



## UNSW Course Outline

# MERE2001 Sedimentary and Energy Resources Geology - 2024

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## General Course Information

**Course Code :** MERE2001

**Year :** 2024

**Term :** Term 2

**Teaching Period :** T2

**Is a multi-term course? :** No

**Faculty :** Faculty of Engineering

**Academic Unit :** School of Minerals & Energy Resources Engineering

**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

Sedimentary basins are an important energy and water resource around the world and many cities are built on sedimentary basins. Understanding the development of sedimentary basins and their dynamics through geological history are important for both calculating the resource potential as well as understanding geohazards. This course focuses on the evolution of basins

through geological time and the impact that evolution has for the development and storage of energy resources, the accumulation and maturation of organic material in basins and paleogeography.

## Course Aims

At the end of this course, you will be able to:

- Identify key geological factors that lead to the development of sedimentary basins
- Calculate the impact on sediments during diagenesis
- Develop interpretations of the reservoir potential of basins including potential reservoir conditions for hydrothermal, CO<sub>2</sub>, H<sub>2</sub> and hydrocarbon reservoirs.
- Communicate your geological results to an interdisciplinary audience.

The course is part of the Bachelor of Science major in Earth science as well as the Bachelor of Engineering. The course fits into the former program because it details how we can model the formation of Earth structures and explain their evolution. For the latter, the course helps in quantifying the reservoir properties of aquifers, CO<sub>2</sub> geosequestration and H<sub>2</sub> storage sites.

## Course Learning Outcomes

Course Learning Outcomes
CL01 : Explain sedimentary basin formation and evolutionary processes through geological concepts
CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins
CL03 : Demonstrate strong oral and written communication skills through clear explanations of geological concepts appropriate for an interdisciplinary industry audience.

Course Learning Outcomes	Assessment Item
CL01 : Explain sedimentary basin formation and evolutionary processes through geological concepts	<ul style="list-style-type: none"><li>• Application Exercises and Team Quizzes</li><li>• Topic Quizzes</li><li>• Final Exam</li></ul>
CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins	<ul style="list-style-type: none"><li>• Take-Home Assessments</li><li>• Application Exercises and Team Quizzes</li><li>• Topic Quizzes</li><li>• Final Exam</li></ul>
CL03 : Demonstrate strong oral and written communication skills through clear explanations of geological concepts appropriate for an interdisciplinary industry audience.	<ul style="list-style-type: none"><li>• Take-Home Assessments</li><li>• Application Exercises and Team Quizzes</li></ul>

# Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams | Intedashboard

## Assessments

### Assessment Structure

Assessment Item	Weight	Relevant Dates
Take-Home Assessments Assessment Format: Individual	30%	Due Date: Week 5: 24 June - 30 June, Week 10: 29 July - 04 August
Application Exercises and Team Quizzes Assessment Format: Group	30%	Start Date: Not Applicable Due Date: Week 2: 03 June - 09 June, Week 3: 10 June - 16 June, Week 5: 24 June - 30 June, Week 8: 15 July - 21 July, Week 10: 29 July - 04 August
Topic Quizzes Assessment Format: Individual	10%	Start Date: Not Applicable Due Date: Week 1: 27 May - 02 June, Week 2: 03 June - 09 June, Week 4: 17 June - 23 June, Week 7: 08 July - 14 July, Week 9: 22 July - 28 July
Final Exam Assessment Format: Individual	30%	Start Date: Not Applicable Due Date: Not Applicable

## Assessment Details

### Take-Home Assessments

#### Assessment Overview

Two individual take-home assignments building upon each module, including group work, with comments feedback provided directly to the assignment.

Assignment 1 (due week 5) involves several short questions on material from the first 3 weeks of the course and submit responses with references and academic style.

Assignment 2 is maximum 5 pages and integrates the ideas behind the course into an industry-like report on a particular sedimentary basin.

#### Course Learning Outcomes

- CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins
- CL03 : Demonstrate strong oral and written communication skills through clear explanations of geological concepts appropriate for an interdisciplinary industry audience.

