



EDST4110

Principles of STEM Education

Session 1, In person-scheduled-weekday, North Ryde 2025

Macquarie School of Education

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General Information

Unit convenor and teaching staff

Convenor, Tutor, Marker

John Johnstone

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Contact via email

online only

By appointment

Laurinda Lomas

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Credit points

10

Prerequisites

EDST3110 or EDST311

Corequisites

Co-badged status

Unit description

This unit develops understanding of research-informed contemporary theory, concepts and skills associated with the study of STEM integration, its practices and associated pedagogies. It is the third in a three unit sequence designed to establish a knowledge base for teacher education students to teach STEM using an integrated approach in the primary classroom. The unit uses STEM topics to build knowledge of key principles relating to interdisciplinary STEM learning, including pedagogies that support STEM learning, how research can inform STEM teaching, critical evaluation of STEM materials and resources, and links to other syllabi. The unit will focus on modelling a range of STEM pedagogies and using a variety of learning resources to develop students' interdisciplinary STEM knowledge and skills.

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: Critically analyse and explain the integrated nature of STEM teaching, learning

and curriculum.

ULO2: Apply the research foundations of the STEM thinking of students.

ULO3: Articulate pedagogical principles for developing students' STEM capabilities with reference to educational research and practice.

ULO4: Critically reflect upon the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.

ULO5: Engage in and contribute to a learning community.

General Assessment Information

General Submission Information

All assessments must be submitted electronically. Turnitin plagiarism detection software is used to check all written assessments. It is the responsibility of all students to ensure that their submitted work is in a format compatible with Turnitin software for plagiarism checking. Submissions must meet the required file type and formatting specifications outlined in the assessment guidelines. Failure to submit work in an acceptable format may result in delays in processing your submission and potential penalties for non-compliance with assessment requirements. If you are unsure about the file format or have technical difficulties, it is your responsibility to seek assistance before the submission deadline. Students should be careful to check that they submit the correct file for an assessment as no re-submissions will be accepted after the due date and time, including instances where students upload an incorrect file. It is not the responsibility of unit staff to contact students who have failed to submit assessments. If you have any missing items of assessment, it is your responsibility to contact the unit convenor.

Students can use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.

Word limits are strictly applied. Work above the word limit will not be marked.

Use of Artificial Intelligence (AI)

Students should be aware of and apply the University policy on academic integrity (see: <https://policies.mq.edu.au/document/view.php?id=3>). Any student suspected of using unauthorised AI in an assignment will be referred to the Faculty of Arts Discipline Committee. Penalties can include reduced marks for an assessment, being awarded '0' for a task, failing an entire unit, being excluded from a course of study. Please see each assessment task description/rubric for expectations about AI.

Special Consideration / Late Penalties

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day an assessment is not submitted, up until the 7th day (including weekends) (see: <https://students.mq.edu.au/study/assessment-exams/special-consideration>). Applications for extensions must be made via [Service Connect](#). After the 7th day, a mark of 0 (zero) will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55pm. A 1-hour grace period is provided to students who experience a

technical issue. This late penalty will apply to non-timed sensitive assessments (incl. essays, reports, posters, portfolios, journals, recordings etc).

Late submission of time sensitive tasks (such as tests/exams, performance assessments/presentations, scheduled practical assessments/labs etc) will only be addressed by the unit convenor in a Special Consideration application. A Special Consideration outcome may result in a new question or topic.

Marking

All assessments are marked using a rubric.

Marking of all assessments is moderated by the Unit Convenor.

University Policy on Grading

Assignments will be awarded grades ranging from HD to F according to guidelines set out in the [University's Grading System](#) and [University Assessment Policy](#).

To attain a pass or higher grade in Professional Experience a student must obtain a satisfactory in both the Professional Experience component and a pass or higher grade in the academic component. For Professional Experience units the Professional Experience Evaluation Report is marked as Satisfactory or Unsatisfactory. The Macquarie Teaching Performance Assessment (MQTPA - in final WIL/PEX units) is marked as Not met, Met or Exceeds.

