



Course Outline

GEOS1211

Earth and Environmental Science

School of Biological, Earth and Environmental Sciences

Faculty of Science

Trimester 1, 2021

1 Staff

Convenor and Lecturer: Andy Baker

a.baker@unsw.edu.au

Lecturer: Amy Dougherty

a.dougherty@unsw.edu.au



2 Course Information

Units of credit: 6

Pre-requisite(s): None.

Teaching times and locations:

Lectures

Lectures are pre-recorded and available online for viewing at a time of your choosing. A different topic will be covered each week. You will have a series of mini-lectures to watch, which we recommend you do in the allocated week. These mini-lectures may link to additional video material, reading material or informal (non-assessed) questions or exercises. Expect to allocate 3-hours each week for this material.

Week One Welcome

On the first Thursday, we will have an informal welcome to the course, where you can get to know each other and the staff, complete some paperwork needed for field classes, and have an introduction to Assignment 2. The face-to-face meetings will be at 10:00-11:00 and 14:00-15:00, and the on-line meetings 11:00-12:00 and 15:00-16:00. You will have signed up for either a morning or afternoon session – if you want to change, please tell us

first to ensure we comply with COVID-safe group size limits. Face-to-face meetings will be outside building E26 Biological Sciences (under the Jacaranda tree on Michael Birt Lawn). On-line meetings will use the meeting link from the Moodle page. You can change from on-line to face-to-face, or face-to-face to on-line. If you would like to change to face-to-face, please just tell us first to ensure we comply with COVID-safe group size limits

Field classes

Alternate Thursdays, weeks 2, 4, 7, and 9, either 9:00-12:00 or 14:00-17:00. You will have signed up for either a morning or afternoon session – if you want to change, please tell us first to ensure we comply with COVID-safe group size limits. Four local field classes will be held at locations on or close to campus. A virtual (on-line version) is also available for students who cannot, or prefer not, to attend the field-days. You can change from on-line to face-to-face, or face-to-face to on-line. If you would like to change to face-to-face, please just tell us first to ensure we comply with COVID-safe group size limits

Tutorials

Alternate Thursdays, weeks 3, 5, 8 and 10, either 9:00-12:00 or 14:00-17:00. You will have signed up for either a morning or afternoon session – please stick with these sessions. These sessions will online in Moodle, where the relevant teaching staff will be available to provide guidance on the fieldtrip assignment, the most recent two weeks of lecture material and Assessment 2. Although we have allocated three hours for these sessions, you can attend for as long as you need to and drop in and out at any time.

What to bring to field-based practical sessions:

The field classes will take place outside and you should come prepared for whatever weather is forecast. Wear appropriate footwear and apply necessary sun protection.

You will not be allowed to attend the field trip if:

(a) you have not completed all relevant paperwork (we will tell you how to do this in Week 1, and

(b) you are not wearing suitable enclosed footwear.

Please bring:

- A backpack
- A full water bottle
- Sunscreen
- A hat and sunglasses
- A shirt that covers your shoulders to avoid heatstroke
- A raincoat (if rainy weather is forecast)
- Lead pencil
- Eraser
- Ruler
- Notebook (or can take notes on device but email them to yourself as backup).

2.1 Course Summary

The UNSW Earth & Environmental Science (GEOS1211) course focusses on environmental science through an earth science perspective.

It provides a sound basis in environmental earth science for those interested in professional careers in environmental science and engineering consultancy, geology, education, as well of general interest to anyone interested in understanding more about environmental science from a long-term, geological perspective.

This course examines the effects of environmental change, both natural and occurring over geological timescales, and more recent, induced by humans, on planet Earth. Skills in environmental earth science will be acquired through four, problem-solving, half-day field classes held close to UNSW.

2.2 Course aims

The overall aim of this course is to enable you to develop and gain further understanding of the natural world through the investigation of earth systems and processes with a direct emphasis of their application to real-world situations in the field of environmental science. You will develop skills in describing and interpreting geological processes, paleo environmental archives, earth surface landforms, and our groundwater resource.

