



# ENVS3240

## Environmental Change

Session 1, Weekday attendance, North Ryde 2020

*Department of Earth and Environmental Sciences*

### Contents

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<a href="#"><u>General Information</u></a>	2
<a href="#"><u>Learning Outcomes</u></a>	3
<a href="#"><u>Assessment Tasks</u></a>	3
<a href="#"><u>Delivery and Resources</u></a>	4
<a href="#"><u>Unit Schedule</u></a>	9
<a href="#"><u>Policies and Procedures</u></a>	11
<a href="#"><u>Changes from Previous Offering</u></a>	14
<a href="#"><u>Fieldwork</u></a>	15
<a href="#"><u>Grading of assessed tasks</u></a>	18

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#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Convenor and Lecturer

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Credit points

10

Prerequisites

(130cp at 1000 level or above) including (ENVS214(Cr) or ENVS2114(Cr) or ENVS266 or ENVS2266 or ENVE214(Cr) or ENVE266 or GEOS214(Cr) or GEOS266)

Corequisites

Co-badged status

### Unit description

This unit requires you to piece together lines of evidence to reconstruct the climatic and environmental changes over the last 2.6 million years. This period saw dramatic changes as the environment swung in and out of huge glacials, where large sections of the planet were covered in ice, to interglacials, where the climate recovered and the environment flourished. We will use different lines of evidence such as cave and fluvial sediment, tree rings, pollen, ice cores, marine cores and landforms as proxies to reconstruct past environments, to establish a benchmark for environmental change and to define the normal range of variability. We can then use this benchmark as a context for present day changes to predict how the environment will change in the future and how landscapes, vegetation, fauna and humans will respond. This understanding is then related to evidence of environmental change seen in the local Australian landscape, and investigated during field excursions, including a week-long field trip during the mid-semester break. Case studies include: rapid environmental change in Indonesia; reconstructing the last glacial maximum in NSW; how environmental change in Africa and Asia shaped the evolution of early humans; human-environmental interactions in Australia such as the mega fauna debate; and how forest fires and deforestation have affected our present day climate.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

- ULO1:** Apply your knowledge and skills to identify and evaluate present day environmental issues
- ULO3:** Demonstrate your ability to 'Read the landscape' through geomorphological and sedimentary field skills
- ULO4:** Collect data in a manner that is rigorous, reliable and replicable.
- ULO2:** Communicate scientific information and concepts through oral, visual and written formats
- ULO5:** Design and conduct a field research project including data gathering and interpreting and evaluating your own data

## Assessment Tasks

### Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the

Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

## Delivery and Resources

### Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

## LECTURES

A one hour lecture followed by a one hour activity will be held on most Tuesdays from 11-1 pm. Lectures are designed to provide you with a framework with which to focus your study of the subject and are an essential and important component of the unit. They are by no means exhaustive on each and every topic, and you are expected to supplement them by reading especially from the textbook but also from the current journals, where the most up-to-date information can be found. There is a reading list for you to use as a starting point later in this document, and additional material will be referred to during the lecture program. Lecture slides are available on-line through <https://ilearn.mq.edu.au/> login/MQ for viewing and/or printing. **ilectures are not available for this course, audio will not be recorded.** It is your responsibility to keep up to date with lecture content. **DO NOT MISS LECTURES!!** We will be conducting some semi-flipped classroom activities so that some of your learning is conducted at home and some of your understanding conducted in its place in the lecture time. This makes it even more important that lectures and pracs are not missed.

## PRACTICALS

Practicals are held some weeks on Tuesdays at 2 pm for 3-4 hours. Each student **must attend** all practical sessions, held in E5A240. Most practicals will have no take-home component but students must demonstrate understanding of the topics and mastery of the skills introduced before being allowed to leave. Practical classes comprise a practical exercise, including numerical analysis, examination of sediments or local fieldwork. Practical classes provide greater depth to the related lecture materials and are designed to assist learning by encouraging your active participation. The venue of the practical classes varies (see Unit schedule). Important material for the practical classes is included in the practical book. Additional material may be posted on ilearn for download. Each student must bring the appropriate equipment to the practical session and pre-read the practical description. Equipment may include; overhead transparencies, permanent FINE overhead pen (red or green preferably), drawing pencils (2B, HB, 2H), coloured pencils, ruler, sharpener, eraser, protractor, calculator, field note book. You should also wear appropriate clothes for the laboratory and field: closed shoes, sun protection etc.

