



# ENVE266

## Earth Surface Processes

S1 Day 2014

*Dept of Environment & Geography*

### Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	8
<u>Policies and Procedures</u>	11
<u>Graduate Capabilities</u>	12
<u>About this unit and Environmental Earth Science Major</u>	19
<u>Fieldwork</u>	20
<u>Geoff Humphreys Prize</u>	22
<u>Information on Assessment Tasks</u>	22

#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit Convenor

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Credit points

3

Prerequisites

ENVE117(P) or GEOS117(P) or GEOS112(P)

Corequisites

Co-badged status

Unit description

Understanding how and why the Earth's surface looks and changes in the way it does is fundamental to effective environmental management. This unit examines earth surface processes from a catchment perspective: hill slopes and soils; rivers and floodplains. We draw on Australian and overseas examples from diverse environments to demonstrate how biophysical processes shape our landscape. Students gain practical, laboratory and field-based skills that help them interpret the landscape. These are taught in both on-campus sessions and weekend field trips. This unit builds on themes introduced in ENVE117 and GEOS112, and provides a sound conceptual background for students continuing in environmental sciences, environmental management and programs in ecology, biology, geology and archaeology.

## 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:

Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil

and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power

Demonstrate critical thinking in your reading of the literature and interpretation of your own data

Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses

Design a field research project including data gathering and interpret your own data

Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Assessment Tasks

Name	Weighting	Due
<u>Practicals</u>	10%	10 am Tuesday follow
<u>Field Report 1</u>	20%	10 am 29/4/14
<u>Field Report 2</u>	30%	10 am 13/6/14
<u>Exam</u>	40%	tba

### Practicals

Due: **10 am Tuesday follow**

Weighting: **10%**

Externals: Due Friday 5 pm prior to fieldtrips (electronic submission)

Internals: Due 10 a.m. Tuesday following practical classes (electronic submission)

On successful completion you will be able to:

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power

- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Field Report 1

Due: **10 am 29/4/14**

Weighting: **20%**

to be submitted electronically through Turnitin (see iLearn page)

On successful completion you will be able to:

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Field Report 2

Due: **10 am 13/6/14**

Weighting: **30%**

to be submitted electronically throughg Turnitin (see iLearn page)

On successful completion you will be able to:

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a

geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power

- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Exam

Due: **tba**

Weighting: **40%**

see e-reserve for past exam papers

On successful completion you will be able to:

- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Delivery and Resources

### UNIT ORGANISATION

- Lectures are held each Monday at 3 and Thursday at 9 in E7B100
- Each internal student must attend one of three weekly 3 hour practical sessions, usually held in E5A240
- External students must attend two on-campus sessions: 29 & 30 March and 10 May
- There are two compulsory 2 day fieldtrips for all students: 5 and 6 April, and 24 & 25 May

**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 course. 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/> for viewing and/or printing. Audio recordings of the lectures are available on-line shortly after delivery and are mailed to external students after that.

**PRACTICAL CLASSES** comprise a practical exercise, including map and air photo interpretation, numerical analysis, examination of rocks and sediments or local fieldwork. Practicals provide greater depth to the related lecture materials and are designed to assist learning by encouraging your active participation. You will usually complete the practical within the class time. The venue of the practical classes varies (see page 5). The week 1 practical is held in E5A240 and some other practicals will be held in the field within a short distance from the university. Important material for the practical classes is included in this book. Additional material may be posted on Blackboard 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 (week 1) and field: closed shoes, sun protection etc.**

**ON-CAMPUS SESSIONS FOR EXTERNAL STUDENTS** are held on weekends 1 or 2 weeks prior to the two weekend fieldtrips. There is no need to sign on at COE. You should proceed to Building E5A Room 240 by 9am. On the first day of the first on-campus session, the group will then proceed to a field site in the Lane Cove valley, starting at the end of Vimiera Rd, Marsfield (see Practical 2 description) by 9.30. We will proceed by private vehicles (sharing) and spend the morning in the field, away from shops, toilets or other facilities.

Each of these sessions will enable you to undertake the practical components of the unit and also discuss the lecture content with the lecturers. You will be expected to have listened to the audio lecture recordings before each on-campus session. In some cases (where internal lectures lag behind) you will be given additional introduction before each practical activity. It is **expected that external students will be able to access the Internet**. If you do not have dial-up or broadband internet access from home, most local libraries have access.

