EESC2150

Mass extinctions and the hidden history of Earth

Session 2, In person-scheduled-weekday, North Ryde 2023

School of Natural Sciences

Contents

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General Information

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Credit points
10

Prerequisites EESC1150 (or GEOS112 or GEOS1110 or GEOS125 or GEOS1120 or GEOS126 or GEOS1130)
Corequisites
Co-badged status
Unit description Life on our planet has nearly been exterminated at multiple times in Earth history and the causes of mass extinctions are still debated. This unit will develop the interdisciplinary skills needed to describe and interpret the geological record throughout Earth history to understand changes in Earth processes and the imprint left in rocks of major upheavals. You will develop skills in field work and geological mapping, rock and mineral identification in hand samples and under the microscope, viewing and probing global datasets and synthesising data to address scientific questions. This is a topical elective for those interested in how geoscience informs current and future environmental crises.

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: observe, understand and record geological information to map rocks and structures and interpret geological history.

ULO2: identify and analyse common sedimentary, metamorphic and igneous rocks to deduce how they formed.

ULO3: integrate scientific data from multiple sources to solve real-world problems and effectively communicate scientific information to experts and non-experts.

ULO4: develop team work, problem solving and project management skills to assess geological settings in Earth's past.

General Assessment Information

Hurdle Assessments: Student Engagement

Development of knowledge and skills requires continual practice at authentic problems in a laboratory-based setting. In an effort to develop good study skills and because this is a skills-based unit, we have made participation compulsory for the Workshops - this is a hurdle assessment for the unit i.e., you must comply with this requirement to pass the unit.

While we expect 100% participation at all workshops to guarantee a successful outcome, the hurdle assessment in this unit requires that you attend and participate in at least 9 out of the 11 weekly workshops. The teaching staff of your registered class will provide you with further details on what we define as participation and we will record your participation weekly in the iLearn grade book.

Please contact your convenor [nathan.daczko@mq.edu.au] as soon as possible if you have difficulty attending and participating in any classes. If there are circumstances that mean you miss a class, you can apply for a disruption to studies request through ask.mq.edu.au and if approved, this workshop will be removed from your record of absences.

Late Assessment Submission Penalty

Students enrolled in Session based units with written assessments will have the following university standard late penalty applied. Please see https://students.mq.edu.au/study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

Assessments where Late Submissions will be accepted: In this unit, late submissions will accepted for all assessments following the standard late penalties described above. The dates for submission of assessment tasks are listed on the schedule. ***Students must keep a photocopy of their reports.***

Requirements to Pass this Unit

To pass this unit, you must: (1) attempt all assessments; (2) achieve a total mark greater than or equal to 50%; (3) meet the engagement hurdle described above; and (4) achieve at least 50% in the final examination.

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment.

Written Assessments: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Weekly practice-based tasks: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 13 of the weekly practical classes. If you miss a weekly practical class due to a serious, unavoidable and significant disruption, contact your

convenor ASAP as you may be able to attend another class that week. If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time.

Note that a Special Consideration should only be applied for if you miss more than three of the weekly practical classes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly Quizzes	15%	No	Weekly
Literature Review	20%	No	Week 8
Field Report	25%	No	Week 4
Final exam	40%	No	Week 12

Weekly Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 11 hours
Due: **Weekly**
Weighting: **15%**

Short weekly quizzes that test knowledge of lecture and workshop material and may be online or in class. See iLearn for a detailed list of quizzes in this unit.

On successful completion you will be able to:

- identify and analyse common sedimentary, metamorphic and igneous rocks to deduce how they formed.
- integrate scientific data from multiple sources to solve real-world problems and effectively communicate scientific information to experts and non-experts.

Literature Review

Assessment Type [1]: Literature review
Indicative Time on Task [2]: 20 hours
Due: **Week 8**
Weighting: **20%**

A summary, interpretation or an evaluation of research findings in a field of study. See iLearn for

details of the literature review.

