



Faculty of Engineering

**School of Minerals and Energy Resources Engineering**

Postgraduate Course Outline

MINE9910

Mine Ventilation Short Course

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## 1. INFORMATION ABOUT THE COURSE

Course Code:	MINE9910	Term:	T2, 2021	Level:	PG	Units/Credits	6 UOC
Course Name:	<b>Mine Ventilation Short Course (Distance based)</b>						

Course Convenor:	<b>Dr Guangyao Si / Duncan Chalmers</b>		
Contact Details	School of Minerals and Energy Resources Engineering Old Main Building - Rm 159B	EMAIL:	<b><a href="mailto:g.si@unsw.edu.au">g.si@unsw.edu.au</a></b> <b><a href="mailto:d.chalmers@unsw.edu.au">d.chalmers@unsw.edu.au</a></b>
		Phone:	+61 2 9385 5727
Contact times	Online Distance Offering Commencing 14 June 2021 plus 7 weeks <b>All lectures are pre-recorded and available via Moodle.</b> Online consultation time: <ul style="list-style-type: none"><li>• 10-11 am every Thursday</li></ul>		
Online consultation platform	You need to use your UNSW account ( <b><a href="mailto:zid@ad.unsw.edu.au">zid@ad.unsw.edu.au</a></b> ) to log-in Teams. We will use the same Link for all our sessions, which has also been provided above.  <b>Microsoft Teams meeting</b> <b>Join on your computer or mobile app</b> <a href="#">Click here to join the meeting</a> <b>Join with a video conferencing device</b> <a href="mailto:teams@vtc.unsw.edu.au">teams@vtc.unsw.edu.au</a> Video Conference ID: 134 222 279 2 <a href="#">Alternate VTC dialing instructions</a> <b>Or call in (audio only)</b> <a href="tel:+61283180024">+61 2 8318 0024</a> ,541599136# Australia, Sydney Phone Conference ID: 541 599 136# <a href="#">Find a local number</a>   <a href="#">Reset PIN</a>		

### 1.1. Course Description

This course covers basic principles of coal and metalliferous mine ventilation and underground environmental control. The emphasis is on the practical aspects of mine ventilation to ensure that learning outcomes are immediately relevant to industry. Course topics include those common to both types of mines, such as fan performance and circuit analysis using Ventsim, occurrence and control of gases, dust and heat together with design and management of ventilation systems. Coal mine specific hazards such as spontaneous combustion, outbursts and management of seam gas emission are also covered. It is preferred if practical course assignments be undertaken at operating mine sites however this is not a course prerequisite.

### 1.2. Course Completion

Course completion requires submission of all assessment items; failure to submit all assessment items can result in the award of an Unsatisfactory Failure (UF) grade for the Course.

### 1.3. Assumed Knowledge

This course assumes that a student:

- has knowledge of mining terms and descriptions and have been exposed to mining methods and systems.

### 1.4. How to Access Moodle online lecture room and recordings

1. Login to your UNSW Moodle account and find our course 'MINE9910-Mine Ventilation (T2-2021)'
2. Under the heading of each week, you will see the lecture material and link to pre-recorded lectures.

#### ^ Week 1 Ventilation and Mine Services

This section covers:

1.1 Fluid Flow, Friction And Shock Losses

1.2 Fans And Auxiliary Ventilation

Answer assignment 1 Question 1, 2 and 3


Note that the topics in week 2 are also related. Plan to use the full 2 weeks to cover the topics i.e. week 1 has a larger work load than week 2.

 Ventilation and Mine Services Notes  3.5MB PDF document

 Fluid Flow Slides  1.4MB PDF document

 Fans Slides  1.7MB PDF document

 Reading material  11MB PDF document

 [Lecture recording on Teams for Week 1](#)

## 2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

### 2.1. Course Aims

The main purpose of the course material is to provide a complete educational framework for the teaching of ventilation related topics to graduates and suitable candidates from industry. This has been undertaken with a focus on providing knowledge, calculation methods and worked examples currently employed, and pertinent to, the modern underground mining industry. The aim is that, within the limited scope of this course, the contents are both academically suitable and immediately relevant to industry.