## FIELDWORK

There is one compulsory fieldtrip for all students: 18-24th April a mid-semester field trip to Nerrandera. This fieldwork forms an essential component of this unit (Module 3) and therefore all students must attend. The assignments and fieldtrip are described in detail elsewhere in this unit guide. Equipment and safety issues for field work are described in the fieldwork section.

## ASSESSMENTS

There are 4 assessments overall with different percentage weightings.

## PROBLEM SOLVING QUEST

A private or team study quest to practice problem solving skills and create environmental detectives. At the end of each lecture series an environmental problem will be presented that needs to be solved, the answers can be entered into ilearn at home producing a clue - these clues can be combined to form the location of the quest - further details will be provided in the first lecture.

## LIGHTNING PRESENTATIONS

Each student will be expected to present a 1 minute presentation (with no notes) to their peers on an important topic in Quaternary Science. The presentations will not be graded but will be helpful for developing essential communication skills and understanding of the topic areas. They will be conducted on the week-long fieldtrip

## PEER REVIEW

All students will be given the opportunity to assess the final presentations (assignment 3) this will contribute a small proportion to the final grades. You will be assessed on your scores provided by your peers.

## 60 SECOND SCIENCE

A short 60 s video to be watched before each lecture (preferably just before the lecture starts) - designed to stimulate provoke and engage you on the chosen topic or concept to aid understanding in the lecture.

## VIMEO CHALLENGE

There will be the opportunity to present your final presentation as a video using basic editing software. Videos will be presented in the ENV53240 conference in the last week of semester

## ESSENTIAL READINGS

There is no specific essential reading for this topic – but you will need to read widely in order to have the background necessary to achieve a good understanding of the topic. However, the following texts are suggested as being valuable reading and will be referred to during lectures.

You are not required to purchase them, but may find them useful. There are some copies in the library, which have been placed in special reserve so everyone can have access:

- **Global Environments through the Quaternary**, Anderson, D., Goudie A.S., Parker, A.G., 2007. Oxford University Press
- **Reconstructing Quaternary Environments**, JJ Lowe Walker, MJC. 2nd Edition.
- **Quaternary Environments**. Martin Williams, David Dunkerley, Patrick De Deckker, Peter Kershaw, John Chappell. 1998. Arnold.
- **Quaternary Geochronology**, Noller, JS., Sowers JS Lettis WR 2000. American Geophysical Union, Washington DC
- **Encyclopaedia of Quaternary Science**, Elias, S.A. (Ed.), 2007. Elsevier, London (Electronic resources in MQ library – each article can be downloaded)
- **Tectonic Geomorphology** Burbank DW, Anderson RS. 2001. Blackwell Scientific: Oxford

If you have not already done so, you should invest in a Dictionary of Physical Geography, available in the bookshop.

To keep up with lecture materials and also some of the practical classes and the fieldtrips you should read all '**essential text**' BEFORE the lectures each week. Start with these chapters as a foundation then supplement your reading with the listed journal references when you have some spare time. MORE READING = BETTER UNDERSTANDING. Key journals for this course include:

Quaternary Science Reviews

Journal of Quaternary Science

Quaternary International

Quaternary Research

Palaeogeography, Palaeoclimatology, Palaeoecology

Nature Geoscience

Journal of Human Evolution

**TECHNOLOGY USED AND REQUIRED - iLearn and ON-LINE MATERIALS**

You will require access to a computer for parts of this unit. The university uses iLearn – you will need to make yourself familiar with this system – student guides can be found at <http://mq.edu.au/iLearn/studentinfo.htm>. You can gain access to the Powerpoint slides used for each lecture by visiting the iLearn page for ENV5340 (<https://ilearn.mq.edu.au/login/MQ/> - login with your Macquarie OneID username and password). Please note: Audio lecture recordings in ilecture will not be available for this unit – it is your responsibility to come to the lectures or catch up on material missed. This iLearn site will be used by staff to outline course