This course provides you with fundamental knowledge essential for most 'GEOS' courses (those where the course code starts with GEOS) in the School of Biological, Earth and Environmental Sciences. It is complementary with GEOS1701, GEOS1111, BIOS1301, and BIOS1101.

GEOS1211 prepares students for GEOS2131, GEOS2181, GEOS2291, GEOS2721 and GEOS2821. (It is a core compulsory course in the Earth Science majors and the Environmental Management program).

2.3 Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Apply fundamental geological principles to environmental issues
2. Analyse and observe fundamental features of a variety earth materials and surface landforms for identification and interpretation of environmental processes.
3. Analyse landscapes and their underlying geology as well as interpret how this affects human and environmental processes/use.
4. Investigate projects in the natural world using a framework of interconnected earth processes.

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	LO Statement	Program Learning Outcome (PLO)	Related Tasks & Assessment
CLO 1	Apply fundamental geological principles to environmental issues	Ethical, social and professional understanding including the ability to critically reflect upon broad ethical principles and codes of conduct in order to behave consistently with a personal respect and commitment to ethical practice and social responsibility, multicultural, cultural and personal diversity.	Lectures, assessment 1, 2, 3

		Information literacy including the ability to make appropriate and effective use of information and information technology relevant to their discipline.	
CLO 2	Analyse and observe fundamental features of a variety of earth materials, and surface landforms for identification and interpretation of environmental processes.	<p>Research, enquiry and analytical thinking abilities including the ability to construct new concepts or create new understanding through the process of enquiry, critical analysis, problem solving and research.</p> <p>Teamwork, collaborative and management skills including the ability to recognise opportunities and contribute positively to collaborative scientific research, and to demonstrate a capacity for self management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.</p>	Lecture, fieldtrip, assessment 1, 2, 3
CLO 3	Analyse landscapes and their underlying geology as well as interpret how this affects human and environmental processes/use	Teamwork, collaborative and management skills including the ability to recognise opportunities and contribute positively to collaborative scientific research, and to demonstrate a capacity for self management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.	Fieldtrip, assessment 1, 2, 3
CLO 4	Investigate projects in the natural world using a framework of interconnected earth processes	Research, enquiry and analytical thinking abilities including the ability to construct new concepts or create new understanding through the process of enquiry, critical analysis, problem solving and research.	Fieldtrip, assessment 3

3 Strategies and approaches to learning

3.1 Learning and teaching activities

This course utilises online lectures and face-to-face fieldtrips (with on-line option). These different learning activities are directly linked with each other and enable successful learning outcomes in a COVID-safe environment.

The lectures are designed to explain and understand the basic elements of environmental earth sciences. The course is designed to have a very practical orientation: with theoretical concepts followed up with problem-based learning activities through field-based learning, providing an earth science perspective to environmental science processes.

3.2 Expectations of students

An integral part of this course is engagement in field class activities, either face-to-face or a virtual field class held on-line. All four field classes are assessed, and these assessments are expected to comprise the largest proportion of your workload through the trimester. As such, you are required to attend each field class (in person, or online).

Online lectures are not compulsory but highly valuable and provide background to the field classes and their related assignments, and also assignment 2, where you are to critique the environmental earth science presented in a movie.

On-line tutorials are held to allow you the opportunity to question your teachers about online lecture material, field classes, and assessments.

You must actively participate in online discussions and complete all set work to a satisfactory standard as outlined in the lectures, course material and in the assignment descriptions.

From the university guidelines (<https://student.unsw.edu.au/uoc>): “The normal workload expectations of a student are approximately 25 hours per term for each UOC, including class.”