### 2.2. Course Topics

- Ventilation and Mine Services
- Environmental Contaminants
- Heat in Underground Mines
- Ventilation System Management
- Coal Mine Hazards & Control
- Mine ventilation planning and Practice

### 2.3. Learning Outcomes

The intended outcomes of the course, with respect to specific modules covered, include;

Awareness of;

- Significance of related topics in underground mining environments.
- Technical issues, assumptions and limitations incorporated in design techniques.
- Health and safety issues, assumptions and limitations.

Knowledge of;

- Underpinning scientific and engineering principles.
- Current legislative requirements and operational standards within the mining industry.
- Engineering and design techniques employed.
- Available solutions to underground environmental control problems.

Competency in;

- Fundamental calculations using laws and relationships provided.
- Demonstration of decision making ability in mine design and problem solving.

Provision of;

- Resources for use in the management of ventilation systems in underground mines.
- Peer networking.

### 3. REFERENCE RESOURCES

#### 3.1. Reference Materials

Other material that should be referred to in conjunction with this Course Outline include:

- Learning Guide: Ventilation short course
- Course notes, and course resources are available in LMS.

Classic textbooks:

- Le Roux's Notes on Environmental Engineering.
- Subsurface Ventilation and Environmental Engineering, Malcolm J. McPherson, 1993
- Environmental Engineering In South African Mines
- Mine Fires In Australian Underground Coal Mines
- Spontaneous Combustion In Australian Underground Coal Mines.

#### 3.2. Online Resources

Selected readings as well as other supporting material (e.g. course outline and lecture notes will be made available on Moodle.

Videos are often provided to students as a web stream within the Moodle learning management system. Videos are not available for download by students, unless approved by the Course Convenor and either the Undergraduate or Postgraduate Coursework Director. Special consideration can be provided for students to access videos off-line (eg. working remotely). Please contact the Course Convenor for more information. Note that UNSW reserves the right to deliver videos as a web stream rather than off-line, and cannot provide videos that are copyright from other providers.

## 4. COURSE CONTENT AND LEARNING ACTIVITIES

### 4.1. Learning Activities Summary

The schedule of learning activities and outcomes for the course are listed in Table 1.

**TABLE 1:** Course content

Week	Date of week start	Topic	Content / Activities
1	14 June	Ventilation and Mine Services	1.1 Fluid Flow, Friction And Shock Losses
		Ventilation and Mine Services	1.2 Fans And Auxiliary Ventilation
2	21 June	Ventilation and Mine Services	1.3 Ventilation Network Analysis
		Ventilation and Mine Services	1.4 Ventilation System Monitoring And Mine Services
3	28 June	Gases and Dust	2.1 Mine Gases And Gas Laws 2.2 Gas Monitoring
		Dust	2.3 Airborne And Explosible Dust
4	5 July	Heat and Environmental Contaminants	3.1 Psychrometry
		Heat and Environmental Contaminants	3.2 Heat Transfer And Sources Of Heat 3.3 Heat Stress Management
5	12 July	Mine Hazards & Control	5.1 Gas Reservoir Characteristics
		Mine Hazards & Control	5.3 Spontaneous Combustion Of Coal and Reactive Ground
6	19 July	Revision	Assignment 1
		Ventilation Planning and Practice	6.2 Coal Mine Ventilation Planning and Practice
7	26 July	Ventilation Planning and Practice	7.2 Metalliferous Mine Ventilation Planning and Practice
		Revision	Completion of Assignments 2 and 3

**Total student effort hours:** Approx. 120

Note:

- The above indication of “student effort hours” is indicative only – It reflects the anticipated level of total student involvement with the course)
- The above schedule is a guide only and the indicated dates when each theme and course content is discussed is subject to change without notice.
- Assessment submission dates are listed in Section 5 Course Assessment.

## 4.2. Learning Activities Summary

1. *Lectures and tutorials:* The interactive sessions could include a traditional lecture using a PowerPoint presentation or a tutorial session or a group activity to reinforce the learning. The lecture tutorials will cover a “broad brush” approach to the course materials to explain essential components. These lectures and tutorials are supported by optional tutorial examples in the learning guide. Spreadsheets and other course resources are explained.