content week by week, to post video clips, to send reminders and notices concerning fieldtrips, practical classes and lectures, and to keep in contact with students. **You should check the site regularly**, especially the day before lectures/pracs. There is also capacity for discussion between students; please feel free to use this to discuss issues relating to any aspect of the unit and environmental change in general. For specific questions on the lecturers, either post them on iLearn or email them directly (see front cover).

In addition to iLearn we will be using student and teacher 'clicker' (Socrative – m.socrative.com) to facilitate rapid student responses during the lecture. Everyone is encouraged to participate – all it requires is a SMART phone, laptop, tablet or ipad with a connection to the internet (all web enabled devices can be used) – if everyone has a device then a short 'exit' quiz will be used at the end of most lectures to test understanding.

Your own study time for ENV53240 should be a **minimum** of an **additional 1.5 hours per week (for 13 weeks)**. Simply attending lectures and practical classes is not enough to guarantee a good grade.

## **LIBRARY RESEARCH RESOURCES**

The Library provides a range of learning opportunities aimed at developing student capabilities in research and information technology. Topics covered include:

computer essentials

navigating the Macquarie University website

getting started in your online unit

using the library catalogue and e-readings to locate key references

using research databases to find journal articles

locating scholarly information on the Internet

effective searching of the Internet

You can choose to learn online or at face-to-face session in the library.

More information is available at: (<http://www.lib.mq.edu.au/training/>). Follow the links to Training

## **FINDING RELEVANT SCIENTIFIC JOURNALS**

While you should begin with the readings listed below, wander through the GB, S590 and QE sections of the library (in particular). You are especially encouraged to keep an eye on the current journals, where the most up-to-date information can be found. Particular attention should be placed on the journals *Earth Surface Processes and Landforms* and *Geomorphology*. Don't be scared to bring journal articles to our attention – we are always ready to chat about such things!

Additional journals that you are encouraged to 'keep your eye on' are listed below. Recent years of many of these titles are available on-line. Go to 'Journal Search' on the Library web page and follow directions. Usually, papers can be downloaded and printed freely.

American Journal of Science.	Q1.A5	Journal of Sedimentary Research.	QE420.J84
Annals of the Association of American Geographers	G3.A7	Nature.	Q1.N202
Applied Geography.	G1.A7	Palaeogeography, Palaeoclimatology, Palaeoecology.	QE500.P25
Australian Geographer.	G1.A9	Progress in Physical Geography.	G1.P685
Australian Geographical Studies.	G51.A9	Quaternary Research.	QE696.Q33
Australian Journal of Earth Science.	QE1.G3	Science.	Q1.S35
Australian Journal of Soil Research.	S590.A78	Sedimentary Geology.	QE581.A1.S42
Catena.	S590.C3	Sedimentology.	QE581.A1.S4
Earth and Planetary Science Letters.	QE1.E12	Zeitschrift fur Geomorphologie.	G1.Z472
Earth Surface Processes & Landforms.	GB400.E3		

## FINDING RELEVANT SCIENTIFIC PAPERS

In addition to the journal papers we have listed below, there are many more papers, especially recent and overseas papers, which you may find have valuable information for your reports. To find relevant papers you should become familiar with the searchable databases available through the library web page. From the main Library page, go to 'Databases' and try these:

- Science Direct
- Web of Science (also called ISI Web of Science)
- SCOPUS
- INGENTA
- GEORef

And enter search terms (e.g. ice cores, speleothems). There are many other environmental and biological databases as well. For example, Google Scholar (see the Google search page) is also a good search engine for scientific papers.

All databases are slightly different and it's often worth trying more than one. Once you have found the details (often including the abstract) you will probably need to go back to the journal (use 'journal search' on the library page) to find and download the paper.