On successful completion you will be able to:

- integrate scientific data from multiple sources to solve real-world problems and effectively communicate scientific information to experts and non-experts.

Field Report

Assessment Type [1]: Case study/analysis
Indicative Time on Task [2]: 20 hours
Due: **Week 4**
Weighting: **25%**

A report comprising multiple components that may include preparation for going in the field, virtual and field-based tasks and analysis of data. See iLearn for details.

On successful completion you will be able to:

- observe, understand and record geological information to map rocks and structures and interpret geological history.
- identify and analyse common sedimentary, metamorphic and igneous rocks to deduce how they formed.
- integrate scientific data from multiple sources to solve real-world problems and effectively communicate scientific information to experts and non-experts.
- develop team work, problem solving and project management skills to assess geological settings in Earth's past.

Final exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 17 hours
Due: **Week 12**
Weighting: **40%**

Final examination that requires the application of skills and knowledge developed in this unit.

On successful completion you will be able to:

- identify and analyse common sedimentary, metamorphic and igneous rocks to deduce how they formed.
- integrate scientific data from multiple sources to solve real-world problems and effectively communicate scientific information to experts and non-experts.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Week 1 class: EESC2150 runs a Workshop (3hr) in week 1, i.e., you must attend class in week 1.

Methods of communication: We will communucate with you via your university email (if personal) and through announcements on iLearn. Queries to convenors must be placed on the iLearn discussion board (if not personal) or sent to the unit convenor via the contact email on iLearn (if personal).

COVID information: For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Introduction: This is a hands on unit of study that will reinforce skills developed in first year (EESC1150 Planet Earth) and acquaint you with the essential features of the materials that constitute the Earth, processes that shape the Earth's surface, and the deeper Earth processes that lead to rock change. The unit is an **introduction to deep Earth processes and interpreting Earth history** and not only forms the vital stepping stone for future studies in Earth and Environmental Science, but also sets out to give students from other disciplines a basic understanding of the physical Earth.

We aim to help you develop the skills necessary for study of the physical Earth. By the end of the unit, you should have the skills to:

- Make critical observations of geology for yourself
- Identify minerals and rocks
- Determine geometric relationships between rock units, as depicted on geological maps
- Use geological information to better understand the physical Earth

STUDY PROGRAM

This unit concentrates on five major themes that will be explored and revisited in various ways throughout the unit. These themes include:

- Deep time (prehistorical and ancient geological past)
- Plate tectonics
- The rock cycle
- Geological skills, e.g., mineral/rock identification, cross-sectioning, interpreting geological history, mapping
- How geoscience can be used to solve some of the problems of the 21st century

There are three modules that investigate different aspects of geoscience. The main ideas and objectives for the modules are:

Module 1: Applied Geology (approximately one-third of the unit)

By the end of this unit module students should be able to:

- Understand the rock-cycle and key deep earth processes that make and change rocks
- Distinguish typical hand specimens of different rock types and investigate these in thin section
- Read and interpret geological maps using cross sections to determine geological history

Module 2: Stratigraphy and geological time (approximately one-third of the unit)

By the end of this unit module students should be able to:

- Characterise sedimentary rocks and interpret sedimentary facies
- Describe methods of dating the Earth
- Reconstruct paleoenvironments from sedimentary rocks

Module 3: Palaeontology (approximately one-third of the unit)

By the end of this unit students should be able to:

- Describe body and trace fossils and use these in biostratigraphy
- Illustrate how knowledge of mass extinctions can be useful to understanding diversification and evolution
- Reconstruct paleoenvironments from fossil records

FIELD TRIPS

During this unit of study you will be required to participate in field trips: on-campus (in-person during the workshop class) and off-campus, as well as virtual. These excursions form an essential part of the unit and give you an introduction to field geology. You should take special note of the following:

Equipment: The basic requirements are a hand lens, magnet, and some method of testing mineral hardness (e.g. a pocket knife, copper coin, etc.). Buy a geological hammer only if you intend to continue in a geological field. As the weather is not always kind, note taking can be a problem if ballpoint or ink pens are used. Pencils are recommended. Bring several, and keep them sharp. Learn to be neat and tidy in these initial stages, and form a good habit early. It is much easier to discipline yourself now than to change habits later.