## 5. COURSE ASSESSMENT

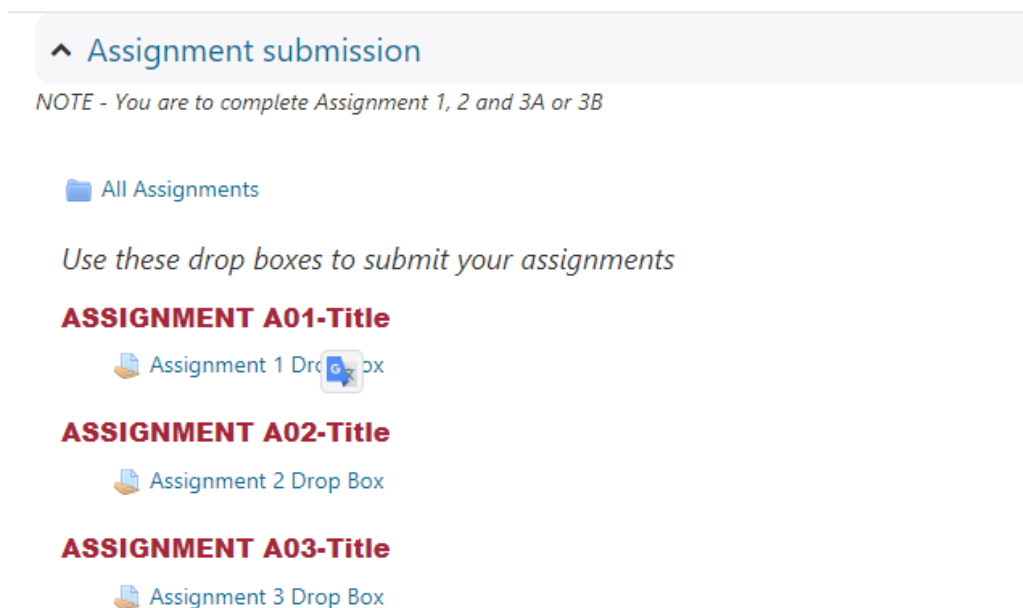
### 5.1. Assessment Summary

The following assessment tasks indicated in Table 2 have been devised to ensure the student can demonstrate that they have satisfactorily attained the minimum requirements of the course as defined in the Learning Outcomes of the course and the Graduate Attributes of the program. The student is advised to review the respective Assessment Criteria prior to commencing each assessment item. All assignments are due **5pm Sydney time on Friday of the week**. Please submit your work to specified **Dropbox on Moodle** (see Figure below) before the submission deadline.

**TABLE 2:** Course assessments and due dates.

Assessment Task	Weight	Assessment	Due date	Learning Outcomes Assessed
<b>A01</b>	33%	Assignment 1	16 July	1-5
<b>A02</b>	33%	Assignment 2	20 Aug	1-5
<b>A03</b>	34%	Assignment 3	17 Sep	1-5

Moodle submission Dropbox:



The screenshot shows a Moodle interface for assignment submission. At the top, there is a header 'Assignment submission' with an upward-pointing arrow. Below this is a note: 'NOTE - You are to complete Assignment 1, 2 and 3A or 3B'. Underneath the note is a folder icon labeled 'All Assignments'. A message reads 'Use these drop boxes to submit your assignments'. There are three sections, each with a red title and a blue folder icon: 'ASSIGNMENT A01-Title' with 'Assignment 1 Drop Box', 'ASSIGNMENT A02-Title' with 'Assignment 2 Drop Box', and 'ASSIGNMENT A03-Title' with 'Assignment 3 Drop Box'.



## 5.2. Assessment Requirements

### **Who**

- **All assessment items must be submitted to the Course Convenor.** It must not be submitted directly to the student's individual Project Supervisor – this includes the Project Proposal, Annotated Bibliography and Project Progress Report.