**FIELD WORK** There are two **compulsory** weekend fieldtrips in this unit during which a range of natural and human-modified landscape features are examined. Each of these fieldtrips reinforces and extends the content of the Soils and Coasts modules (first fieldtrip) or Catchment and Fluvial Processes module (fieldtrip 2). The major assignments are based on these field trips. In addition, two of the weekly practicals (Weeks 2 and 3) will be conducted in the field within the normal practical class times. The assignments and fieldtrips are described in detail elsewhere in this book. Equipment and safety issues for field work are described below.

### **TEXTBOOKS and ESSENTIAL READINGS**

The following texts are suggested as being valuable reading. You are not required to purchase them, but may find them useful. There are some copies in the library.

- Paton TR, Humphreys GS and Mitchell PB 1995. *Soils: A New Global View*. UCL Press.
- Brierley, G.J. and Fryirs, K.A., 2004. *Geomorphology and River Management*. Blackwell Publishing.
- Fryirs KA and Brierley GJ, 2013. Geomorphic analysis of river systems. Wiley-Blackwell. ISBN 978-1-4051-9274-3. (this book is an alternative to Brierley and Fryirs, above, but may not be available early in 2013)

To keep up with lecture materials and also some of the practical classes and the fieldtrips you should complete all ‘essential’ reading BEFORE the lectures each week. Essential readings are shown on the timetable on page 5.

### **TECHNOLOGY USED AND REQUIRED**

You will require access to a computer for parts of this unit. You can gain access to slides used for each lecture by visiting the iLearn page for ENVE266 (<https://ilearn.mq.edu.au/>). Audio lecture recordings will also be available shortly after live presentation

through Echo 360 link in iLearn. iLearn may be used by staff to send reminders and notices concerning fieldtrips, practical classes and lectures. You should check the site regularly, especially the day before lectures/pracs. There is also the space for a bulletin board discussion between students; please feel free to use this to discuss issues relating to any aspect of the unit and geomorphology in general. For specific questions of the lecturers, email them directly (see front cover). The major assignments must also be submitted electronically through Turnitin, via the iLearn page for this unit. This software provides a means of gauging the timing of submission, an originality checker to test for potential plagiarism and a paperless grading system, more information on this program can be found at (<http://turnitin.com/>) and ([http://mq.edu.au/iLearn/student\\_info/assignments.htm](http://mq.edu.au/iLearn/student_info/assignments.htm)) and a 'quick guide' in ilearn next to the Turnitin link.

Many of the readings (scientific papers) are available on-line from the library's e-reserve page for ENVE266 (<http://www.lib.mq.edu.au/borrowing/ereserve.php>).

### WORKLOAD

ENVE266 is a 3 credit point unit and, according to University guidelines, you should spend at least 9 hours on the unit each week, or 135 hours over the 15 week semester. The following is a guideline as to how that time should be spent:

24 lectures 24 hours

4 days of excursions 28 hours

Writing up field trip reports 30 hours

8 practicals 24 hours

Writing up 4 assessable practicals 8 hours

Your own study time for ENVE 266 should therefore be a **minimum** of an **additional 2 hours per week**. Simply attending lectures and practical classes is not enough to guarantee a good grade.

### 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/>

## CHANGES TO THIS UNIT IN 2014

This unit will be offered in 2014 in much the same format as 2013. We always tinker a little to try and make things better and in 2014 there are some changes to the structure of the first fieldtrip to improve data analysis skills teaching and to accommodate the early fieldtrip necessitated by the fall of Easter in term time.

In 2014 we have also added online submission of the practicals, as well as the major assignments, through Turnitin

## Unit Schedule

### ENVE266 Earth Surface Processes –TIMETABLE 2014

#### INTERNAL LECTURE AND PRACTICAL CLASS TIMETABLE

Week	Week begin- ing	Lecture Title	Practical Class	Essential reading
1	3/3	1 Introduction: unit organization; philosophy, science & geomorphology  2 The biomantle	1 Soil materials - E5A 240	Summerfield, Ch 1  Summerfield, Ch 2-5
2	10/3	3 Soils and surface processes  4 Weathering and soil landscapes	2 Hillslope processes and surveying (in the field)	Bishop et al., 1980; Paton et al, 1995, Ch 3-4
3	17/3	5 Soil mapping  6 Soil models and classifications	3 Soil description (in the field)	Paton et al., 1995, Ch 1-2.  Paton et al., 1995, intro.



4	24/3	7 The Coastal System	4 Aerial photograph interp (API) and first field trip preparation: Coastal landforms and processes E5A 240	Short & Wright, 1983
5	31/3	8 Waves and beach morphodynamic		
		9 Aeolian processes at the coast	(students may complete API from Prac 4)	Lees, 2006; Thompson 1981 Lambeck & Chappell, 2001; Thom & Roy, 1985
		10 Coastal Evolution and Sea level change		
FIRST WEEKEND FIELD TRIP: SMITH'S LAKE/ SEAL ROCKS 5 <sup>TH</sup> AND 6 <sup>TH</sup> APRIL				
6	7/4	11 First fieldwork report: what to do	5. post-fieldwork data preparation and analysis	Tree in the Woods' (iLearn) Cooke and Doornkamp, 1990 Ch 10
		12 Bedrock coasts, Storms and Tsunamis, and coastal management		
MID SEMESTER BREAK 14 <sup>th</sup> -27 <sup>th</sup> April (2 weeks) FIELD REPORT 1 DUE 10 AM TUESDAY 29 <sup>TH</sup> APRIL				
7	28/4	13 Diversity of rivers	6 The Diversity of Rivers E5A240	Brierley & Fryirs, 2005 Ch 4; Tooth & Nanson, 1995
		14 Catchment perspectives and sediment budgets		
8	5/5	15 Channel dynamics and magnitude-frequency relationships	7 Flood Hydrology and Stream Power Analysis E5A240	Wolman and Miller, 1960; Wolman and Gerson, 1978; Brierley & Fryirs, 2005 Ch 4 & 5
		16 Geomorphic units and river behaviour		

9	12/5	17 Floodplain forms and processes  18 Fluvial sedimentology and river evolution	<i>No practical class</i>	Nanson and Croke, 1992; Brierley, 1996; Brierley & Fryirs, 2005 Ch 6
10	19/5	19 River responses to human disturbance  20 Rivers summary and reviews	8 Second field trip preparation E5A240	Crouch & Blong, 1989
SECOND WEEKEND FIELD TRIP: MACDONALD RIVER 24 <sup>th</sup> AND 25 <sup>th</sup> MAY				
11	26/5	21 Post field-trip overview  22 Mass transport	9 Second fieldtrip data analysis E5A240	Selby, 1993, Ch 14
12	2/6	23 Long-term landscape evolution  24 Rapid landscape evolution: the geomorphology of uplifting regions	<i>No practical class</i>	Summerfield, 1991 Ch 18  Summerfield, 1991 Ch 15
13	9/6	<i>no lecture (Monday – Queen's birthday)</i>  25 Unit overview, exam discussion & TEDS	<i>No practical class</i>	
FIELD REPORT 2 DUE 10 AM TUESDAY 10 <sup>th</sup> JUNE				

## EXTERNAL ON-CAMPUS SESSION and FIELDTRIP TIMETABLE

Date	Place	Content	Readings
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29 <sup>th</sup> and 30 <sup>th</sup> March	E5A240 9am and field from 9.30am (see Prac 2) to 5pm	Soils and coasts (based on lectures 1 to 68) Day 1: practicals 2 and 4; Day 2: practicals 1 and 3; 4 continued	as above
5 <sup>th</sup> and 6 <sup>th</sup> April	<b>FIELDTRIP</b> – Smith's Lake/Seal Rocks	Coastal geomorphology and evolution. Own transport required to Smith's Lake (Friday PM). Finish on site by 4pm Sunday.	see fieldtrip outline
10 <sup>th</sup> May	E5A240 - 9am to 5pm	Catchments and Rivers practicals 6 to 8 ( based on lectures 12 to 19)	as above
24 <sup>th</sup> and 25 <sup>th</sup> May	<b>FIELDTRIP</b> – Macdonald River	Catchment and fluvial processes. Own transport required to Wiseman's Ferry (Friday PM). Finish on site by 4pm Sunday.	see fieldtrip outline

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy [http://mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/student\\_conduct/](https://students.mq.edu.au/support/student_conduct/)

