UNSW Course Outline

GEOS1111 Investigating Earth and Its Evolution - 2024

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General Course Information

Course Code : GEOS1111
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Biological, Earth and Environmental Sciences
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This course provides core knowledge about geology, paleontology and Earth's systems for those wishing to pursue professional careers as geologists, environmental scientists, or earth scientists. It will be of interest to those who wish to understand more about the nature and origin

of the Earth's systems processes like plate tectonics, the formation of rocks and minerals, the evolution of the atmosphere, and the origin of the hydrosphere. Students will gain knowledge about the evolution of life and what the fossil record tells us about past climates and ecosystems.
The course will provide a basis in advanced measurement techniques using ground-, aircraft-, and satellite-based systems. Students will also learn how to use their understanding of geological processes to investigate and manage environmental issues. A comprehensive understanding of Earth's processes is critical for the development of sustainable societies, protecting our ecosystems, sourcing materials for modern technologies, and economic growth.

There is no assumed knowledge required for the course. Each week students will engage with pre-recorded lectures and attend a laboratory session. There are two trips to the Australian Museum (https://australian.museum), where students will explore one of the world's best mineral and rock collections and be taken on a behind-the-scenes visit to see the extensive unique fossil collection.

Course Aims

The aims of this course are to introduce students to the fields of geology, Earth systems science, paleontology and Earth observations using advanced measurement methods. Students develop a comprehensive understanding of the evolution of Earth and life through time and gain an appreciation of how Earth's systems interconnect and function. Students also learn how to find the geological resources required to sustain our modern societies and assess the environmental impact of using Earth's resources.

Relationship to Other Courses

GEOS1111 Investigating Earth and Its Evolution provides core knowledge for students who will undertake 2nd and 3rd year courses in the Earth Sciences, Environmental Sciences, Geology, Geophysics, Physical Geography, Sustainability and Environmental Management.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe, classify and identify common rock-forming minerals, and igneous, sedimentary and metamorphic rocks.
CLO2 : Understand why we need to use minerals, rocks, fossil fuels, and soil to sustain our economies and apply knowledge of Earth’s systems to quantify the local and global environmental impacts of using these resources.
CLO3 : Discern when to use satellite-, aircraft- and ground-based measurement methods to map earth materials and track Earth processes.
CLO4 : Recognise the major divisions of Earth's history and how life has changed over time.
CLO5 : Critique popular controversial geoscience topics in the media and scientific literature.

Course Learning Outcomes	Assessment Item
CLO1 : Describe, classify and identify common rock-forming minerals, and igneous, sedimentary and metamorphic rocks.	• Mineral and Rock Specimen Test • Final Exam
CLO2 : Understand why we need to use minerals, rocks, fossil fuels, and soil to sustain our economies and apply knowledge of Earth’s systems to quantify the local and global environmental impacts of using these resources.	• Earth's Systems • Mineral and Rock Specimen Test • Final Exam
CLO3 : Discern when to use satellite-, aircraft- and ground-based measurement methods to map earth materials and track Earth processes.	• Final Exam
CLO4 : Recognise the major divisions of Earth's history and how life has changed over time.	• Australian Museum Fossils • Final Exam
CLO5 : Critique popular controversial geoscience topics in the media and scientific literature.	• Earth's Systems • Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Mineral and rock samples: Teaching Laboratory 02 and at the Australian Museum

Learning and Teaching in this course

This course utilises lectures, laboratory practicals and online exercises. These different learning activities are directly linked with one another. The lectures are designed to explain the basic elements of geology and biogeochemistry and give a background to the practical exercises.

Most of the course practical component involves working in teams to characterise minerals and rocks and to understand geological maps. There is an emphasis on visualising rocks and fossils in three dimensions. An overarching theme is to understand Earth's interconnections.