4 Course schedule and structure

Week	Starts on...	Topic (on-line)	Field class / tutorial (Thursdays)	Location
1	15-Feb	Introduction & Meteorite Impacts	Ice-breaker, course administration, introduction to assignment 2	UNSW, outside building E26
2	22-Feb	Super Volcanoes	Campus environmental earth science tour (and field class assignment 1)	UNSW, meet outside building E26 (or virtual option)
3	1-Mar	Mega Earthquakes	Tutorial	
4	8-Mar	Tsunami	Sydney Harbour hazards (and field class assignment 2)	Ms Macquarie's Chair, Ms Macquarie's Point (near Royal Botanical Gardens, Sydney Harbour)
5	15-Mar	Mass extinctions	Tutorial	
6	22-Mar	Flexibility (reading) week		
7	29-Mar	Groundwater	Botany Sands Aquifer (and field class assignment 3)	Centennial Parklands (Royal Randwick Light Rail station)
8	5-Apr	Caves	Tutorial	
9	12-Apr	Paleohydrology – Big rivers, mega floods and drought	The sandstone city (and field class assignment 4)	First Fleet Park, Circular Quay
10	19-Apr	Solar Flares	Tutorial, exam tips	

5 Assessment

Assessment task	Length	Weight	Mark	Assessment criteria	Due date	Feedback
Assessment 1: 1. Campus Environmental Earth Science map 2. Sydney Harbour hazards 3. Botany Sands aquifer 4. The sandstone city	Short field reports (indicative length 4 pages)	40% total (4 x 10% field reports)	/100	Field reports. Understanding of environmental earth science processes through field observations and their interpretation	Friday, weeks 3, 5, 8 and 10, by Turnitin on Moodle	Generic feedback given in online tutorial time, and individual feedback given via Moodle
Assessment 2: Critical earth and environmental science movie review	<1000 words	20%	/100	Critical review	Friday week 10, by Turnitin on Moodle	Generic feedback and individual feedback given via Moodle
Assessment 3: Final exam	On-line, 2 hrs	40%	/100	Multiple choice	In official exam period, exam is active for 24 hrs, 1 attempt allowed	

Assignment submission must be digital via Turnitin through Moodle.

Further information UNSW grading system: <https://student.unsw.edu.au/grades> UNSW assessment policy: <https://student.unsw.edu.au/assessment>

5.1 Submission of assessment tasks / special consideration

If you experience sickness, misadventure or other circumstances beyond your control that may impact your ability to complete/attend classes/fieldtrips/assessments you should request special consideration through <https://student.unsw.edu.au/special-consideration>. Please also e-mail the course convenor, as soon as possible.

The School of BEES also has certified Mental Health First Aiders who can help in an emergency or help with accessing other university or external supports. and can help provide information regarding supports provided by the university and externally. <http://www.bees.unsw.edu.au/flourish-mentally>

Assignments submitted after the due date will be penalised at the rate of 10% per day, unless accompanied by a medical certificate. All outstanding assignments must be handed in by the end of Week 10. Work will only be accepted after this date if accompanied by a medical certificate. Academic misconduct will not be tolerated in any form in this course and particular attention is drawn to the information about plagiarism included in the following section.

6 Academic integrity, referencing and plagiarism

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>

The preferred referencing style for this course is the APA 6th edition format. Details can be found here:

http://www.tandf.co.uk/journals/authors/style/reference/tf_APA.pdf

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.¹ 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 and **plagiarism** can be located at:

- The *Current Students* site <https://student.unsw.edu.au/plagiarism>, and

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

- The *ELISE* training site
<http://subjectguides.library.unsw.edu.au/elise/presenting>

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student:

<https://student.unsw.edu.au/conduct>

The UNSW Learning Centre also provides substantial educational written materials, workshops, and tutorials <http://www.lc.unsw.edu.au/services-programs>

What is Plagiarism? †

Plagiarism is the presentation of the thoughts or work of another as one's own.

Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor;
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.
- for the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism;
- knowingly permitting your work to be copied by another student may also be considered to be plagiarism; and
- an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

†Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle and adapted with kind permission from the University of Melbourne.

