



# EESC1150

## Planet Earth

Session 2, Weekday attendance, North Ryde 2021

*Archive (Pre-2022) - Department of Earth and Environmental Sciences*

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### Disclaimer

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

### Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

## General Information

Unit convenor and teaching staff

Unit convenor

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12 Wally's Walk Room 220

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Practical and Workshop facilitator

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Credit points

10

Prerequisites

Corequisites

Co-badged status

### Unit description

We invite you to meet our planet Earth and discover the processes which influence every aspect of our society, from the distribution of habitable environments, natural hazards and critical resources for our renewable future. Immerse yourself in and explore things that happened millions to billions of years ago and are recorded in the vast time capsules of Earth - its rocks. This introductory unit is suitable for all students including those wanting to try a natural science. It explores the composition and structure of our planet and the dynamic processes that change our environment. The unit provides a strong background for further studies in earth and environmental sciences as well as biology, chemistry, physics and archaeology. This unit involves an adventurous day trip across the Blue Mountains and pairs well with ENVS1017 The Living Environment and EESC1160 Blue Planet: Climate, Oceans and Life.

## 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:** synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.

**ULO2:** apply skills in map reading and analysis to draw cross-sections and interpret Earth history.

**ULO3:** demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.

**ULO4:** draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.

**ULO5:** display independent, team and communication skills, to actively engage in learning.

## General Assessment Information

### Student Engagement in 100-level Units

In an effort to develop good study skills from the outset the Faculty of Science and Engineering have made participation compulsory for 100 level units - this is now a hurdle assessment for the unit i.e., you must comply with this requirement to pass the unit.

While we expect 100% attendance at all lectures/workshops and practical laboratory classes to guarantee a successful outcome, the hurdle assessment in this unit requires that you attend and participate in at least 10 out of the 13 weekly lectures/workshops and practical laboratory

classes. Your tutor will provide you with further details on what we define as participation.

Please contact your convenor [nathan.daczko@mq.edu.au] as soon as possible if you have difficulty attending and participating in any classes. We will endeavour to enable you to attend a practical class later in the week. If there are circumstances that mean you miss a class, you can apply for a disruption to studies request through [ask.mq.edu.au](http://ask.mq.edu.au) and if approved this practical will be removed from your record of absences.

The dates for submission of assessment tasks are listed on the schedule. Extensions for submission of assessment tasks will be given only for illness or misadventure, which must be supported by documentation through the online request portal ([ask.mq.edu.au](http://ask.mq.edu.au)). Assessment tasks submitted late without approval will be penalised 10% of the potential total mark per day late, up to a maximum of five days, after which you will receive zero. Students must keep a photocopy of their reports.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Multiple Quizzes</u>	20%	No	weekly
<u>Case Study 1 and 2</u>	30%	No	see iLearn for breakdown
<u>Workshop / Practical Participation</u>	0%	Yes	weekly
<u>Final Examination</u>	50%	No	examination period

### Multiple Quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **weekly**

Weighting: **20%**

The quizzes test knowledge 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:

- synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.
- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock

types and understand their tectonic context.

- draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.
- display independent, team and communication skills, to actively engage in learning.

## Case Study 1 and 2

Assessment Type <sup>1</sup>: Case study/analysis

Indicative Time on Task <sup>2</sup>: 35 hours

Due: **see iLearn for breakdown**

Weighting: **30%**

Each case study links theoretical concepts and practical situations using real-world scenarios and problems. Students will analyse, evaluate and relate ideas to each case and propose a solution to the problem posed. See iLearn for details of the two case studies.

On successful completion you will be able to:

- synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.
- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.
- draw on Earth and Environmental knowledge by evaluating possible solutions to complex problems and justifying the selected best solution.
- display independent, team and communication skills, to actively engage in learning.

## Workshop / Practical Participation

Assessment Type <sup>1</sup>: Participatory task

Indicative Time on Task <sup>2</sup>: 0 hours

Due: **weekly**

Weighting: **0%**

**This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)**

The participatory task is a hurdle assessment and requires participation in more than 75% of workshops / practical classes.