Additional Course Information

Science program learning outcomes:

1. Develop and sustain an interest in and knowledge of science.
2. Develop a working knowledge of scientific methods of investigation.
3. Encourage curiosity, creative imagination, and an appreciation of the role of speculation in the selection and solution of problems, the construction of hypotheses, and the design of experiments.
4. Develop an appreciation of scientific criteria and a concern for objectivity and precision.
5. Develop confidence and skill in formulating problems and in analysing both qualitative and quantitative data.
6. Develop the ability and disposition to think logically, to communicate clearly by written and oral means, and to read critically and with understanding.
7. Promote understanding of the significance of science, technology, economics, and social factors in modern society, and of the contributions they can make in improving material conditions.
8. Provide opportunities for the development of students' motivations and social maturity, and an awareness of their capabilities in relation to a choice of career which will be fruitful to themselves and to society.
9. Provide opportunities to study science in combination with other disciplines.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Mineral and Rock Specimen Test Assessment Format: Individual Short Extension: Yes (3 days)	25%	Start Date: Week 1 Due Date: Week 4 Post Date: 03/10/2024 06:00 PM
Australian Museum Fossils Assessment Format: Individual Short Extension: Yes (3 days)	20%	Start Date: Week 7 Due Date: Week 9: 04 November - 10 November Post Date: 08/11/2024 05:00 PM
Earth's Systems Assessment Format: Individual Short Extension: Yes (3 days)	15%	Start Date: Week 9 Due Date: Week 10: 11 November - 17 November Post Date: 13/11/2024 09:00 AM
Final Exam Assessment Format: Individual	40%	Start Date: UNSW Term 3 Examination Period Due Date: UNSW Term 3 Examination Period Post Date: 30/11/2024 12:00 AM

Assessment Details

Mineral and Rock Specimen Test

Assessment Overview

You will be examined on your ability to describe and identify minerals and rocks. You will also be tested on your knowledge about how the minerals are used in products and the impacts of the use of the resources on the environment.

The 1.5-hour test will be run in the Week 5 laboratory.

Feedback: Feedback will be provided in Moodle and in the Week 7 laboratory.

Course Learning Outcomes

- CLO1 : Describe, classify and identify common rock-forming minerals, and igneous, sedimentary and metamorphic rocks.
- CLO2 : Understand why we need to use minerals, rocks, fossil fuels, and soil to sustain our economies and apply knowledge of Earth’s systems to quantify the local and global environmental impacts of using these resources.

Detailed Assessment Description

Topic: Mineral and Rock Hand Specimen Quiz

Description: The examination will assess your knowledge of the minerals and rocks you have examined at the Australian Museum and in the UNSW teaching collection (E26, teaching laboratory 02).

When: The 1.5-hour test will be run in the Week 5 laboratory.

Grading: Correct answers to a multiple choice and short answer quiz

Student Learning Outcomes: 1 and 2

Feedback: Assessment 1 feedback will be provided in Moodle.

Assessment Length

1.5 hours Multiple Choice

Submission notes

Moodle - multiple choice

Assessment information

You will complete this multiple choice examination in your Week 4 laboratory timeslot.

Assignment submission Turnitin type

This is not a Turnitin assignment

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

All assessments have been checked on a range of AI platforms.

Australian Museum Fossils

Assessment Overview

You will be required to select a fossil
site in NSW to discuss in a short science focused video. The fossil site can be one discussed during the Australian Museum trip or selected from the scientific literature.

The video is to be up to 3 minutes in length and is due in Week 9.

The video is submitted online, and a transcript of the speech in the video is also to be uploaded to Moodle.

Feedback is provided in written form within two weeks of submission.

Course Learning Outcomes

- CLO4 : Recognise the major divisions of Earth's history and how life has changed over time.

Detailed Assessment Description

Topic: Australian Museum Fossils - Science Communication Video

Description: Your 3 minute video must focus on interpreting and placing in geological and evolutionary context an individual fossil or fossil assemblage. The fossil or fossil assemblage must be from the Australian Museum fossil collection or a NSW fossil site. In your video and transcript, you must make reference to the scientific literature. You may also reference online resources if they enhance the scientific discussion.

When: The paleontology Australian Museum Fossils trip is in week 7, and your video is to be submitted in week 9.

Grading:

Students will be graded considering:

- background and introduction of the topic
- selection of an appropriate fossil site and appropriate references (web links should be added to the transcript)
- visuals used to help convey insights about the evolutionary and geological content discussed
- the scientific rigour of the discussion and conclusions
- continuity of the storyline throughout the video
- transcript and supporting information.

