



# EDUC8250

## Effective Instruction in Mathematics, Science and Technology

Session 1, Fully online/virtual 2021

*Macquarie School of Education*

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#### **Disclaimer**

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#### **Notice**

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

Unit convenor and teaching staff

Unit Convenor and Lecturer

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Contact via By email

Lecturer

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Credit points

10

Prerequisites

Admission to MSpecEd or GradDipSpecEd or MInc&SpecEd or GradDipInc&SpecEd or GradCertLearnDiffSuppTeach

Corequisites

Co-badged status

Unit description

The aim of this unit is to examine how students with diverse needs can be supported in their participation in Mathematics, Science, and Technology. It will explore a full range of teaching methodologies, including teacher-directed explicit instruction as well as student-centered and inquiry-driven approaches. The unit focuses on the functional needs of the learner and will draw on knowledge gained in other units to consider how differentiated instruction is applied to best support the strengths and needs of individual learners. It will develop understanding regarding how to adapt pedagogy, resources, assessment tasks and classroom environments to ensure that every student has equitable opportunities to engage in Mathematics, Science and Technology learning experiences. There will also be a strong focus on the use of digital technologies to support learning in all areas.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

**ULO1:** apply advanced discipline knowledge and scholarly understanding to evaluate student learning of mathematics, science and technology concepts

**ULO2:** draw on domain knowledge to critically reflect on your own professional knowledge and practice

**ULO3:** apply domain knowledge to examine and critically evaluate theories and research that underpin practice in the fields of mathematics, science and technology instruction

**ULO4:** develop appropriate assessment, monitoring and adaptation / intervention strategies to meet the needs of diverse learners

**ULO5:** synthesize concepts effectively through written and oral communication

## General Assessment Information

### Assessment Presentation and Submission Guidelines

Please follow these guidelines when you submit each assignment:

- Allow a left and right-hand margin of at least 2cm in all assignments.
- Please type all assignments using 12-point font and 1.5 spacing.
- All assessments must be submitted through Turnitin in .doc or .pdf format
- It is the responsibility of the student to ensure that all assessments are successfully submitted through Turnitin.
- Faculty assignment cover sheets are NOT required.

### Draft Submissions & Turnitin Originality Reports

- Students may use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.
- Students are strongly encouraged to upload a draft copy of each assessment to Turnitin at least one week prior to the due date to obtain an Originality Report.
- The Originality Report provides students with a similarity index that may indicate if plagiarism has occurred. Students will be able to make amendments to their drafts prior to their final submission on the due date.
- Generally, one Originality Report is generated every 24 hours up to the due date.

**Please note:**

- Students should regularly save a copy of all assignments before submission,
- Students are responsible for checking that their submission has been successful and has been submitted by the due date and time.

**Assignment extensions and late penalties**

- In general, there should be no need for extensions except through illness or misadventure that would be categorised as serious and unavoidable disruption according to the University definition of same, see: <https://students.mq.edu.au/study/my-study-program/special-consideration>
- Applications for extensions must be made via AskMQ according to the Special Consideration policy. Extensions can only be granted if they meet the Special Considerations policy and are submitted via <https://ask.mq.edu.au/>. This will ensure consistency in the consideration of such requests is maintained.
- Late submissions: Unless a Special Consideration request has been submitted and approved, (a) a penalty for lateness will apply – two (2) marks out of 100 will be deducted per day for assignments submitted after the due date – and (b) no assignment will be accepted more than seven (7) days (incl. weekends) after the original submission deadline. No late submissions will be accepted for timed assessments – e.g., quizzes, online tests. Late penalties are applied by unit convenors or their delegates after tasks are assessed.
- If a student is still permitted to submit on the basis of unavoidable disruption, an alternative topic may be set.
- Students should keep an electronic file of all assessments. Claims regarding "lost" assessments cannot be made if the file cannot be produced. It is also advisable to keep an electronic file of all drafts and the final submission on a USB untouched/unopened after submission. This can be used to demonstrate easily that the assessment has not

been amended after the submission date.

### **Requesting a re-assessment of an assignment**

If you have evidence that your task has been incorrectly assessed against the grade descriptors you can request a re-mark. To request a re-mark you need to contact the unit convenor within 7 days of the date of return of the assignment and provide a detailed assessment of your script against the task criteria. Evidence from your assignment must be provided to support your judgements.

Note:

- Please do not request a re-mark for a Failed assessment as they are all double-marked as a part of the moderation process.
- The outcome of a re-mark may be a higher/lower or unchanged grade.
- Grades are standards referenced and effort is NOT a criterion.

### **Units with Quiz Assessments**

Online quizzes are an individual assessment task and **MUST BE COMPLETED** by each student individually. Similarities in responses between students will be checked and investigated for possible collusion. Please see the Academic Honesty Handbook for more information.

### **University policy on grading**

Criteria for awarding grades for assessment tasks

Assignments will be awarded grades ranging from HD to F according to guidelines set out in the University's Grading Policy. The following descriptive criteria are included for your information.