On successful completion you will be able to:

- synthesise knowledge of how our planet works to draw meaningful conclusions about Earth processes.
- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.

## Final Examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **examination period**

Weighting: **50%**

The final examination requires students to apply the new skills and knowledge developed in this unit.

On successful completion you will be able to:

- apply skills in map reading and analysis to draw cross-sections and interpret Earth history.
- demonstrate mineral identification skills in field and laboratory settings to define rock types and understand their tectonic context.

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<sup>1</sup> 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.

<sup>2</sup> 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

### INTRODUCTION

Planet Earth is a hands on unit of study, that sets out to acquaint you with the essential features of the materials that constitute the Earth, processes that shape the Earth's surface, and the interaction of people and the geologic environment. The unit is an **introduction to geology** 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 that will be helpful in studies and careers in environmental science, geomorphology, biology, geodesy, gemology and economics.

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 simple geological maps
- Use geological information to better understand the physical Earth

These different threads come together via an understanding of the cyclic nature of rock-forming and rock degrading processes of our planet, in terms of the Plate Tectonic Theory.

Geology is a vital, living science that touches our everyday lives. For example, materials such as diamonds, natural resources and energy are essential to our modern civilisation, and precious stones add to our appreciation of nature's beauty. Processes such as volcanism, earthquakes, landslides and erosion may dramatically affect our well being. Knowledge you gain of these materials and processes, based on scientific approaches of observation, testing and evaluation, will assist you towards a better understanding of this planet, Earth.

## **STUDY PROGRAM**

Students coming into this unit have a variety of backgrounds, since there are no set pre-requisites. Some of you will have no geology or physical geography at all in your previous studies, others will have taken Earth and Environmental Science at HSC level. However, previous studies in geology and related subjects are not necessary and in terms of your geological knowledge, by the end of this unit it should not matter what background you had before you started. In spite of this, inevitably in the early stages some of you might find many more new concepts to come to grips with than others. **DO NOT BE DISCOURAGED**, as by persevering into the unit of study, you will gain the satisfaction of seeing how the pieces of the overall Earth puzzle start to come together.

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. mapping and mineral/rock recognition
- How geoscience can be used to solve some of the problems of the 21<sup>st</sup> century

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

## Module 1: Tools of Geoscience (approximately one-third of the unit)

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

- Understand that the rocks we see today have undergone change through geologic time and are still undergoing change (this is known as the rock-cycle)
- Recognise that there are 3 main groups of rocks (igneous, sedimentary and metamorphic) and be able to distinguish typical hand specimen examples of each type (Note: this skill will be reinforced throughout the unit)
- Understand the basic concepts of the plate tectonic theory and appreciate that it is the major unifying idea of geoscience
- Describe the main tools of geoscience and give examples of how they are used: e.g. mapping, satellite imagery, air photos, geophysical investigations, Geographic Information Systems (GIS)
- Read and interpret topographic maps, and understand how contours are constructed and how to interpret them
- Use geological maps including legends, scales, grid references, etc. to solve simple problems and navigate
- Understand that maps are two dimensional representations of a three dimensional world, and the graphical techniques that are used to illustrate what is under the surface (e.g. making and interpreting geological cross sections)
- Explain the sequence of events that led to the geological configuration of an area (geological history)

## Module 2: Hot Rocks (approximately one-third of the unit)

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

- Analyse volcanic processes, the landforms produced, and volcanic hazards
- Account for differences between volcanoes in terms of lava type (chemistry, appearance, explosiveness, etc) and their geographic position in relation to plate tectonic theory (e.g. boundary, intra-plate, etc)
- Examine intrusive igneous processes (e.g. magma composition and behaviour), and the features these processes produce
- Recognise common volcanic and intrusive igneous rocks and be able to use a classification scheme to identify them; interpret the origin of igneous rocks from hand specimens and field relations
- Describe and appreciate the significance of deeper Earth processes (e.g. mantle plumes)



- Understand the impact of plate tectonic theory on igneous processes
- Identify the main silicate rock-forming minerals
- Comprehend the basic chemical structure of the main groups of minerals (e.g. silica tetrahedra) and how this structure determines their appearance and physical properties
- Illustrate how knowledge of igneous processes can be useful to people (e.g. natural resources and energy; building materials)