7 Reading and resources

The following provides a small selection of resources that may be of interest; however, these are NOT PRESCRIBED. We will provide further reading and resources in the lecture and field class materials, available on the Moodle site

Search the library here: <https://www.library.unsw.edu.au>

Meteorite Impacts

[Ch. 14 Thinking Ahead - Astronomy | OpenStax](#)

[Why study impact craters? | AMNH](#)

[Meteorite crater discovered while drilling for gold in outback WA estimated to be 100 million years old - ABC News](#)

Super Volcanos

[4 Igneous Processes and Volcanoes – An Introduction to Geology \(opengeology.org\)](#)

[Most Powerful Supervolcano Eruption In The Last 28 Million Years Had No Effect On Human Evolution \(forbes.com\)](#)

[Big Ben Erupts — One of Australia's only two erupting volcanoes goes off - YouTube](#)

Mega Earthquakes

[9 Crustal Deformation and Earthquakes – An Introduction to Geology \(opengeology.org\)](#)

[The “Devil’s Staircase” Shows Why Earthquakes Are Hard to Predict - YouTube](#)

[WA earthquake: Indonesia, Western Australia hit by strong tremors \(news.com.au\)](#)

Tsunami

[A review on the potential effects of tsunami on built environment - ScienceDirect](#)

[Making waves: the tsunami risk in Australia \(theconversation.com\)](#)

[Hundreds of Japanese species floated to the US on tsunami debris | New Scientist](#)

Mass Extinctions

[Kenneth Lacovara: Hunting for dinosaurs showed me our place in the universe | TED Talk](#)

[Has the Earth’s sixth mass extinction already arrived? | Nature](#)

[Climate change and humans together pushed Australia's biggest beasts to extinction | Nature Research Ecology & Evolution Community](#)

Groundwater

Price, Michael, 2013. Introducing Groundwater (ProQuest ebook via UNSW library)

<https://theconversation.com/the-worlds-biggest-source-of-freshwater-is-beneath-your-feet-53874>

Digital sand tank model: <https://hydroframe.org/lesson-plans/> and <https://hydroframe.org/groundwater-education-tools/>

Caves

EGU blogs about karst: <https://blogs.egu.eu/network/water-underground/2017/04/05/of-karst-short-episodes-about-karst/>

(there are also episodes 2, 3 and 4. Add "-2", "-3", or "-4" to the web address)

<https://www.businessinsider.com.au/thai-cave-rescue-timeline-how-it-unfolded-2018-7>

<https://www.environment.nsw.gov.au/topics/land-and-soil/geodiversity/karst-and-caves>

Paleohydrology:

Baker, V.R. (2020) Global MegaFlood Paleohydrology In: Herget, J. and Fontana, A. (Eds) Palaeohydrology: Traces, Tracks and Trails of Extreme Events. (SpringerLink ebook at UNSW library)

Weiss, H. 2017. Megadrought and Collapse: From Early Agriculture to Angkor. Oxford Scholarship online ebook via UNSW library

NOAA, accessed 2021. DROUGHT: Understanding Drought from a Paleoclimate Perspective. <https://www.ncdc.noaa.gov/news/drought-understanding-drought-paleoclimate-perspective>

Ice Age Megafloods (49 mins)

https://www.youtube.com/watch?v=LxXWuUfdYLA&ab_channel=mudbug

Mega Droughts (9 mins) https://www.youtube.com/watch?v=GyKFv-bEamU&ab_channel=SciShow

Solar Flares

<https://www.nasaspaceflight.com/2020/08/carrington-event-warning/>

Buntgen, U. et al 2018. Tree rings reveal globally coherent signature of cosmogenic radiocarbon events in 774 and 993 CE. *Nature Communications*, 9 3605.

8 Administrative matters

8.1 School of BEES Student Office

Please contact the Nucleus Student Hub: <https://nucleus.unsw.edu.au/en/contact-us>

8.2 Equity and Diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener (Mira van der Ley) prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or <https://student.unsw.edu.au/disability>).

Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made (<https://student.unsw.edu.au/disability>).