Student Learning Outcomes: 4 and 5

Feedback: Written feedback will be provided within two weeks (provided all students have submitted in a timely manner).

Assessment Length

3 minute video and transcript

Submission notes

Upload transcript to Moodle and your video to MS Teams

Assessment information

You need to attend the Australian Museum field trip to get context for the assignment.

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

Earth's Systems

Assessment Overview

In Week 9 you will be provided with a selection of controversial Earth science media and research topics. In the laboratory these controversial topics will be discussed collectively and in groups. These discussions will provide you with background ideas for your poster presentation session in Week 10.

In the Week 10 laboratory, you are to present a poster on one of the topics analysed in Week 9. In the poster you are to summarise the controversial topic and present an argument for your position.
Feedback will be provided in Week 10 laboratory and in written form in Week 11.

Course Learning Outcomes

- CLO2 : Understand why we need to use minerals, rocks, fossil fuels, and soil to sustain our economies and apply knowledge of Earth’s systems to quantify the local and global environmental impacts of using these resources.

- CLO5 : Critique popular controversial geoscience topics in the media and scientific literature.

Detailed Assessment Description

Topic: Controversial Earth Science Media and Research Topics

When: Week 9 and 10 laboratories

Grading: Rubric

Student Learning Outcomes: 2 and 5

Feedback: Assessment 3 feedback will be provided in the Week 10 laboratory and in written form by the end of Week 11.

Assessment Length

Poster

Submission notes

Poster - PowerPoint Format

Assessment information

Upload your poster in PowerPoint format to MS Teams by 5pm on the day before your scheduled laboratory.

Assignment submission Turnitin type

This is not a Turnitin assignment

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

Final Exam

Assessment Overview

In the final examination you will be tested on all the course content, including the lectures, prescribed reading and laboratory exercises. The examination will be 2 hours in duration and held during the University examination period.

You be assessed on your understanding of Earth's processes and materials, the evolution of Earth and life, the use of advanced measurement methods, and the environmental impact of using Earth's resources.

This will be a multiple choice and short answer quiz during the examination period.

Feedback is available through inquiry with the convenor.

Course Learning Outcomes

- CLO1 : Describe, classify and identify common rock-forming minerals, and igneous, sedimentary and metamorphic rocks.
- CLO2 : Understand why we need to use minerals, rocks, fossil fuels, and soil to sustain our economies and apply knowledge of Earth's systems to quantify the local and global environmental impacts of using these resources.
- CLO3 : Discern when to use satellite-, aircraft- and ground-based measurement methods to map earth materials and track Earth processes.
- CLO4 : Recognise the major divisions of Earth's history and how life has changed over time.
- CLO5 : Critique popular controversial geoscience topics in the media and scientific literature.

Detailed Assessment Description

Topic: Final Examination

Description: A comprehensive assessment of each student's knowledge about Earth's evolution and understanding geological processes

Grading: Multiple-choice

Student Learning Outcomes: 1, 2, 3, 4, & 5

Feedback: Students can request individual general feedback.

Assessment Length

2 hours

Submission notes

Online multiple choice examination in Moodle

Assessment information

How to prepare for the final examination will be discussed in the weekly laboratories and in the online lectures.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

General Assessment Information

All assessments will be discussed in the laboratories or during trips to the Australian Museum.