## 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 improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## 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)

## IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

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

## Graduate Capabilities

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood

return period and stream power

- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## **Assessment tasks**

- Practicals
- Field Report 1
- Field Report 2

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
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- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Assessment tasks

- Practicals
- Field Report 1
- Field Report 2
- Exam

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## Learning outcomes

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
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- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## Assessment tasks

- Practicals
- Field Report 1
- Field Report 2

- Exam

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
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- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

### Assessment tasks

- Practicals
- Field Report 1
- Field Report 2
- Exam

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## **Assessment tasks**

- Practicals
- Field Report 1
- Field Report 2
- Exam

## **Creative and Innovative**

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships



- f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## **Assessment tasks**

- Practicals
- Field Report 1
- Field Report 2
- Exam

## **Effective Communication**

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Demonstrate your ability to 'Read the landscape' through morphodynamic description and analyses
- Design a field research project including data gathering and interpret your own data

- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## **Assessment tasks**

- Practicals
- Field Report 1
- Field Report 2
- Exam

## **Engaged and Ethical Local and Global citizens**

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

## **Assessment tasks**

- Practicals
- Field Report 1
- Field Report 2

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate field skills, including a) make clear, accurate field descriptions of geomorphology, soil profiles, sediment sections b) interpret landforms and make a geomorphic map from your interpretation of air photographs, maps or other sources c) survey topography (tape and clino), compute and plot data d) describe and sketch soil and sediment sections in the field using standard methods e) draw and interpret stratigraphic sections, correlate profiles and interpret temporal and process relationships f) analyse hydrology using river styles and river planform description/classification, flood return period and stream power
- Demonstrate critical thinking in your reading of the literature and interpretation of your own data
- Design a field research project including data gathering and interpret your own data
- Communicate scientific information and concepts through oral, visual and written formats, including scientific reports

### Assessment tasks

- Practicals
- Field Report 1
- Field Report 2

## About this unit and Environmental Earth Science Major

### AIMS AND SCOPE

Welcome to ENVE266 Earth Surface Processes. ENVE266 aims to present a unified picture of processes, materials and forms occurring at the surface of the earth. That means how and why the earth's surface looks and behaves as it does and includes the soils, sediments and landforms as well as the processes important to them. Given its antiquity, along with its geographic, tectonic and climatic character, Australia has a distinctive and diverse landscape. The unit therefore draws unashamedly on Australian, and often local, examples which have immediate relevance to Australian environmental problems. The principles and ideas, however, are certainly global and possibly universal (at least applying to the solar system). We aim to give you the 'tools' to understand landscape processes no matter where you are. Time constraints prevent coverage of all aspects of geomorphic enquiry. Emphasis is placed on soil materials, slope, river and coastal environments, although the arid interior of Australia and other exotic places are also examined

briefly and the role of human activities is examined. Connections between various aspects of the landscape will be stressed, aiming to provide an integrative perspective on surface processes.

## ENVE266 AND THE ENVIRONMENTAL EARTH SCIENCE MAJOR AT MACQUARIE

ENVE266 is the core 200-level unit in Environmental Earth Science and is the main prerequisite for the 300-level units ENVE338 (Environmental Quality and Assessment), ENVE339 (Fluvial Geomorphology and River Management), ENVE340 (Environmental Change) and ENVE341 (Advanced Environmental Earth Science) which comprise the Environmental Earth Science major.

Environmental Earth Science describes the study of the earth's surface, the diverse physical processes found there and the connections between them. As the name suggests, it 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. Environmental Earth 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 Environmental Earth Science program 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.

Environmental Earth Science is offered as a major within the Bachelor of Science and Bachelor of Environment. It is also suitable as a component of other specialised programs, including Environmental Management, SIS, Climate Science, Ecology and Environmental Geology. Depending on your own goals you may decide to combine Environmental Earth Science units with other fields e.g. geology, atmospheric science, biology, Spatial Information Science (SIS).

Second year is usually the time you will need to make a decision about your goals and your academic program. Please feel free to discuss your program with any of the staff in the unit at any time during the semester.