### **When**

- If not otherwise stated, **the default deadline for submission of an assignment is 5pm Sydney time on Friday of the week in the nominated week.**
- Early submission is required in cases where the student will otherwise be absent on the due date of submission, for example to attend the Student Mining Games, a graduate employment interview etc. – no extensions will be granted.
- In particular, the student should make sure they have read and understood the:
  - Declaration of Academic Integrity;
  - Assignment Submission requirements detailed in the *University Policies* section of the Course Outline; and
  - School Policy on *Assignment Submission* available on the School's website (the web address is given in the Course Outline). In particular note the requirement that only PDF documents should be uploaded and the required file naming convention.

### **Where**

- *Submissions must be made electronically* through Turnitin in Moodle unless otherwise stated. Turnitin is a plagiarism checking service that will retain a copy of the assessment item on its database for the purpose of future plagiarism checking.

### **What**

- Submission requirements for all assignments are listed in Sections 4 and 7 of the *Course Learning Guide*.
- The submission must be:
  - a single document in PDF format; and
  - prepared in the form of a formal report that includes a list of reference sources cited in the report, prepared in accordance with the report writing standards.
- Each submission must have appended:
  - to the front, a signed copy of the Student Declaration Form and Coversheet; and
- It is **strongly recommended** when preparing the major assignment; students use the **Report Template** available from Moodle. Note: as this template already incorporates the required the Student Declaration Form, a student does not need to separately append a signed copy of coversheet to their assignment.

### **How**

- The submitted document must be consistent with the following file naming convention: **< FamilyNameInitials\_CourseCode\_AssignmentNumber.pdf >**.
- A typical complaint filename would take the following form **< SmithPD\_MINE9940\_A01.pdf >** which elements correspond to:
  - Family name of student: Smith
  - Initial(s) of student: PD
  - Course Code: MINE9910

- Assignment number: A01...as defined in the Course Outline for the assessment task
- File format: PDF document

### 5.3. Penalties for Non-Compliant Submission

A submission that is non-compliant with the School Policy on *Assignment Submission* and/or requirements as contained in this Course Outline may not be marked and/or penalty marks subtracted from the assignment mark for non-compliance.

Some examples of a non-compliant assignment include that the assignment submission:

- is not a single PDF document. *Penalty for non-compliance:* assignment not marked.
- does not contain a signed copy of the *Student Declaration Statement*. *Penalty for non-compliance:* assignment not marked.
- is not fully consistent with the designated file naming convention as listed above and defined as Item #6 in the School Policy on electronic submission. For example, a file name such as < *ProjectProposal.pdf* > is NOT compliant. *Penalty for non-compliance:* 10 marks.
- does not have appended at the end of the assignment a completed self-assessment by the student of the assignment using the official *Assessment Criteria* template. *Penalty for non-compliance:* 10 marks.

### 5.4. Assignment Attachments

Each assignment submitted for assessment must be attached with:

- an official School Coversheet at the front of the assignment;

## 6. ASSESSMENT CRITERIA

Full marks for an assignment or examination question can be obtained were

- The numerical 'result' is substantiated by an 'answer' comprising a complete mathematical working with appropriate definitions, assumptions, explanations and sketch diagrams at each stage.
- The result is numerically correct, with the correct units, magnitude and sign.
- The appropriate number of significant figures has been reported in the result and the accuracy of the result has not been compromised by rounding errors.
- Where appropriate, there is some discussion of the reliability and applicability of the result in the relevant engineering context.
- The answers to purely descriptive questions, which do not require any calculation and do not have a numerical result, should clearly and comprehensively address the specific question, supported by appropriate diagrams, graphs, formulae, examples and cited references.

A key ability of an engineer is to recognise when a numerical result 'looks wrong' and then go back over the work to check the input data, assumptions, and calculations.

These typical maximum marks apply where the following errors occur:

- There is a minor calculation or transcription error, but otherwise the answer is satisfactory and the result is consistent and apparently reasonable: 70 to 90%
- The answer is satisfactory but the result is compromised by one of more of the following: is inaccurate due to rounding errors, has incorrect or no units, has the wrong magnitude, has the wrong sign: 60 to 80%
- There is a minor calculation or transcription error but, although the answer is satisfactory, the result is clearly unreasonable: 40 to 60%
- The result is correct but there is little or no mathematical working with appropriate definitions, assumptions, explanations and sketch diagrams at each stage: 30 to 50%
- The question has been misunderstood, an inappropriate mathematical working has been applied but the result is consistent and apparently reasonable: 20 to 40%
- The question has been misunderstood, an inappropriate mathematical working has been applied and the result is clearly unreasonable: 0 to 30%
- The input data have been transcribed correctly, but there has been no serious attempt to answer the question 0 to 10%
- A descriptive answer, although substantially correct, is padded with waffle and irrelevant material: 60 to 80%
- A descriptive answer is very brief and clearly deficient: 30 to 60%
- A descriptive answer merely comprises a re-statement of the question with something like "... is very important" added at the end: 0 to 10%