### **Module 3: Rocks Under Stress and Deep Earth (approximately one-third of the unit)**

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

- Comprehend that metamorphism causes change to existing rocks by the application of heat and pressure
- Comprehend that rocks slowly change form and shape under the application of forces
- Match parent rocks with metamorphosed equivalents
- Establish that rock microstructure and the existence of particular minerals indicate that rocks have undergone change
- Discern the difference between contact and regional metamorphism and be able to distinguish this difference in hand specimens showing a visible difference
- Understand the concept of metamorphic grade
- Use and interpret geological maps with intrusive rock bodies and simple structural features
- Describe how knowledge of metamorphic processes can be of benefit to people
- Understand the relationship between metamorphism, deformation and plate tectonic theory
- Understand how geophysics is used to understand the deep Earth and to monitor geological hazards

### **STUDENT LEARNING EXPERIENCES**

This unit can be seen as two interconnected streams. A lecture/workshop stream involving short presentations and hands on activities that will give a broad overview of the topic, provide background information and introduce new ideas and concepts that link in with the other stream. Parallel to the lecture/workshop stream are a series of laboratory and field-based activities and case study workshops.

There will be two case studies. These case studies will be extended inquiries into real geo-scientific problems, extending over several weeks. These problems are different to the ones that you would typically find in textbooks, and more closely resemble the investigations that scientists face in the real world, with many interacting factors and a number of possible solutions.

Each of the case studies will allow you to explore the ideas in depth and will provide an effective and, we hope, enjoyable method of learning. There is also the added benefit of providing you

with opportunities to develop generic skills such as problem solving, teamwork, communication, accessing and evaluating information and in using scientific approaches to solve problems.

You will be working individually or in small teams for each case study, both in attempting to solve the problem and to produce a final report. The reports will be awarded marks for your individual synthesis. You will be expected to do substantial research outside of the scheduled time (e.g. library and/or web-based literature search).

## **FIELD TRIPS**

During this unit of study you will be required to participate in two field trips: one on-campus (in-person) and one off-campus (virtual if COVID-impacted). 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.

## **TEXTS AND REFERENCES**

### **Unit of study booklet**

This is available through iLearn and contains the lecture/workshop activities, laboratory practicals and case study assignments. The booklet is essential for you to have to follow the unit. You must print this yourself. The completed worksheets are invaluable as an aid during revision for the examination.

### **Textbook**

The recommended text is:

Tarback, E.J., Lutgens, F.K. and Tasa, D. (2016). Earth: An introduction to Physical Geology (12th Global). Pearson . ISBN 9781292161839

This gives more background information, often written from a different perspective from the workshops and practical class notes. It also contains photographs and diagrams for use in the workshops and laboratory exercises. In the library you may find several other basic textbooks on Physical Geology that will be of use to you. The other text mentioned is Merali, Z. and Skinner B.J. Visualizing Earth Science. Wiley. ISBN 978-0-471-74705-5.

### **Reading List**

You may find the following books helpful for reference. They should provide useful supportive material to the workshops, case studies and laboratory exercises, and supplement the prescribed textbook and the Unit of Study booklet.

Dynamic Earth is a subject relying heavily on observation, so it will be of great help to look at a variety of illustrations of the features that are covered in the unit of study. The books listed below are generally well illustrated, with striking colour photographs and diagrams.

\*\* indicates a book in Special Reserve in the Library; \* indicates a book on 3-day loan.

\*\*Branagan, D.F. and Packham, G.H., 2000. Field geology of NSW. NSW Dept of Mineral Resources. Sydney. QE45.B7

\*Busch, R.M., Tarbuck, E.J. and Lutgens, F.K, 1993. A study guide to accompany "The earth — an introduction to physical geology". Merrill. QE28.2.T37

\*Cattermole, P., 2000. Building Planet Earth. Cambridge University Press. QE26.2.C384