The School of Biological, Earth and Environmental Sciences aims to provide a safe, supportive and welcoming environment for all staff and students regardless of their race, sex, age, religion, disability, sexual orientation or gender identification. As such, the School strongly supports UNSW's Equity and Diversity Policy in regard to these matters. <http://www.bees.unsw.edu.au/equity>

Definitions, policies and reporting portals can be found here: <https://student.unsw.edu.au/equity>

8.3 Grievance policy

In all cases you should first try to resolve any issues with the course convenor (Andy Baker, a.baker@unsw.edu.au). If this is unsatisfactory, you should contact the School Student Ethics Officer (A/Prof Stephen Bonser, s.bonser@unsw.edu.au) or the Deputy Head of School (A/Prof Scott Mooney s.mooney@unsw.edu.au) who is the School's Grievance Officer and Designated Officer under the UNSW Plagiarism Procedure. UNSW has formal policies about the resolution of grievances that can be reviewed in myUNSW A to Z Guide (see <https://student.unsw.edu.au/complaints>).

Designated/Grievance Officer

A/Prof Scott Moony

School of BEES

s.mooney@unsw.edu.au

Tel: 9385 8036

School Student Ethics Officer

A/Prof Stephen Bonser

School of BEES

s.bonser@unsw.edu.au

Tel: 9385 3863

University Contact

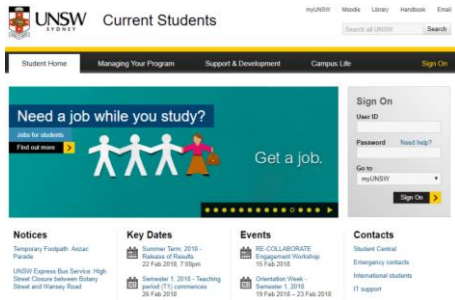
University Counselling Services

Tel: 9385 5418

9. Additional support for students

The Current Students Gateway:

<https://student.unsw.edu.au/>



Academic Skills and Support:

<https://student.unsw.edu.au/academic-skills>

Academic Skills

The Learning Centre wants you to make the most of your university studies. Here you will find resources and support to help you develop and refine your academic skills.



 Essay and Assignment Writing Resources to help you with	 Working with Academic Integrity online module For good academic practice	 Individual consultations One-on-one support and advice about assignment writing
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Disability Support Services:

<https://student.unsw.edu.au/disability-services>

Disability Support Services

If you are trying to manage the demands of university as well as a health condition, learning disability or have personal circumstances that are having an impact on your studies, our disability services may be able to provide you with assistance.

Featured information



Study skills support Disability services program	Mental health video Raising awareness video	Join us on facebook Disability services on facebook
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What you need to know

Register for support

If you want to receive support during your time at university for your disability needs then you will need to register for disability support.

Overview of disability services

Discover the things you need to know about studying with a disability at university as well as some answers to some commonly asked questions.

Support and educational adjustments

Student Wellbeing, Health and Safety:

<https://student.unsw.edu.au/wellbeing>



Same sex marriage debate Counselling newsletter	Sexual misconduct Harassment, assault, rape	Urgent help Emergency contacts
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Campus security 24/7 security on campus	Counselling Individual appointments	Medical health services Doctor, dentist, pharmacy...
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Discrimination / harassment Know your rights	Safety Online safety tutorial	LGBTIQ support ALLY Network
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Mind smart Self-help videos and guides	Student Minds Student voice on mental health	Bullying & cyberbullying Put a stop to bullying
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UNSWAlert SMS Emergency notification system	Join us on facebook Wellbeing and safety pages	More contacts Wellbeing, health and safety support services
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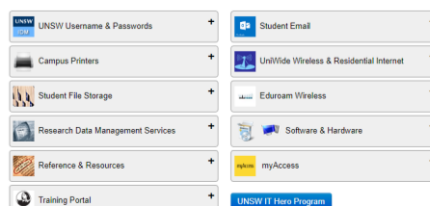
UNSW IT Service Centre:

www.it.unsw.edu.au/students/index.html

Services & Support for Students

Getting started at UNSW - a guide for new students

As a new student at UNSW you will receive a student ID when you collect your student card. You use this as your UNSW username with either your pPass or UniPass password to access online resources at UNSW. Each student is automatically assigned a UNSW email address and can use the free student email service. On campus, students with laptops and mobile devices can access the free UniWide wireless service. For more details on these and other services click the links below. If you require support for IT related matters contact the IT Service Centre.