### Detailed Assessment Description

Assignment 1 is due in Week 5. Assignment 2 is due Week 10.

The use of AI is encouraged in helping you understand the material and in helping formulating your responses. However, you are responsible for the standard of the work submitted and must be able to explain your ideas in your own words. All work submitted must be correctly referenced and in line with the [UNSW plagiarism policy and student code of conduct](#).

### Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

## **Application Exercises and Team Quizzes**

### Assessment Overview

Students undertake application exercises consisting of submitting written material, computer code or online presentations. Students work in groups throughout the term. Written solutions and model answers will be given after the submission deadline and provided in lecture recordings.

### Course Learning Outcomes

- CL01 : Explain sedimentary basin formation and evolutionary processes through geological concepts
- CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins
- CL03 : Demonstrate strong oral and written communication skills through clear explanations of geological concepts appropriate for an interdisciplinary industry audience.

### Assignment submission Turnitin type

Not Applicable

## **Topic Quizzes**

### Assessment Overview

Individual multiple-choice quizzes covering each of the modules for the course. Feedback will be given via lectures and through the quiz itself. A self-evaluation quiz is also provided prior to the topic quiz.

### Course Learning Outcomes

- CL01 : Explain sedimentary basin formation and evolutionary processes through geological concepts

- CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins

#### **Detailed Assessment Description**

5 multiple choice quizzes held in class during the 1st week of each module.

#### **Assessment Length**

10 multiple-choice questions

#### **Assignment submission Turnitin type**

Not Applicable

### **Final Exam**

#### **Assessment Overview**

Final course exam covering all course content.

#### **Course Learning Outcomes**

- CL01 : Explain sedimentary basin formation and evolutionary processes through geological concepts
- CL02 : Identify and discuss key geological factors in the identification and development of energy resources in sedimentary basins

#### **Assignment submission Turnitin type**

This is not a Turnitin assignment

## **General Assessment Information**

Modules

Each module has several phases:

- A Preparation Phase
- Readiness Assurance Tests (RAT) Phase
- Application Exercise (AE) Phase

Relationship to Major Assessments

Each module is tested in individual assignments and the exam. Take-home assignment covers Module 1-2 and Take-home 2 covers Modules 3-5. The exam covers all course content.

Preparation Phase

This is a self-study phase. Prior to coming to the first class of a module (even the first lecture!),

you will need to have completed a number of online learning activities, including:

- An pre-recorded lecture and read lecture notes (via Microsoft Teams)
- Course readings (via Leganto)
- A self-preparation quiz (via Microsoft Teams)

These are intended to make the class time as effective as possible and to focus class time on feedback.

### Readiness Assurance Test (RAT) Phase (In-class Quiz)

The RAT phase is designed to test your readings and learnings from the preparation phase and identify any gaps. We will discuss the results in the weekly lectures and I will use the opportunity to give you feedback on the material that you might have problems with. For in-class students, the RAT has an individual component and a team component, but only the individual component is graded (2% per quiz). The RAT typically consists of 10 unique multiple-choice questions with 3-5 possible answers taken in ~10 minutes.

### Application Exercise (AE) Phase

In this phase, you will start doing some more applied work on the module. These have been designed to facilitate engagement and discussion and provide you with some industry-like problems that you will solve. For in-class students, this phase is conducted in teams.

### Grading Basis

Standard

### Requirements to pass course

A composite mark of at least 50 out of 100 is required to pass this course.

## Course Schedule

### Attendance Requirements

Students are expected to attend all classes and workshops to participate in team work, class quizzes and discussions. Note that many assessments are conducted in-class, including individual quizzes, application exercises and team quizzes.