### **Descriptive Criteria for awarding grades in the unit**

In order to meet the unit outcomes and successfully pass this unit, students must make a genuine attempt at all assessment tasks. Where any submitted assessment task is considered to be unsatisfactory in this regard, the highest possible final grade that can be awarded for the unit will be 45.

Students will be awarded grades ranging from HD to F according to guidelines set out in the policy: <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/assessment-in-effect-from-session-2-2016>

The following generic grade descriptors provide university-wide standards for awarding final grades.

Grade	Descriptor
HD (High Distinction)	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the discipline.
D (Distinction)	Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.
Cr (Credit)	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the discipline.
P (Pass).	Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes
F (Fail)	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

Note: If you fail a unit with a professional experience component, the fail grade will be on your transcript irrespective of the timing of the placement.

### Withdrawing from this unit

If you are considering withdrawing from this unit, please seek academic advice via <https://ask.mq.edu.au> before doing so as this unit may be a co-requisite or prerequisite for units in the following sessions and may impact on your progression through the degree.

### Results

Results shown in iLearn, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au).

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Mathematics Problem Set</a>	50%	No	25/04/2021 @ 11.55pm
<a href="#">Science/Technology Problem Set</a>	50%	No	06/06/2021 @ 11.55pm

### Mathematics Problem Set

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **25/04/2021 @ 11.55pm**

Weighting: **50%**

Students will be provided with a task (or a set of tasks) designed to develop and apply their knowledge of effective instruction in Mathematics. For example, this may be conducting web and literature searches to find suitable tasks to assess different areas of mathematics, a case study where the student is asked to identify suitable methods of assessment and to explain an instructional approach or intervention that could be used to support the learning of the student, or a lesson plan where the student is asked to recommend adaptations to instruction, resources, and assessments to accommodate diverse learners.

On successful completion you will be able to:

- apply advanced discipline knowledge and scholarly understanding to evaluate student learning of mathematics, science and technology concepts
- draw on domain knowledge to critically reflect on your own professional knowledge and practice
- apply domain knowledge to examine and critically evaluate theories and research that underpin practice in the fields of mathematics, science and technology instruction
- develop appropriate assessment, monitoring and adaptation / intervention strategies to meet the needs of diverse learners
- synthesize concepts effectively through written and oral communication

### Science/Technology Problem Set

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **06/06/2021 @ 11.55pm**

Weighting: **50%**

Students will be provided with a task (or a set of tasks) designed to develop and apply their knowledge of effective instruction in Science and/or Technology. For example, this may be conducting web and literature searches to find suitable tasks to assess different areas of science and technology learning, a case study where the student is asked to identify suitable methods of assessment and to explain an instructional approach or intervention that could be used to support the learning of the student, or a lesson plan where the student is asked to recommend adaptations to instruction, resources, and assessments to accommodate diverse learners.

On successful completion you will be able to:

- apply advanced discipline knowledge and scholarly understanding to evaluate student learning of mathematics, science and technology concepts
- draw on domain knowledge to critically reflect on your own professional knowledge and practice
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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Learning Skills Unit](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## **Delivery and Resources**

### **Required and recommended texts**

Stein, M., Kinder, D., Rolf, K., Silbert, J., & Carnine, D. W. (2018). Direct instruction mathematics (5th ed.). Pearson.

### **Additional reading**

Additional reading will be provided each week. These should all be directly available from the library or will be made available on the unit iLearn site.



## Unit delivery and communication

This unit has a full web presence through iLearn.

Students will need regular access to a computer and the Internet to complete this unit.

**Regular (preferably daily) access to iLearn is compulsory for all students. Important assessment information will be posted here, as will other relevant unit notices and materials**

## Access and technical assistance

Information for students about access to the online component of this unit is available at [ilearn.mq.edu.au/login/MQ/](https://ilearn.mq.edu.au/login/MQ/). You will need to enter your student username and password.

Please do NOT contact the Unit Convenor regarding iLearn technical help.

No extensions will be given for any technical issues. Allow enough time for your submissions.

Assistance is available from IT Helpdesk ph: 1800 67 4357, or log a request at [help.mq.edu.au](https://help.mq.edu.au). OneHelp is the online IT support service for both students and staff.

## Unit Schedule

Week	Topic
1	Participation in mathematics, science, and technology for diverse learners  Review of knowledge (math and numeracy curriculum, assessment, planning, programming, and implementation recommendations),  Universal Design for Learning.
2	Mathematics 1: Assessment, Instructional Approaches, and Evidence-Based Practice
3	Mathematics 2: Number Sense: Symbol Identification, Counting, and Place Value
4	Mathematics 3: Addition and subtraction
5	Mathematics 4: Multiplication and Division
6	Mathematics 5: Problem Solving
7	Self-choice of math content area and completion of first assessment
8	Science 1
9	Science 2
10	Science 3

11	Technology
12	STEM
13	Completion of second assessment

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

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

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

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

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

## Student Enquiry Service

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

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

## Equity Support

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

## IT Help

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

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