You can also find more information about the Environmental Earth Science program and units of study at:

<http://www.envsci.mq.edu.au/geoecology/index.html>

## Fieldwork

**FIELD WORK** There are two **compulsory** weekend fieldtrips in this unit during which a range of natural and human-modified landscape features are examined. Each of these fieldtrips reinforces and extends the content of the Soils and Coasts modules (first fieldtrip) or Catchment and Fluvial Processes module (fieldtrip 2). The major assignments are based on these field trips. In addition, two of the weekly practicals (Weeks 2 and 3) will be conducted in the field within the normal practical class times.

### FIELDWORK

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

**Transport:** You will need to arrange your own transport for these fieldtrips. Ideally you should arrange to drive to each site with several other students from your practical class.

**Arrival:** Both fieldtrips start at 8 am on the Saturday morning and therefore you should arrive the previous afternoon. We book accommodation for the Friday and Saturday nights.

**Cost:** You must cover your own food and transport costs and pay for accommodation. We book accommodation on behalf of the group and you must pay your money to the Cashier using the payment slips found on the iLearn page BEFORE THE TRIP.

**Food:** You should bring food for breakfast (2 days) and lunch (2 days - to be carried into the field). You should cater for your own dinner on the Friday night and we will organise a BBQ on Saturday night.

**Accommodation:** Field accommodation is in bunk rooms with communal kitchens, dining, bathroom/toilet and work areas. You should bring (apart from the gear listed below) a sleeping bag, pillow and towel. You can camp, but the cost is the same.

**Departure:** We aim to leave the field by 4pm on the Sunday afternoon, after all field equipment is returned and the accommodation cleaned. You must advise a staff member before returning home.

**Personal Field Equipment:** Each student should bring the following aids/comforts on each field trip:

- sturdy shoes - no sandals, thongs, or high heels! (no visible skin below the ankles)
- water bottle (at least 1 litre)
- wet weather gear - we go whatever the weather!!! Cheap plastic ponchos will not survive walking through scrub.
- hat (with a wide brim, front and back) and sunscreen
- field note book and pencils (see note below)
- calculator, hand lens, small pocket knife
- camera
- your lunch, drinks & snacks for the day - we do not stop at shops!!!
- a back pack to store it all in

### **FIELD EQUIPMENT YOU SHOULD PURCHASE**

- Field notebook
- Hand lens

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). The notebook does not necessarily have to be used only for this unit (you may have used it on previous trips) but it should be good quality and able to withstand a week in the field – in what may be wet conditions. The best, and most expensive, option is a waterproof Rite-in-the-Rain, Markrite or Chartwell notebook. There are several versions but the best options are 1. Geological (Rite in the Rain 540F), with columns, lines and grids (good for sketching and data), included classifications; 2. Small Rite in the Rain notebook (200T) which can be inserted in a hard cover (200C). The first will last you several fieldtrips (and units), the second will probably last you this Unit.

A 10x hand lens can be purchased at the Campus Shop. It can be used in many ENVE, BIOL and GEOS units.

### **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.

## Geoff Humphreys Prize

All students taking ENVE266 are eligible for the Geoff Humphreys Prize for proficiency in this unit. The prize is for \$300 (cash).

Geoff Humphreys was a lecturer in Physical Geography from 1994 to 2007 but had an association with Macquarie extending back to the early 1970s when he began his undergraduate degree here. Geoff was an energetic and enthusiastic researcher and teacher in soil science and geomorphology. His great passion was researching the processes of soil formation, especially the role of the biosphere in soil turnover and movement – bioturbation. Geoff was very much at home in the field and greatly enjoyed teaching students in the bush where it is possible to see processes in action and also the landscape context of detailed measurements.

Geoff was instrumental in devising the curriculum of ENVE266 and taught in the unit for many years. This prize, first awarded in 2007 following Geoff's sudden death, is awarded to the student who shows the most proficiency in this unit which attempts to convey some of Geoff's fascination with how landscapes work.

## Information on Assessment Tasks

### ASSESSMENT TASKS

#### PRACTICALS (10%, four assessable practicals)

These should be clearly presented (as opposed to beautiful) but short and not over-produced. The main objective is to see that you have understood the content of each practical and are competent in the required skills so that we can monitor your progress. The remaining pre and post fieldwork practicals will be used for preparation of maps or data analysis which will be used in the fieldwork reports.