Grading Basis

Standard

Requirements to pass course

A total grade of 50 out of 100 is required to pass the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Other	Welcome to the course. There is no week 0 content.
Week 1 : 9 September - 15 September	Blended	Week 1 Lectures 1) Big Picture - Evolution of the Earth 2) Minerals and Gemstones 3) The Formation of Economic Mineral Deposits Laboratory Mineral Identification and Economic Minerals
Week 2 : 16 September - 22 September	Blended	Week 2 Lectures 1) Igneous Rocks and Processes 2) Metamorphic Rocks and Processes 3) Sedimentology Laboratory Igneous, Metamorphic and Sedimentary Rocks
Week 3 : 23 September - 29 September	Blended	Week 3 Lectures 1) Mineral Cycles and Ore Deposits 2) Earth's Geochemical Interconnections 3) Google Earth for Geology Field Trip Australian Museum Mineral and Rock Collection (Assessment 1 - Part A)
Week 4 : 30 September - 6 October	Blended	Week 4 Lectures 1) Geological Faults and Folding 2) Exploring Earth's Core and Plate Tectonics 3) Soil Health Laboratory Part A 1.5 hours - The minerals and rocks quiz Break Part B 2 hours - Geological Faults and Folding Exercises
Week 5 : 7 October - 13 October	Blended	Week 5 Lectures 1) Earth's Gravitational and Magnetic Fields 2) Geology for Sustainable Societies 3) Energy and Carbon Cycles Laboratory Coogee Beach Field Trip - Geological Observations and Processes. Some Final Examination questions will be based on this field trip.
Week 6 : 14 October - 20 October	Other	Enjoy your break There are no lectures and no laboratories.
Week 7 : 21 October - 27 October	Blended	Week 7 Lectures 1) Geological Time Scale 2) Life Through Time (a) 3) Life Through Time (b) Field Trip Australian Museum Tour of the Fossil Collection (Assessment 2)
Week 8 : 28 October - 3 November	Blended	Week 8 Lectures 1) Measuring and Monitoring Earth System Processes - Part 1 2) Measuring and Monitoring Earth System Processes - Part 2 Laboratory Climate Fresk - Some Final Examination questions will be based on the laboratory exercise.
Week 9 : 4 November - 10 November	Blended	Week 9 Lectures 1) Plate Tectonics 2) Atmosphere and Ocean Chemistry 3) Life Laboratory The Big Picture Discussion In Week 9 you will be provided with a selection of controversial Earth science media and research topics. In the laboratory these controversial topics will be discussed collectively and in groups. These discussions will provide you with background ideas for your poster presentation session in Week 10.

		In the Week 10 laboratory, you are to present a poster on one of the topics analysed in Week 9. In the poster you are to summarise the controversial topic and present an argument for your position. This is assessment 3.
Week 10 : 11 November - 17 November	Blended	Week 10 Lectures 1) The Chemical World Origins (ABC TV Documentary) 2) Synthesis/Controversies Laboratory Poster Session (Assessment 3)

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

Each week consists of 2 to 3 hours of online lectures and a 4 hour laboratory or trip to the Australian Museum or Coogee Beach.

Course Resources

Prescribed Resources

Fletcher, C. (2014) Physical Geology – The Science of Earth. Wiley,

(Available online via UNSW Library: https://www.library.unsw.edu.au/)

Recommended Resources

Web links to required reading will be provided at the end of each set of lecture slides.

Wilkerson, S.C., Wilkerson, M.B., Marshak, S. (2017) GeoTours Workbook: A Guide for Exploring Geology using Google Earth. 2nd Edition, W.W. Norton & Company. *Exercises will be selected from this book in Week 4. You do not need to purchase, but it is a great resource for exploring Earth.*

Additional Costs

There are no additional costs associated with this course.

Course Evaluation and Development

This course has not been reviewed in its current format.

The new course format has resulted from insightful and constructive myExperience feedback. We have refreshed portions of the online lecture content, increase the number of one day field trips, and made the laboratories more hands on and interactive.

Constructive feedback to improve the learning experience via myExperience is always welcome.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Bryce Kelly		Room 5115, Level 5 Biological Sciences South (E26) UNSW, Kensington 2052+61 2 9065 5144	+61 2 9065 5144	Arrange via email	No	Yes
Lecturer	Indrani Mukherjee		124B, Level 1 - Samuels Building (F25)	unknown	Arrange via email	No	No
	Matthew McCurry		Australian Museum	unknown	Arrange via email	No	No
	Stuart Clark		Tyree Energy and Technology Building (H6) Level 2, Room 214	61468332796	Arrange via email	No	No
	Mike Archer		Rm 114a, Samuels Building (F25)	+61 2 9385 3446	Arrange via email	No	No

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://

student.unsw.edu.au/special-consideration

Important note: UNSW has a “fit to sit/submit” rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines