. Re-using any of your own work (either in part or in full) which you have submitted previously for assessment is not permitted without appropriate acknowledgement. Plagiarism can be detected and has led to students being expelled from the University.

The use by students of any website that provides access to essays or other assessment items (sometimes marketed as 'resources'), is extremely unwise. Students who provide an assessment item (or provide access to an assessment item) to others, either directly or indirectly (for example by uploading an assessment item to a website) are considered by the university to be intentionally or recklessly helping other students to cheat. This is considered academic misconduct and students place themselves at risk of being expelled from the University.”

Submission of Assessments
Refer to the submission requirements under the details of the individual assessments. Students should ensure that they receive a receipt acknowledging submission. Students will be required to produce this in the event that an assessment task is considered to be lost. Students are also expected to keep a copy of all their submitted assessments in the event that re-submission is required.

Assessment Return
Students will be notified when they can collect or view their marked assessment. In accordance with University Policy marked assessments will usually only be held for 21 days after the declaration of marks for that assessment.
Section C: General Advice

Students should refer to the Faculty of Science, Medicine and Health website for information on policies, learning and support services and other general advice.

University Policies

Students should be familiar with the following University policies:

a. Code of Practice – Teaching and Assessment

b. Student Charter

c. Academic Integrity and Plagiarism Policy

d. Student Academic Consideration Policy

e. Course Progress Policy

f. Graduate Qualities Policy

g. Academic Complaints Policy (Coursework and Honours Students)

h. Policy and Guidelines on Non-Discriminatory Language Practice and Presentation

i. Intellectual Property Policy

Student Support Services and Facilities

Students can access information on student support services and facilities at the following link. This includes information on “Academic Support”, “Starting at University”, “Help at University” as well as information and support on “Career’s and Jobs”. http://www.uow.edu.au/student/services/index.html

Student Etiquette

Guidelines on the use of email to contact teaching staff, mobile phone use in class and information on the university guide to eLearning ‘Netiquette’ can be found at http://www.uow.edu.au/student/elearning/netiquette/index.html

Version Control Table

<table>
<thead>
<tr>
<th>Version Control</th>
<th>Release Date</th>
<th>Author/Reviewer</th>
<th>Approved By</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20151113</td>
<td>Dr Alexandru Tibi Codilean – Subject Coordinator</td>
<td>Sonia Losinno – ADE Nominee</td>
<td>Final EESC105 Autumn 2016 Subject Outline</td>
</tr>
</tbody>
</table>