## 7. STUDYING A UG COURSE IN UNSW MINERALS AND ENERGY RESOURCES ENGINEERING

### 7.1. How We Contact You

At times, the School or your course convenors may need to contact you about your course or your enrolment. Your course convenors will use the email function within Moodle or we will contact you on your @student.unsw.edu.au email address.

We understand that you may have an existing email account and would prefer for your UNSW emails to be redirected to your preferred account. Please see these instructions on how to redirect your UNSW emails: <https://www.it.unsw.edu.au/students/email/index.html>

### 7.2. How You Can Contact Us

We are always ready to assist you with your inquiries. To ensure your question is directed to the correct person, please use the email address below for:

Enrolment or other admin questions regarding your program:

<https://unswinsight.microsoftcrmpartals.com/web-forms/>

Course inquiries: these should be directed to the Course Convenor.

### 7.3. Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the on-line Moodle LMS (Learning Management System).

It is essential that you have access to a PC or notebook computer. Mobile devices such as smart phones and tablets may compliment learning, but access to a PC or notebook computer is also required. Note that some specialist engineering software is not available for Mac computers.

Mining Engineering Students: OMB G48/49

Petroleum Engineering Students: TETB

It is recommended that you have regular internet access to participate in forum discussion and group work. To run Moodle most effectively, you should have:

- broadband connection (256 kbit/sec or faster)
- ability to view streaming video (high or low definition UNSW TV options)

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)

### 7.4. 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)

## 7.5. Assignment Submissions

The School has developed a guideline to help you when submitting a course assignment.

We encourage you to retain a copy of every assignment submitted for assessment for your own record either in hardcopy or electronic form.

All assessments must have an assessment cover sheet attached.

## 7.6. Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date.

We understand that at times you may not be able to submit an assignment on time, and the School will accommodate any fair and reasonable extension. We would recommend you review the UNSW Special Consideration guidelines – see following section.

In the case of the Project Report, penalty marks will be applied at the following rate if submitted after the due date: five (5) percentile points of the maximum possible mark for each day or part thereof that the assessment is overdue.

For example if a student submitted the Project Report five days after the due date and the unadjusted mark was 68% then the final adjustment mark for the assignment would be 43%; that is the raw mark of 68% less 25 percentile points (5 days @ 5 percentile points per day).

## 7.7. Special Consideration

You can apply for special consideration through [UNSW Student Central](#) when illness or other circumstances interfere with your assessment performance. Sickness, misadventure or other circumstances beyond your control may:

- Prevent you from completing a course requirement,
- Keep you from attending an assessable activity,
- Stop you submitting assessable work for a course,
- Significantly affect your performance in assessable work, be it a formal end-of-semester examination, a class test, a laboratory test, a seminar presentation or any other form of assessment.

We ask that you please contact the Course Convenor immediately once you have completed the special consideration application, no later than one week from submission.

More details on special consideration can be found at: [www.student.unsw.edu.au/special-consideration](http://www.student.unsw.edu.au/special-consideration)

## 7.8. Course Results

For details on UNSW assessment policy, please visit: [www.student.unsw.edu.au/assessment](http://www.student.unsw.edu.au/assessment)

In some instances your final course result may be withheld and not released on the UNSW planned date. This is indicated by a course grade result of either:

- WD – which usually indicates you have not completed one or more items of assessment or there is an issue with one or more assignment; or
- WC – which indicates you have applied for Special Consideration due to illness or

misadventure and the course results have not been finalised.