\*Hamblin, W.K. 1998. Earth's Dynamic Systems. Macmillan (8th Ed.) QE28.2.H35

\*Hamblin, W.K. and Howard, J.D. 1995. Exercises in Physical Geology. QE28.2.H36

\*\*Herbert, C. and Helby, R., 1980. A Guide to the Sydney Basin. Geological Survey of NSW Bulletin 26. QE341.N4

\*\*Kimberley, M.M and Kimberley, S.J. 1995. Study guide to Skinner/Porter's The Dynamic Earth: an introduction to physical geology. Third Edition. Wiley (3rd Ed) QE28.2K56

\*Merritts, D.J., De Wet, A., and Menking, K., 1998. Environmental Geology: an earth system science approach. Freeman, New York. QE38.M47

\*Monroe, J.S. and Wicander, R. 1992 Physical Geology — exploring the earth. Harper Educational Publ.; West Publ. Co St. Paul. QE28.2.M655

\*Montgomery, C.W., 1993. Physical Geology. Wm C. Brown (3rd Ed.) QE28.2.M66

\*Morrison, R., 1988. Voyage of the Great Southern Ark. Ure Smith Press. QE340.M67

\*Morton, R.D., 1995. Student's Companion to Skinner and Porter's The Dynamic Earth; an introduction to Physical Geology, Third Edition. Wiley QE28.2.S552

\*Murck, B.W., Skinner, B.J. and Porter, S.C., 1996. Environmental Geology. Wiley and Sons, New York. QE38.M87/1996

\*Plummer, C.C. and McGeary, D., 1999. Physical Geology. Wm C. Brown Publ., Iowa (8th Ed.). QE28.2.P58

\*Press, F. and Siever, R. 1998. Understanding Earth. Freeman, New York (2nd Ed.) (replaces Earth, 4th Ed.). QE28.P9

\*\*Scheibner, E., 1999. The geological evolution of New South Wales. Dept of Mineral Resources. QE341.S296

\*\*Skinner, B.J. and Porter, S.C., 2000. The Dynamic Earth: an introduction to physical geology. Wiley , 4th Ed. QE28.2.S55

**\*\*Skinner, B.J., Porter, S.C. and Botkin, D.B., 1999. The Blue Planet. Wiley , 2nd Ed. QB631.S57**

**\*Smith, D.G., 1981. The Cambridge Encyclopedia of Earth Sciences Cambridge Univ. Press, Cambridge. QE26.2.C35**

**\*Stanley, S.M., 1989. Earth and life through time. W.H. Freeman and Company, N.Y. QE28.3.S73**

**\*Tarbuck, E.J., Lutgens, F.K. and Tasa, D. (2016). Earth: An introduction to Physical Geology (12th Global). Pearson . ISBN 9781292161839**

**\*\*Van Andel, T.H., 1994. New views of an old planet: continental drift and the history of the earth. Cambridge Univ. Press, Cambridge (2nd Ed.). QE26.2.V36**

**\*Veevers, J.J., 2000. Billion-year earth history of Australia and neighbours in Gondwanaland. GEMOC Press, Sydney. QE340.B55**

## CD-ROMS

**\*\*Dunning, J and Onesti, L.J., 1998. Earth Matters. Freeman and Co., New York. QE38.D8**

**\*\*Tasa, D., 1999. Illustrated dictionary of earth science. Tasa Graphic Arts. QE5.I45**

## Library Loans

The Library at Macquarie will have provided you with information on library loans. The procedures differ for metropolitan and country students. Please familiarise yourself with the procedures appropriate in your case. If you have any enquiries contact the Library on (02) 9850-7500.

# Unit Schedule

## SCHEDULE:

Date	Week	Workshop (compulsory participation) Mon 9–11 [1CC 201] or 3–5 [1CC 109]	Laboratory Practical (compulsory participation) Many day options [11WW 220]	
26 Jul	1	A tour of Planet Earth [Nathan Daczko] (1.4, 1.6, 2, 9.5)*	Practical 1: Topographic Maps	Volcanoes Case Study
2 Aug	2	Minerals [Tracy Rushmer] (3)	Practical 2: Campus Excursion	
9 Aug	3	The Deep Earth-Volcano Connection [Tracy Rushmer] (4, 5)	Practical 3: Geological Map Reading	
16 Aug	4	Explosive Volcanism and Hazards [Tracy Rushmer] (4, 5)	Practical 4: Minerals	