Clothing: Everyone has their own idea of comfort, but some common features of field clothing are obvious. Wear sensible, tough footwear, such as boots or strong sneakers. Thongs, fashion shoes and street shoes are useless and unacceptable. We will be walking over some irregular rock outcrops and may be in snake-infested areas. We cannot guarantee good quality weather; so you should have waterproof clothing. Long trousers, such as jeans, are safer than shorts. Bring a hat and sunscreen.

Unit Schedule

SCHEDULE:

Date	Week	Workshop (compulsory participation) Thu 10–13 or 14–17 [11 WW 210]	Fieldwork (compulsory participation) Tue 9–14 [off campus or online]
24 Jul	1	**Weeks 1–4: Nathan Daczko** Introduction Applied Geology • Mineral/rock identification in hand sample and thin section • Cross-section construction • Interpreting Earth history Quiz 1 (30 min)	**Weeks 1–4** (virtual field trip) Mapping Bingie Remote Sensing Mapping igneous field relationships https://sites.google.com/view/mapping-bingie/home [Nathan Daczko, Aditi Chatterjee, Michelle Moxey]
31 Jul	**2**		
7 Aug	**3**		
14 Aug	**4**		
21 Aug	**5**	**Weeks 5–8: Chris Firth** Stratigraphy • Sedimentology • Sedimentary facies • Palaeoenvironments Quiz 2 (30 min) *Note: session break between weeks 7–8*	**Weeks 5–8** (off campus field trip) Stratigraphy, North Narrabeen headland Stratigraphic column Geochronology Sedimentary structures Depositional environments [Chris Firth, Nathan Daczko, Aditi Chatterjee, Michelle Moxey]
28 Aug	**6**		
4 Sep	**7**		
25 Sep	**8**		

2 Oct	**9**	**Weeks 9–11: John Alroy** Palaeontology • Body and trace fossils • Biostratigraphy and deep time • Diversification and mass extinctions • Dinosaurs, brachiopods,K-Pg event • Quiz 3 (30 min)	**Weeks 9–11** (no field component)
9 Oct	**10**		
16 Oct	**11**		
23 Oct	**12**	No classes	No classes
30 Oct	**13**	No classes	No classes

IMPORTANT DATES:

Week 4 – 25% Mapping Bingie 'Field Report' is due

Week 8 – 20% Narrabeen 'Literature Review' is due

Weeks 4,8,11 – 15% iLearn 'Quiz' is due

Exam period – 40% 'Exam' (date advised once the examinations timetable is drawn up)

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about

throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the 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

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

Changes to the Special Consideration Policy

Please note, changes to the special consideration policy/procedure were approved by Senate on 24 May 2022. The most significant changes are the use of statements of fact rather than other documentation and the inclusion of "circumstances or events which are anticipated but unable to be changed". These changes will take effect from 25 July 2022.

https://policies.mq.edu.au/document/view.php?id=136&version=2

Special Considerations are checked by the central assessment team. If the SC meets the appropriate criteria, then it **must be** accepted by the team and will be forwarded to the unit convenor to action. If the SC doesn't meet the appropriate criteria, it is rejected and does not go to the unit convenor. It is the role of the central assessment team to accept or reject SCs. It is the role of the unit convenor to recommend the remedy. SCs need to be actioned by UCs within 5 working days.

IT Help

For help with University computer systems and technology, visit 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

This unit is experiencing a change of academic staff and so the content for the current offering is being developed as we deliver the unit. Please help us by providing feedback each week on how the unit is progressing.

Changes since First Published

Date	Description
03/10/2023	"tutor" replaced by "teaching staff"