**Note: Many of the readings (scientific papers) are available online from the library's e-reserve page for ENV53240 (<http://www.lib.mq.edu/borrowing/ereserve.php>)**

## Unit Schedule

### Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult [iLearn](#) for latest details, and check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

Week	Date	Lecture Title	Practical Class	Essential reading
1	23/2	<p><b>Module 1: Global Environmental change</b></p> <p>1 – <b>Lecture</b> –Introduction and sources of evidence</p> <p>* <b>Activity</b> – Orbit and evidence</p> <p>* <b>Optional Flipped:</b> Sources of evidence and methods for reconstructing past environmental change</p>	No prac class this week	<p>Lowe, JJ Walker MJC – Ch1 and 2-6 (skim)</p> <p>Williams et al., 1998 – Ch 1,2,5</p> <p>Anderson et al., 2007 – Ch 1, 9</p> <p>Noller et al., 2000 p1-10</p> <p>Lowe et al., 2007</p>
KW				
2	3/3	<p>2 – <b>Lecture -Proxies</b></p> <p>* <b>Activity</b> Isotopes and the next ice age</p> <p><b>Optional Flipped:</b> Sedimentology and stratigraphy</p>	No prac class this week 3/3	<p>Lowe, JJ Walker MJC – Ch 3 (p85-86, 127-135, 148-158), 6</p> <p>Williams et al., 1998 – Ch 3, 7</p> <p>Anderson et al., 2007 – Ch 2</p> <p>Noller et al., 2000 – p 427</p> <p>Burbank and Anderson, 2001</p> <p>Williams et al. – Ch 4</p> <p>Lowe and Walker – Ch 7</p>
KW				
3	10/3	<p>3 - <b>Lecture –Dating</b></p>	No prac class this week	<p>Turney et al., 2001</p> <p>Lowe and Walker – Ch 5</p>
KW		<p>* Activity – OSL game and dating stratigraphy</p>		<p>Anderson et al., 2007 – Ch 2</p> <p>Noller et al., 2000 p157-176</p> <p>Sloss et al., 2010?</p>

4	17/3	4 – <b>Lecture - Caves and fossils</b>	29/3 Proxies, caves and dating <b>(Assessment 1)</b> . E5A 240.	Roberts et al., 2001 Roberts and Brook, 2010 Wroe et al., 2012 Cohen et al., 2015 Salze et al., 2016
<b>KW</b>		* Activity - Megafauna arguments <b>Optional Flipped</b> ; Human Dispersal		
5	24/3	<b>Module 2: Australian Environmental change</b>  5 – <b>Lecture</b> ; Palaeohydrology – Rivers and lakes	No prac class this week	Petherick et al., 2013 Page et al., 2009 Hesse et al., 2018
<b>PH</b>		* <b>Activity</b> : - field trip preparation  <b>Flipped – Field area</b>		
6	31/4	6 – <b>Lecture</b> ; Palaeoenvironments and Palaeoclimates:  How did Australian ecosystems respond to climate change?	No prac class this week	Lowe, JJ Walker MJC – Ch2 Williams et al., 1998 – Ch 3, 4, 5, 6, 12 Lowe, JJ Walker MJC – Ch4 Williams et al., 1998 – Ch 7, 10 Rule et al, 2012
<b>PH</b>		* <b>Activity</b> : Australian palaeoecology		
7	7/4	<b>No lecture</b>	No prac class this week	
<b>PH</b>				
MID SEMESTER BREAK (2 weeks)				
MAJOR FIELD TRIP 18-24th APRIL <b>Module 3; Evidence for Environmental Change (Assessment 2 in field)</b>				
8	28/4	7 – <b>Lecture</b> : Dunes and dust: records from the deserts  8 - <b>Lecture</b> : Past and future <b>desertification</b> : natural and anthropogenic	<b>Module 4; Reconstructing Environmental Change</b>  28/4 Initial sample preparation	Fitzsimmons et al., 2013  Lowe, JJ Walker MJC – Ch3
<b>PH</b>				