23 Aug	5	Supervolcanoes and Below [Tracy Rushmer] (4, 5)	Practical 5: Mafic and Intermediate Igneous Rocks	
30 Aug	6	Sedimentary Processes [Nathan Daczko] (7, 23.2)	Practical 6: Felsic Igneous Rocks	
6 Sep	7	Metamorphism [Nathan Daczko] (8)	Practical 7: Metamorphic Minerals	
		Session 2 break		
27 Sep	8	Crustal Deformation [Nathan Daczko] (10, 14)	Practical 8: Metamorphic Rocks	Hartley Case Study
4 Oct	9	Geochemical Tools and Dating the Earth [Tracy Rushmer] (9.4, PDF of chapter in iLearn)	Practical 9: Geological Cross Sections	
11 Oct	10	Earth's Interior [Tracy Rushmer] (11,12)	Practical 10: Geological History	
18 Oct	11	Understanding the Earth System [Tracy Rushmer] (22)	Practical 11: Exam Revision – Rocks and Minerals	
25 Oct	12	Exam Revision [Nathan Daczko]	Practical 12: Geo Jeopardy	
1 Nov	13	No classes	No classes	

\*Numbers in brackets represent chapters from *Earth: An introduction to Physical Geology*

### IMPORTANT DATES:

*Week 3 – at start of your Workshop:* Part A of Volcanoes Case Study is due

*Week 5 – at start of your Workshop:* Part B of Volcanoes Case Study is due

*Week 7 – at start of your Workshop:* Part C of Volcanoes Case Study is due

*During session 2 break: Thursday 16<sup>th</sup> OR Friday 17<sup>th</sup> September:* Full-day fieldtrip to Hartley

*Week 12 – at start of your Workshop:* Report for Hartley Case Study is due and in class Quiz

*Exam:* To be 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) (<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](#)
- [Grade Appeal Policy](#)
- [Complaint Management 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) (<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) (<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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

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

- [Getting help with your assignment](#)
- [Workshops](#)

- [StudyWise](#)
- [Academic Integrity Module](#)

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

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

## Student Services and Support

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

## Student Enquiries

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

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

## IT Help

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

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

## Changes from Previous Offering

Two key messages: (1) lecture/workshops are available on campus or online in 2021 [We recommend the on campus class] and (2) field trip may be virtual if needed [We will let you know].

This year sees our fourth year of some significant changes to the EESC1150 offering and we ask for your patience and feedback. There have been major changes to the content delivery format to incorporate more hands on activities in the lecture/workshop and laboratory components. Participation in both the lecture/workshop and the laboratory practical components is compulsory. We have shortened the laboratory practical component from 3 hours to 2 hours following feedback from students.

Swapping traditional lectures for novel two-hour workshops has seen a dramatic improvement in first year geology students' engagement, depth of learning and final grades. The lecture/workshops—which involve 10 to 15 minute 'mini-lectures' interspersed with object-based and active learning exercises—are conducted in the new active learning spaces at Macquarie. First year geology is ideal for object-based and active learning as it is strongly skills-based with students learning how to identify minerals and rock types, think in three dimensions and understand geophysical principles. Each week a mystery box is placed on each of the tables that contains the workshop objects and instructions for the activities. Our goal is to deliver new information that advances the students' learning, while including a process of immediate



feedback on the effectiveness of their learning during the activities. We found in 2018 and 2019 that the object-based and active learning stimulated discussion, group work and lateral thinking at each table, along with excellent engagement with the workshop leader and tutors. The objects enhanced the delivery of unit-specific knowledge while also improving students' generic skills such as communication, teamwork, and observational and drawing ability. The results from the 2018 and 2019 sessions showed the success of the new format. The failure rate dropped from around 20 per cent to less than five per cent of the cohort, and the percentage of students scoring a distinction or high distinction jumped from approximately a quarter to more than half the class. 2020 was a COVID impacted year where the lectures/workshops ran online and this was not as good for student outcomes.

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Unit information based on version 2021.01 of the [Handbook](#)