



# ENVE237

## Natural Hazards

S2 External 2014

*Dept of Environment & Geography*

### Contents

|                                |    |
|--------------------------------|----|
| <u>General Information</u>     | 2  |
| <u>Learning Outcomes</u>       | 3  |
| <u>Assessment Tasks</u>        | 3  |
| <u>Delivery and Resources</u>  | 9  |
| <u>Unit Schedule</u>           | 10 |
| <u>Policies and Procedures</u> | 11 |
| <u>Graduate Capabilities</u>   | 12 |

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## General Information

Unit convenor and teaching staff

Unit Convenor, Lecturer

Damian Gore

[damian.gore@mq.edu.au](mailto:damian.gore@mq.edu.au)

Contact via [damian.gore@mq.edu.au](mailto:damian.gore@mq.edu.au)

E7A630

Email for appointment

Lecturer

Kevin Roche

[kevin.roche@mq.edu.au](mailto:kevin.roche@mq.edu.au)

Contact via [kevin.roche@mq.edu.au](mailto:kevin.roche@mq.edu.au)

E7A806

Email for appointment

Tutor

Marek Rouillon

[marek.rouillon@mq.edu.au](mailto:marek.rouillon@mq.edu.au)

Contact via [marek.rouillon@mq.edu.au](mailto:marek.rouillon@mq.edu.au)

E7A831

Email for appointment

Credit points

3

Prerequisites

18cp(P)

Corequisites

Co-badged status

## Unit description

Everybody is at risk from natural hazards, either physically or economically, and as the global population grows, so too does the social and economic impact of natural disasters. Recent disasters in Australia have caused damage greater than \$1.5 billion and globally individual disasters have caused damage greater than \$100 billion. These disasters are a significant drain on our economy and cause enormous human suffering. However, some individuals, communities and societies are more at risk than others and experience greater losses following natural hazards. This unit examines the risk posed by natural perils through an understanding of the causes and impacts of the most significant natural hazards such as earthquakes, volcanoes, floods, tropical cyclones and tsunamis, as well as 'megahazards' such as asteroid impacts with Earth. A number of career paths are available for specialists in natural hazards – for example, the emergency services, disaster managers, the insurance industry and hazards research.

## 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:

Recognise and understand the key processes by which natural hazards occur.

Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.

Better understand the temporal pattern of natural hazards including return period.

Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

Develop critical reading and thinking skills through regular reading and assessment tasks.

Develop written and verbal communication skills.

## Assessment Tasks

| Name                   | Weighting | Due    |
|------------------------|-----------|--------|
| <a href="#">Prac 1</a> | 5%        | 17 Aug |
| <a href="#">Prac 2</a> | 5%        | 24 Aug |
| <a href="#">Prac 3</a> | 5%        | 31 Aug |

| Name                    | Weighting | Due    |
|-------------------------|-----------|--------|
| <a href="#">Prac 4</a>  | 5%        | 07 Sep |
| <a href="#">Prac 5</a>  | 5%        | 14 Sep |
| <a href="#">Prac 6</a>  | 5%        | 21 Sep |
| <a href="#">Prac 7</a>  | 5%        | 12 Oct |
| <a href="#">Prac 8</a>  | 5%        | 19 Oct |
| <a href="#">Prac 10</a> | 5%        | 02 Nov |
| <a href="#">Prac 9</a>  | 5%        | 26 Oct |
| <a href="#">Exam</a>    | 50%       | TBA    |

## Prac 1

Due: **17 Aug**

Weighting: **5%**

Earthquakes - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 2

Due: **24 Aug**

Weighting: **5%**

Volcanoes - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.

- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 3

Due: **31 Aug**

Weighting: **5%**

Mass movements - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 4

Due: **07 Sep**

Weighting: **5%**

Floods - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which

create "hazard pairing".

- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 5

Due: **14 Sep**

Weighting: **5%**

Tropical cyclones - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 6

Due: **21 Sep**

Weighting: **5%**

Tsunami - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 7

Due: **12 Oct**

Weighting: **5%**

ENSO - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 8

Due: **19 Oct**

Weighting: **5%**

Bushfire - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 10

Due: **02 Nov**

Weighting: **5%**

Social aspects - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Prac 9

Due: **26 Oct**

Weighting: **5%**

GIS - detail supplied on unit website

On successful completion you will be able to:

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Exam

Due: **TBA**

Weighting: **50%**

50%, 2 hour examination.

The exam will be set on any aspects of the lectures or practicals. It will consist of short, medium and long answer questions.

It will be set at a place and time by the University later in the semester.

On successful completion you will be able to:



- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".
- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

## Delivery and Resources

**Classes** - The timetable is at <https://timetables.mq.edu.au/> This unit is taught via lectures, workshops (practicals), readings and assessment tasks. Students should make use of iLearn to access teaching and learning materials, to stay in touch with the unit, to contact lecturers and tutors, and to discuss issues and concepts with classmates.

**Workload** - ENVE237 earns 3 credit points towards your degree. University guidelines state that this will involve a minimum of 3 hours per week per credit point, in order to achieve a Pass grade. Therefore, for a 3 credit point unit you are expected to invest at least 9 hours of study per week on average over the semester. This requires planning on your part to do all the work required in lectures, workshops, assignments, reading and for the final exam.

**Assignment Submission** - Assignments in ENVE237 must be submitted via turnitin on the unit website. You don't need a coversheet. All work must be original and, if you choose to enrol in ENVE237, you must understand and agree to adhere to the University's guidelines on academic honesty. Please identify your practical via your name on the filename you upload, e.g. "Smith\_Prac1.pdf". Otherwise, we may not be able to identify your file from the other unnamed files we receive and if this happens, we may not mark it.

**Late submissions** - Late assignments will incur a late penalty unless previously approved in writing by the staff member responsible for the assignment. You must attach a copy of the approval and of your medical certificate to justify a late submission. The penalty for late submission of assignments is 10% of the assignment per day, calculated from the day after the due date. This means that if the assignment is worth 10% of the unit you will lose 1 mark (1% of the aggregate unit mark) per day or part thereof late. This penalty will be applied over weekdays and weekends unless you are granted an extension by the staff member responsible for the assignment prior to the due date and provide appropriate supporting documentation (e.g. medical certificate). The final decision regarding the late penalty imposed lies with the unit convenor.

**Return of Marked Assignments** - We will return your assignments via the unit website with written feedback within two weeks of submission. Your marked assignments will be returned with a letter grade only.

**Exams** - Details of University exams and exam conditions are at <http://www.exams.mq.edu.au/> The final examination period includes weekdays and weekends and all students (including international students) are

expected to present themselves for the examination at the time and place designated in the exam timetable. The timetable will be available in Draft form ~8 weeks before the commencement of the exams and in Final form ~4 weeks before the commencement of the exams.

**Final grade** - The final mark and grade for ENVE237 are calculated from an aggregate. You don't need to pass each piece of assessment to pass the unit. However, our experience (and commonsense) indicates that if you do not submit these assessment tasks, or fail to do well in them, you will not do well in the aggregate result. We urge you therefore to try your best with each piece of assessment.

### **Resources**

**iLearn** - can be found at: <https://ilearn.mq.edu.au/login/MQ/> Information on access to iLearn is at [http://mq.edu.au/iLearn/student\\_info/access.htm](http://mq.edu.au/iLearn/student_info/access.htm) The ENVE237 iLearn page uses Macquarie University's standard interface and has links, discussion threads and access to lectures (as audio files through Echo360, and as downloadable PDF presentations) and workshop material. Important announcements will be made through iLearn, so please check the ENVE237 page at least 3 times per week. We will check it at night, most days.

**Echo360** - Accessing lecture recordings through the Echo360 EchoCenter page in iLearn is at [http://mq.edu.au/iLearn/student\\_info/lecture\\_recordings.htm](http://mq.edu.au/iLearn/student_info/lecture_recordings.htm)

**Technologies used and required** - Access to and competency with browser-based software. Use of Excel or a similar spreadsheet program is strongly recommended.