<i>Developing</i>	<i>Functional</i>	<i>Proficient</i>	<i>Advanced</i>
an incomplete or unreadable record of observations; many inaccuracies, gaps, few or inaccurate interpretations	record accurately and clearly details of location, observations, data, interpretations using diagrams, tables, maps, graphs and text. Give clear, complete answers to questions	complete, accurate and clear record (as for Functional) with clear interpretations, considered answers, additional schematic diagrams	as for proficient but with original attempts at synthesis and exploration of hypotheses.

**FIELD REPORT 1 (20%)**

This report is based on the first weekend fieldtrip, the preparatory practical sessions, post-fieldwork data analysis and your own reading and research on the topic. You will be given a question (Report 1, see below) which you must address in your report. The research and thought which go into each report are an important part of your learning in this unit. We expect that you will deepen your understanding of the topic and your field experience by discovering the links between your observations and previous published research in the scientific literature. The report should be presented with a high standard of presentation (clarity and accuracy, not necessarily ‘pretty’), with diagrams, maps, graphs and tables (as appropriate) and standard scientific citation and referencing. You will be provided with some essential and useful readings for these reports but you should also undertake your own research of the primary scientific literature.

<i>Developing</i>	<i>Functional</i>	<i>Proficient</i>	<i>Advanced</i>
Lacks a clear explanation of research question, hypothesis or research strategy. Results may not be presented completely or accurately and may not support interpretations. May lack support from suitable literature.	able to explain the research question clearly; explain the hypothesis and show a clear and suitable research strategy; show appropriate results clearly and with accuracy; draw main conclusions from data and outstanding limitations. Supported by reference to appropriate literature.	as for functional level but with greater insight into question, results and interpretations. Includes acknowledgement and/or discussion of limitations of data/interpretations.	as for proficient but with originality in approach and/or interpretation of results.

**FIELD REPORT 2 (30%)**

This report is based on the second weekend fieldtrip, the preparatory practical sessions, post-fieldwork data analysis and your own reading and research on the topic. You will develop your own question (Report 2, see below) which you must address in your report, tailoring the presentation and discussion of your results to answer the question and placing them within a context revealed by your readings. The report should be presented in the format of scientific report, with a high standard of presentation (clarity and accuracy, not necessarily ‘pretty’), with diagrams, maps, graphs and tables (as appropriate) and standard scientific citation and referencing. You will be provided with some essential and useful readings for these reports but you should also undertake your own research of the primary scientific literature. See guidelines (below) for report writing style.

<i>Developing</i>	<i>Functional</i>	<i>Proficient</i>	<i>Advanced</i>

Lacks a clear explanation of research question, hypothesis or research strategy. Results may not be presented completely or accurately and may not support interpretations. May lack support from suitable literature.	able to explain the research question clearly; explain the hypothesis and show a clear and suitable research strategy; show appropriate results clearly and with accuracy; draw main conclusions from data and outstanding limitations. Supported by reference to appropriate literature.	as for Functional level but with greater insight into question, results and interpretations. Includes acknowledgement and/or discussion of limitations of data/interpretations.	as for Proficient but with originality in approach and/or interpretation of results.
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## EXAMINATION (40%)

The exam will be scheduled in the regular University examination period. The exam is 2 hours in length and will cover all subjects covered in the lectures, practicals and fieldtrips. There is a combination of short answer and longer (short essay) style questions. Past exam papers can be found on the library web site.

<i>Developing</i>	<i>Functional</i>	<i>Proficient</i>	<i>Advanced</i>
Unable to explain basic terms and concepts clearly or accurately. Unable to illustrate terms and concepts with specific examples or conceptual diagrams. Unable to extrapolate concepts to new situations.	able to explain terms and concepts clearly and accurately; can illustrate terms and concepts with specific examples and conceptual diagrams. Can apply knowledge to new situations with some competence.	as for Functional level but with greater critical insight. Includes acknowledgement and/or discussion of limitations or drawbacks of own knowledge.	as for Proficient but with originality in approach and/or interpretation.

The University examination period in First Semester 2010 is from 6/6/11 to 24/6/11. You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations. (<http://www.reg.mq.edu.au/Forms/APSCon.pdf>)

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at (<http://www.reg.mq.edu.au/Forms/APSCon.pdf>)

If a supplementary examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period. You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is the final day of the official examination period.

## 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 to 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. 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. We are also happy to receive your comments throughout the semester.