9	5/5 PH	9 – <b>Lecture:</b> Fire in the Australian landscape: people v climate  * <b>Activity:</b> The Anthropocene and the Australian environment	5/5 Laboratory project I –E5A 240. Particle size analysis methods.	Mooney et al., 2011  Lewis and Maslin, 2011
10	12/5 PH	<b>No lecture</b>	12/5 Lab Project II. E5A 240.	
11	19/5 PH	<b>No lecture</b>	19/5 no prac	
12	26/5 PH	<b>No lecture</b>	26/5 no prac	
13	2/6 KW	* <b>Activity;</b> Exam preparation	2/6 ENV5 340 conference – presentation of lab data. E5A 240. <b>(Assessment 3)</b>	

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Students seeking more policy resources can visit the [Student Policy Gateway \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## PENALTY FOR LATE ASSIGNMENTS & PLAGIARISM

**Overdue assignments attract a penalty of 10 % per day** i.e. the mark out of which they are assessed will be reduced by 10% for every day that they are late! ALL assignments must be submitted, however late, otherwise you will be excluded from the unit. **Late assignments must be submitted online via the Grademark system.**

If you wish to seek an **extension** on the grounds of illness or misadventure, you MUST submit a copy of the UNIVERSITY'S form as well as a medical certificate or other appropriate proof which shows you were incapacitated. **These must be submitted through the Student Office, not directly to unit staff**, however you should advise us of your situation as early as possible. Regular work commitments are not a reasonable excuse for lateness; plan your time. However, having said that, please DO NOT hesitate to discuss with the unit staff any circumstances which may be preventing you from completing assignments on time or hindering your study in any other way. From experience, we know that early action is best!

**Plagiarism** will not be tolerated and will be checked via the Turnitin software. Quotations should be avoided and only really used if the point being made is vital to your argument and if you could not express it better yourself. If you paraphrase, you must acknowledge your authority as you would when quoting directly - after the paraphrased section or quotation, i.e., (Merali and Skinner, 2009, p. 293). Make sure you document this reference in your list of References. Remember, if you copy any sections of text word-for-word without denoting a quote this is plagiarism – even if you include a reference - **PLAGIARISM IS CHEATING! Therefore you either directly quote or paraphrase both with references.**

*An example* of a direct quote: **Brown et al. (1990 p. 12) conclude that ‘the depth to the Moho under the oceans is less than under the continents’.** Note that for a direct quote the page must be cited.

*An example* of a general acknowledgement of the source of information: **As explained by**

### **Laing (1991) the mid ocean ridges are etc.**

*An example* of a more specific reference but not a direct quote: **The distribution of Tertiary volcanism in eastern Australia (Johnson 1990) can be used to infer etc.** From this the reader would conclude that Johnson (1990) provided information on the distribution of...

*An example* of a more general reference to sources: **Most older textbooks in geology (e.g. Rastal 1941; Stamp 1938) either ignored the deep ocean basin deposition or etc.**

Only those sources referred to in the text of the essay should be listed in the reference list at the end of the essay.

This is always a difficult topic when conducting group assignments, and data sharing is required. Unless otherwise stated, the **results of group work are group contributions** and can be disseminated amongst the group members. **However, each student is required to produce their own interpretations of this data.** Drawing up your own diagrams is an important skill, so we require that each group member present their **own** diagrams, graphs etc. The only exception to this is data that is collected as part of a group effort – e.g. an airphoto interpretation that is collectively drawn. In this case ensure that when you present this piece of work that each author is acknowledged, and if possible define who completed which part of the output. **If uncertain, ask before submission!**

### **APPEALS**

Students have the right to appeal their final grade in this unit. Prior to initiating a formal appeal the student is required by the Division of Environmental and Life Science to have preliminary discussions with the staff member responsible for the unit. This discussion is to be undertaken in the context of unit requirements as set out in the unit outline. A full statement on appeals procedure is available in the Division Office or in the student centre.

### **FEEDBACK**

At all stages in this unit we will try to give you critical feedback on your understanding and performance. The unit has been structured so that assessable practicals and field reports allow us to monitor your progress and understanding throughout the unit. This includes both conceptual and practical (such as field skills) components.