In either event it would be your responsibility to contact the Course Convener as soon as practicable but no later than five (5) days after release of the course result. If you don't contact the convener on time, you may be required to re-submit an assignment or re-sit the final exam and may result in you failing the course. You would also have a NC (course not completed) mark on your transcript and would need to re-enroll in the course.

### **7.9. Students Needing Additional Support**

The Student Equity and Disabilities Unit (SEADU) aims to provide all students with support and professional advice when circumstances may prevent students from achieving a successful university education. Take a look at their webpage: [www.studentequity.unsw.edu.au/](http://www.studentequity.unsw.edu.au/)

### **7.10. Academic Honesty and Plagiarism**

Your lecturer and the University will expect your submitted assignments are truly your own work. UNSW has very clear guidelines on what plagiarism is and how to avoid it. Plagiarism is using the words or ideas of others and presenting them 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. The University has adopted an educative approach to plagiarism and has developed a range of resources to support students. All the details on plagiarism, including some useful resources, can be found at [www.student.unsw.edu.au/plagiarism](http://www.student.unsw.edu.au/plagiarism).

All Mining Engineering students are required to complete a student declaration for academic integrity which is outlined in the assignment cover sheets. By signing this declaration, you agree that your work is your own original work.

If you need some additional support with your writing skills, please contact the Learning Centre or view some of the resources on their website: [www.lc.unsw.edu.au/](http://www.lc.unsw.edu.au/). The Learning Centre is designed to help you improve your academic writing and communication skills. Some students use the Centre services because they are finding their assignments a challenge, others because they want to improve an already successful academic performance.

### **7.11. Continual Course Improvement**

At the end of each course, all students will have the opportunity to complete a course evaluation form. These anonymous surveys help us understand your views of the course, your lecturers and the course materials. We are continuously improving our courses based on student feedback, and your perspective is valuable.

Feedback is given via <https://student.unsw.edu.au/myexperience> and you will be notified when this is available for you to complete.

We also encourage all students to share any feedback they have any time during the course – if you have a concern, please contact us immediately.



## School of Minerals and Energy Resources Engineering

# Assessment Cover Sheet

Course Convenor: \_\_\_\_\_  
 Course Code: \_\_\_\_\_ Course Title: \_\_\_\_\_  
 Assignment: \_\_\_\_\_  
 Due Date: \_\_\_\_\_  
 Student Name: \_\_\_\_\_ Student ID: \_\_\_\_\_

### ACADEMIC REQUIREMENTS

Before submitting this assignment, the student is advised to review:

- the assessment requirements contained in the briefing document for the assignment;
- the various matters related to assessment in the relevant Course Outline; and
- the *Plagiarism and Academic Integrity* website at < <http://www.lc.unsw.edu.au/plagiarism/pintro.html> > to ensure they are familiar with the requirements to provide appropriate acknowledgement of source materials.

If after reviewing this material there is any doubt about assessment requirements, then in the first instance the student should consult with the Course Convenor and then if necessary with the Director – Undergraduate Studies.

While students are generally encouraged to work with other students to enhance learning, all assignments submitted for assessment must be their entire own work and duly acknowledge the use of other person's work or material. The student may be required to explain any or all parts of the assignment to the Course Convenor or other authorised persons. *Plagiarism* is using the work of others in whole or part without appropriate acknowledgement within the assignment in the required form. *Collusion* is where another person(s) assists in the preparation of a student's assignment without the consent or knowledge of the Course Convenor.

*Plagiarism* and *Collusion* are considered as Academic Misconduct and will be dealt with according to University Policy.

### STUDENT DECLARATION OF ACADEMIC INTEGRITY

I declare that:

- This assessment item is entirely my own original work, except where I have acknowledged use of source material [such as books, journal articles, other published material, the Internet, and the work of other student/s or any other person/s].
- This assessment item has not been submitted for assessment for academic credit in this, or any other course, at UNSW or elsewhere.

I understand that:

- The assessor of this assessment item may, for the purpose of assessing this item, reproduce this assessment item and provide a copy to another member of the University.
- The assessor may communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the assessment item on its database for the purpose of future plagiarism checking).

Student Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Students are advised to retain a copy of this assessment for their records and submission should be made in accordance to the assessment details available on the course Moodle site.**

MINE9910 Mine Ventilation, T2 2021