**Recommended Texts** - There is no prescribed text for ENVE237. Suggestions of recommended texts will be placed on iLearn.

## **Unit Schedule**

The unit is taught via lectures, workshops, readings and assessment tasks. Class times and locations are

at <https://timetables.mq.edu.au/>

| Week | Sphere                    | Lecture                                      | Practical                | Assessment |
|------|---------------------------|--|--------------------------|------------|
| 1    | Lithosphere               | 1. Introduction & Overview<br>2. Earthquakes | No prac                  |            |
| 2    | Lithosphere               | 3. Volcanoes<br>4. Mass movements            | Prac 1<br>Earthquakes    | Prac 1     |
| 3    | Hydrosphere<br>Atmosphere | 5. Floods<br>6. Thunderstorms                | Prac 2<br>Volcanoes      | Prac 2     |
| 4    | Atmosphere                | 7. Lightning<br>8. Hail                      | Prac 3<br>Mass movements | Prac 3     |

|              |                             |  |                             |         |
|--------------|-----------------------------|--|-----------------------------|---------|
| 5            | Atmosphere                  | 9. Tornados<br>10. Tropical Cyclones                               | Prac 4<br>Floods            | Prac 4  |
| 6            | Hydrosphere                 | 11. Tsunami<br>12. Coastal/oceanic                                 | Prac 5<br>Tropical Cyclones | Prac 5  |
| 7            | Atmosphere                  | 13. ENSO & Drought<br>14. Heatwaves                                | Prac 6<br>Tsunami           | Prac 6  |
| Uni vacation |                             |  |                             |         |
| 8            | Biosphere<br>Anthroposphere | 15. Bushfire<br>16. Biohazards & Pandemics                         | Prac 7<br>ENSO              | Prac 7  |
| 9            | Risk                        | 17. Secondary & Technological Hazards<br>18. Risk & Uncertainty    | Prac 8<br>Bushfire          | Prac 8  |
| 10           | GIS<br>GIS                  | 19. Spatial dimensions of Hazards and Risk<br>20. Hazard Modelling | Prac 9<br>GIS               | Prac 9  |
| 11           | Social Dimension            | 21. Community vulnerability<br>22. Emergency Management            | Prac 10<br>Social aspects   | Prac 10 |
| 12           | Integration                 | 23. Global change & loss<br>24. Economic & Network impacts         | No prac                     |         |
| 13           | Integration                 | 25. Revision   | No prac                     |         |

## 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/p](http://www.mq.edu.au/policy/docs/disruption_studies/p)

[olicy.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 outcome**

- Recognise and understand the key processes by which natural hazards occur.

### **Assessment task**

- Exam

## **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:

### **Assessment tasks**

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7
- Prac 8
- Prac 10
- Prac 9
- 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

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

## Assessment tasks

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7
- Prac 8
- Prac 10
- Prac 9
- 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

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

## Assessment tasks

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7
- Prac 8
- Prac 10
- Prac 9
- 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

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

## Assessment tasks

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7

- Prac 8
- Prac 10
- Prac 9
- 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:

### Assessment task

- 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

- Develop critical reading and thinking skills through regular reading and assessment tasks.
- Develop written and verbal communication skills.

### Assessment tasks

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7
- Prac 8
- Prac 10
- Prac 9
- 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

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

### Assessment tasks

- Prac 1
- Prac 2
- Prac 3
- Prac 4
- Prac 5
- Prac 6
- Prac 7
- Prac 8
- Prac 10
- Prac 9
- Exam

## 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**

- Recognise and understand the key processes by which natural hazards occur.
- Use the literature, and particularly maps and charts to understand the spatial patterns of natural hazards.
- Better understand the temporal pattern of natural hazards including return period.
- Understand and explain critical pathways between natural and un-natural hazards, which create "hazard pairing".

## **Assessment task**

- Exam