### General Schedule Information

- **Week 1: Module 1 - Introduction to Sedimentary Geology**
- **Weeks 2-3: Module 2 - Organic Matter in Basins**

- **Weeks 4-5: Module 3 - Stratigraphy and Depositional Environments**
- Week 5: Assignment 1 due
- **Week 6: No lectures**
- Weeks 7-8: Module 4: Basin Evolution
- **Weeks 9-10: Module 5: Fluid Migration in Basins**
- Week 10: Assignment 2 due

## Course Resources

### Prescribed Resources

The readings for each module are provided via [Leganto Online System](#)

### Recommended Resources

Recommended texts for this course include (all available via UNSW library online):

- [Elements of Petroleum Geology by Selley and Sonnenberg, 3rd Edition \(2015\)](#)
- [Petroleum Geoscience from Sedimentary Environments to Rock Physics by Knut Bjørlykke \(2010\)](#)
- [Petroleum Geoscience by Gluyas and Swarbrick \(2004\)](#)

### Course Evaluation and Development

Feedback is gathered twice during term (Week 5 and Week 10) as well as through MyExperience.

A number of elements have been improved due to this feedback: scheduling, reduced assessment, worked examples, more group work during class time, improved lecture notes etc.

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Stuart Clark		Tyree Energy Building 214	468332796	Via Teams/ Mobile	No	Yes
Lecturer	Patrick Makuluni			406887053		No	No
Teaching assistant	Elena Babina					No	No

## Other Useful Information

### Academic Information

#### I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's [Special Consideration page](#).

## **II. Administrative matters and links**

All students are expected to read and be familiar with UNSW guidelines and policies. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

## **III. 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 prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. 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.

## **IV. Professional Outcomes and Program Design**

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: <https://www.unsw.edu.au/engineering/student-life/student-resources/program-design>.

*Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published.*



*Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.*

## **Academic Honesty and Plagiarism**

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: [student.unsw.edu.au/plagiarism](http://student.unsw.edu.au/plagiarism). The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

[www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf](http://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)

## **Submission of Assessment Tasks**

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

## **Faculty-specific Information**

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

[Engineering Industrial Training](#) – Industrial training questions

[UNSW Study Abroad](#) – study abroad student enquiries (for inbound students)

[UNSW Exchange](#) – student exchange enquiries (for inbound students)

[UNSW Future Students](#) – potential student enquiries e.g. admissions, fees, programs, credit transfer

## **Phone**

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

## School-specific Information

### Course completion

Course completion requires submission of all assessment items. Failure to submit all assessment items may result in the award of an Unsatisfactory Failure (UF) grade for the Course unless special consideration has been submitted and approved.

### Submission of Assessment Tasks

We encourage you to retain a copy of every assignment submitted for your own record, either in hardcopy or electronic form. All assessments must have an assessment cover sheet attached (if required).

### Student Resources

The School has [student resources](#) section, containing useful advice and information to ensure you're able to focus on your studies.

### Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the online Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: [www.covid19studyonline.unsw.edu.au](http://www.covid19studyonline.unsw.edu.au)

Note that some specialist engineering software is not available for Mac computers.

- Mining Engineering Students: OMB G48
- Petroleum Engineering Students: TETB LG34 & LG35

For more information about system requirements is available at [www.student.unsw.edu.au/moodle-system-requirements](http://www.student.unsw.edu.au/moodle-system-requirements)

### Accessing Course Materials Through Moodle

Course outlines, support materials are uploaded to Moodle, the university standard Learning Management System (LMS). In addition, on-line assignment submissions are made using the assignment dropbox facility provided in Moodle. All enrolled students are automatically included in Moodle for each course. To access these documents and other course resources, please visit: [www.moodle.telt.unsw.edu.au](http://www.moodle.telt.unsw.edu.au)

## School Contact Information

School of Minerals and Energy Resources Engineering  
Old Main Building, Level 1, 159 (K15)  
UNSW SYDNEY NSW 2052 AUSTRALIA

For current students, all enquiries and assistance relating to enrolment, class registration, progression checks and other administrative matters, please see [The Nucleus: Student Hub](#).

### Web & Important Links:

[School of Minerals and Energy Resources](#)

[The Nucleus Student Hub](#)

[Moodle](#)

[UNSW Handbook](#)

[UNSW Timetable](#)

[Student Wellbeing](#)

[Urgent Mental Health & Support](#)

[Equitable Learning Services](#)