We will do our best to return assessment items to you within 2 weeks of submission (sometimes faster). Feedback will be given you as individual comments on each piece of work and also some comments delivered to the group in class. The assessed practicals concentrate on specific practical skills where feedback is detailed but usually short. The field reports will normally carry longer comments addressing both specific skills and generic skills.

If at any stage you wish to receive guidance on the content of the unit or your performance then we encourage you to approach one of the staff and arrange a meeting. Likewise, if you would like more detailed feedback or explanation of the feedback you have received then please approach the staff member who gave this feedback to arrange a meeting.

Finally, we appreciate your (constructive) feedback too. This is especially the case given that this is only the fourth time we are running this unit. Our goal is to improve our teaching (and your learning) continuously. We ask for your feedback at the end of semester and value your specific

comments via the **TEDS** survey (please attend the final lecture so that you can contribute). We are also happy to receive your comments throughout the semester.

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Changes from Previous Offering

Background to the unit

### ENV53240 AND THE EARTH SURFACE SCIENCE PROGRAM AT MACQUARIE

ENV53240 -formerly ENV5340 and ENVE340 is one of the core 300-level unit in Earth Surface

Science (formerly Geoecology), and alongside ENV5 339 (Fluvial Geomorphology and River Management), ENV5 338 (Environmental Quality, capstone), ENV5 341 (Advanced Environmental Earth Science) make up the requirements for a major in Environmental Earth Science. Other units that are suggested as part of an Environmental Earth Science program include ENV5 361 (Environmental Management) and ENV5 382 (Environmental Analysis Using GIS), and ENVE 389 (Special interest seminar).

Earth Surface Science aims to describe the diverse physical processes found at the earth's surface and the connections between them. This area lies at the nexus between earth systems and biological systems – it is often concerned with landscapes and the landforms, sediments and soils within them but also, and crucially, the interaction of plants and animals in directing processes and shaping habitat. Earth Surface Science combines aspects of Geomorphology, Soil Science, Natural Hazards, Environmental Management and Ecology. As a consequence, graduates gain skills essential for management of natural resources, including rural rivers and lands, and highly altered landscapes, including urban environments and mining areas.

Graduates of the Earth Surface Science major are in a wide range of workplaces including: environmental and geotechnical consultancies, local government (environmental officers), state government departments (Infrastructure, Planning and Natural Resources; Environment and Conservation), National Parks and Wildlife Service, Sydney Water, mining companies (environmental officers), teaching (primary and secondary) and research.

This major is offered within the Bachelor programs of Science and Environment. It is highly compatible with a double major in Environmental Management, SIS, Climate Science, Ecology, Environmental Geology, Marine Science and Museum Studies. Depending on your own goals you may decide to combine EES units with other fields e.g. geology, atmospheric science, biology, Geographic Information Science (GIS).

## **CHANGES TO THIS UNIT IN 2020**

In 2010 this unit changed from a 4cp to a 3cp, as well as changing code from GEOS337 to ENVE377 and in 2011 changed to ENVE340 due to curriculum changes. In order to meet the workload requirements of the reduced credit point load, we have changed the unit by reducing the number of lectures, the number of practical classes and the time demands of the field trip assignment. However we feel that we are still trying to get the balance right – and that is partly because we need to get more information on how long each of the assessment tasks takes to complete. We will seek your feedback to try and make sure this is manageable. In response to feedback last year the first assignment has been reduced. In addition the practicals are now completed in class rather than requiring extra work at home, but the hand-in sheet allows you to still be assessed for this work. In addition some flipped lecture content has been removed and some lectures merged to reduce content - there is also a week off lectures and pracs in both the first and second half of semester. This year we have focused the face-to-face teaching in the weeks fieldtrip and reduced the lecture and prac time across the 13 weeks - this should cut down on workload and make the unit more manageable.

## **Fieldwork**

### **FIELDWORK**



**Weather:** We **never** cancel fieldtrips for bad weather! You must be prepared to work in the rain with the appropriate clothing and waterproof notebooks. Likewise you should always protect yourself from the sun and dehydration.