10 Student Conduct and Health & Safety

a. Respectful behaviour

You have a right to feel safe, respected, and welcome to fully participate in university life.

This also means that you have an obligation to ensure that your behaviour does not infringe on the enjoyment of these rights for other students or staff.

Behaviour that negatively impacts on others, or is unlawful, can constitute misconduct.

Definitions, policies and reporting portals can be found at these sites:

<https://student.unsw.edu.au/equity> <https://student.unsw.edu.au/harassment>
<http://subjectguides.library.unsw.edu.au/elise/respect>

Fieldtrips are academic activities which are fun and are a great way to get to know your classmates. Students and staff are committed to providing a friendly and safe environment for all. To achieve this, participants must follow the following:

- Treat all other field participants and members of the public with courtesy and respect.
- Adopt a responsible attitude whilst on the fieldtrip
- Do not perform duties or functions for the University under the influence of alcohol or drugs
- Comply with instructions and directions issued by fieldtrip supervisors
- Take action to avoid, eliminate or minimize risks

Additionally, behaviour on course fieldtrips must be consistent with the Student Code of Conduct. There are five primary student responsibilities under this Code:

- A condition of enrolment that students inform themselves of the University's rules and policies affecting them
- An obligation to act with integrity in academic work, to ensure that all academic work is conducted ethically and safely
- An obligation to observe standards of equity and respect in dealing with every member of the University community
- An obligation to use and care for University resources in a lawful and appropriate manner
- An obligation to not diminish the University's reputation in the carrying out of academic and other associated University activities.

UNSW is within its right to terminate participation in a fieldwork activity and may institute academic misconduct proceedings in circumstances where a student wilfully fails to work in a safe manner or fail in the above duties.

b H&S

According to the School of BEES policy (<http://www.bees.unsw.edu.au/hs-accountabilities-and-responsibilities>), each student is responsible for:

- Taking reasonable care for his or her own health and safety, and
- Taking reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons, and
- Complying, so far as reasonably able, with any reasonable instruction that is given to ensure UNSW is not in breach of the NSW WHS Act 2011, and
- Complying with UNSW HS policies, procedures and guidelines and BEES HS protocols
- Taking action to avoid, eliminate or minimise hazards
- Making proper use of all safety devices and personal protective equipment
- Seeking information or advice regarding hazards and procedures before carrying out new or unfamiliar work
- Being familiar with emergency and evacuation procedures, the location of first aid and emergency personnel and equipment, and if appropriately trained, the use of such equipment.

The School of BEES recognises its obligations to provide a safe working environment for all persons involved in school-related activities. To achieve this goal with regards to teaching and learning, the school adopts the UNSW Health and Safety Policy v4.1 and the H336 HS Responsibility, Authority and Accountability Procedure. These documents stipulate that everyone attending a UNSW workplace must ensure their actions do not adversely affect the health and safety of others. This outcome is achieved through the establishment of a documented chain of responsibility and accountability for all persons in the workplace, extending from the Head of School through to the students undertaking courses offered by the School of BEES. As part of this chain of responsibility and accountability, the course convenor is responsible for ensuring all activities associated with this course are safe. The course convenor has undertaken detailed risk assessments of all course activities and identified all associated potential hazards. These hazards have been minimised and appropriate steps taken to ensure your health and safety. For each activity, clear written instructions are given, and appropriate hazard warnings or risk minimisation procedures included for your protection.