**Transport:** Nerrandera/Griffith: We will meet in the compound behind 11WW, at 7 am on the 18th of April. We will arrange accommodation bookings.

**Cost:** You must cover your own food and accommodation, the University will cover the transport costs. We have booked accommodation on behalf of the group, and you will need to use the payment slips at the rear of the book **before the trip** – amount is to be advised.

**Accommodation:** Field accommodation is in a caravan Park in Nerrandera/Griffith. There will be communal kitchens, dining, bathroom/toilet and work areas with limited power. You should bring (apart from the gear listed below) a sleeping bag, pillow and towel. The cost is the same no matter what accommodation option you choose (amount to be advised).

**Departure:** Mid semester field trip: we will aim to depart in time to return to the University by 6 pm on Sunday night. However, given the distance involved this time should be considered an aim rather than an absolute.

#### PERSONAL FIELD EQUIPMENT

We will be working in a remote environment – both remote from help and in a regional part of Australia, so you will not be able to buy any equipment after departing Sydney.

What we will provide:

- tape measures, augers, spades, soil kits, GPS, geological hammer, grain size card, safety equipment.

Personal field equipment required (i.e. you will need to buy and bring it)

- sturdy shoes ('no visible skin below the ankles')- sandals, thongs, or high heels are for après-field activities
- water bottle (full, of course!)
- wet weather gear - we go whatever the weather! If it rains at Kosi it will get very, very muddy, so at least two sets of old clothes are recommended.
- hat (with a wide brim, front and back) and sunscreen
- field note book and pencils (see note below)
- calculator, hand lens
- camera
- your lunch, drinks & snacks for the day - we do not stop at shops!!!
- a back pack to store it all in



If you have a laptop computer you may find it useful for compiling data while in the field. It is not essential that everyone bring a laptop, but at least one per group is suggested. At least two will be available for loan from Environmental Science (but competition for them might be high).

Other personal items for the mid-semester field trip

sleeping bag and sheet – may be necessary for the shearers quarters – we will inform you closer to the departure date.

cooking/eating – no utensils necessary; but we will cook in the cabins.

towel/toiletries – bring these

food – there will be limited opportunities to purchase food, but the accommodation should have fridges. Expect to stock up on the drive to Wirroona. However, it is feasible that the local supermarket at Dubbo might not have the exact brand of exotic spice/unusual vegetable/vegan expresso chocolate that you covet, so if you can't go without for the week bring it along with you. Be a bit sensible here though as it's a long drive in a small minibus...

*FIELD NOTE BOOK: Each student MUST purchase a small hardcover notebook for use in the field. It should be bound down the spine on the left side, or across the top (but NOT spiral bound). Use only ball-point pen, felt tip pen will run in wet weather and pencil will smudge or rip wet paper. The best, and most expensive, option is a waterproof 'rite-in-the-rain' notebook. Write your personal details on the first page, and a table of contents inside the front cover. On each field day, write the date and project title, the site details, and all observations and measurements, including details of methodology.*

*It is important that you get into the habit of writing thorough, accurate and legible notes at the outset - after all, if you are an expert witness for some environmental issue, your notebook can be tendered as evidence in legal proceedings, either in the Land and Environment court or at a Commission of Inquiry. Get into the practice of structuring your notebook at the start of each exercise and continually taking notes. Do not depend on others, unless prescribed roles are allocated and this is one of the designated tasks.*

## **SAFETY IN THE FIELD AND LABORATORY**

Any student who has a disability that may limit their participation in field work or that could result in a medical emergency in the field should notify the unit convenor immediately. As a general guide to the level of physical fitness required, you should be able to walk 10 km over open undulating terrain in 3 hours.

**Each student must ensure his/her own safety at all times during field excursions.**

- Do not undertake fieldwork alone. You must work with at least one other person.
- You must be adequately equipped to undertake fieldwork, including wet weather clothing, warm clothing, hat and sun protection, protective footwear (closed toe boots or shoes).
- You should bring a first aid kit if you have one (they will be provided to each group).
- Do not undertake any activity you feel to be unsafe. Discuss with the fieldtrip leader any

concerns you have about particular tasks.

•Be watchful of the safety of your fellow students, if they become separated from the group or are at some other risk. Tell the fieldtrip leader as soon as you notice a potentially dangerous situation.

Laboratory work in this unit does not involve hazardous chemicals. Nevertheless, in the laboratory you must wear safe (closed) footwear and generally follow safe practice. Where items of equipment are to be used, do not use them until you have received adequate training.

## Grading of assessed tasks

### Grading of assessed tasks

All assessment tasks will be assessed according to the following criteria:

- level of accuracy and detail in description.
- use of terminology
- presentation
- use of resources
- use of theoretical concepts to support your evaluation

Other specific criteria are given with each Practical and Assignment description elsewhere in this book.

Each assessment item will be returned to you with a letter grade (HD, D, Cr, P, PC, F) determined by the marker according to the University's guidelines.

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include one of these grades plus a standardised numerical grade (SNG). On occasion your raw mark for a unit (i.e. the total of your marks for each assessment item) may not be the same as the SNG which you receive. Under the Senate guidelines, results may be scaled to ensure that there is a degree of comparability across the university, so that units with the same past performances of their students should achieve similar results. It is important that you realise that the policy does not require that a minimum number of students are to be failed in any unit. In fact it does something like the opposite, in requiring examiners to explain their actions if more than 20% of students fail in a unit. The process of scaling does not change the order of marks among students. A student who receives a higher raw mark than another will also receive a higher final scaled mark. For an explanation of the policy see: <http://www.mq.edu.au/senate/MQUonly/Issues/Guidelines2003.doc> or <http://www.mq.edu.au/senate/MQUonly/Issues/detailedguidelines.doc>

Grades for each assessment item and for the unit as a whole will be awarded according to the following general criteria:

	<i>Developing</i>	<i>Functional</i>	<i>Proficient</i>	<i>Advanced</i>
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<p><b>General description of the level of attainment</b></p>	<p>Has not yet reached the desired standard. Limited understanding of required concepts and knowledge.</p> <p>A fail grade (or under some circumstances, a conceded pass) would be given.</p>	<p>Has reached basic academic standards. Work has limited translation of concepts and procedures to new contexts unless aided.</p> <p>A pass grade would be awarded.</p>	<p>Has completely reached the standards expected. Can work independently in new contexts, adapting procedures to meet the context. Demonstrates awareness of own limitations. A credit grade would be awarded.</p>	<p>Has gone beyond the expected standards. Exhibits high levels of independence and can use concepts to generate new ways of completing procedures. Can engage in productive critical reflection.</p> <p>A grade of distinction or high distinction would be awarded.</p>
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**Penalty for Late Submission.** There is no room for lateness! However, if you should hand in some component late you will be penalised 10% each day. Come and see us **before** handing in late to discuss options

**Extensions.** There is no room for extensions either. However, if something comes up you must discuss an extension with a staff member **before** the deadline.

**What is required to complete this unit satisfactorily?**

- **Attendance:** make the most of the opportunities available to you: attend lectures and practicals and the two fieldtrips. You may only submit assessment items based on practicals and fieldwork if you attended those sessions.
- **Assignments:** you must hand in/complete ALL the assessment tasks to complete the unit
- **Attitude:** look, read, ask, discuss, debate, enjoy
- **Quality:** your assessment items will be graded according to your achievement of the learning outcomes. We are looking for deep understanding as well as competence in particular skills of data collection, analysis, interpretation and presentation.
- **Honesty and sharing:** you will often work in groups in the field and the laboratory but all the assessment tasks are individual. Group data must be shared freely but presentation, writing up and interpretation are to be the efforts of each individual. Macquarie's procedures relating to **plagiarism** can be found at <http://www.student.mq.edu.au/plagiarism/>
- Macquarie University has a range of policies that relate to learning and teaching, including
  - o - assessment
  - o - unit guide
  - o - special consideration
  - o They can be found at Policy Central (<http://www.mq.edu.au/policy/>).