Results

Results shown in iLearn, or released directly by your Unit Convenor, are not confirmed because 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 [Service Connect](#).

Withdrawing from this unit

If you are considering withdrawing from this unit, please seek academic advice via [Service Connect](#) before doing so as this unit may be a co-requisite or prerequisite for units in the following sessions and may impact your course progression.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|-----------|--------|------------|
| Gaining insights from research for classroom planning and assessment in mathematics | 45% | No | 23/03/2025 |
| Tutorial participation | 10% | No | Ongoing |
| Interdisciplinary STEM unit | 45% | No | 18/04/2025 |

Gaining insights from research for classroom planning and

assessment in mathematics

Assessment Type ¹: Plan

Indicative Time on Task ²: 30 hours

Due: **23/03/2025**

Weighting: **45%**

This assessment task is an opportunity for you to develop your mathematical knowledge for teaching (Ball et al., 2008) about a particular mathematics content area. You will: present a review of literature about the content area (literature review); and plan an annotated sequence of lessons for the content area that integrate numeracy and other STEM disciplines.

On successful completion you will be able to:

- Apply the research foundations of the STEM thinking of students.
- Articulate pedagogical principles for developing students' STEM capabilities with reference to educational research and practice.
- Critically reflect upon the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.
- Engage in and contribute to a learning community.

Tutorial participation

Assessment Type ¹: Performance

Indicative Time on Task ²: 0 hours

Due: **Ongoing**

Weighting: **10%**

Each tutorial will have a compulsory participation task students will complete in class.

On successful completion you will be able to:

- Critically analyse and explain the integrated nature of STEM teaching, learning and curriculum.
- Articulate pedagogical principles for developing students' STEM capabilities with reference to educational research and practice.
- Engage in and contribute to a learning community.

Interdisciplinary STEM unit

Assessment Type ¹: Learning plan

Indicative Time on Task ²: 30 hours

Due: **18/04/2025**

Weighting: **45%**

This task requires you to develop a sequence of learning experiences for an interdisciplinary science focussed STEM unit that uses sustainability as the context for developing concepts.

On successful completion you will be able to:

- Critically analyse and explain the integrated nature of STEM teaching, learning and curriculum.
- Apply the research foundations of the STEM thinking of students.
- Critically reflect upon the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.

¹ 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 [Writing Centre](#) for academic skills support.

² 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

Information about the unit iLearn site

This unit has a full web presence through iLearn. Information for students about access to the online component of this unit is available at <https://ilearn.mq.edu.au/login/index.php>. You will need to enter your student username and password.

Please do NOT contact the Unit Convenor regarding iLearn technical help. Assistance is available from IT Helpdesk: via email onehelp@mq.edu.au or Ph: 9850 4357 or 1800 67 4357. On Campus: Ground floor at 18 Wally's Walk.

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](#)
- [Assessment Procedure](#)
- [Complaints Resolution 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 connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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 Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit 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.

School of Education Procedures

In addition, the following policies and procedures for the Macquarie School of Education apply to this unit.

Communication

It is the student's responsibility to check all electronic communication on a weekly basis. Communication may occur via:

- Official MQ Student Email Address
- The Dialogue function on iLearn
- Other iLearn communication functions

Attendance and Participation

See the University timetable for information about when classes begin in this unit. [Creating your timetable - Enrolling | Macquarie University, Sydney \(mq.edu.au\)](#)

Attendance at all synchronous activities, completion of non-synchronous formative/diagnostic class tasks and involvement in professional forums is expected as the EDST4110 is a professional qualification. Activities completed during weekly tutorials (DAY or ONLINE DAY mode) or on campus days (INFQ mode) are essential for building the core knowledge and/or skills required to demonstrate the learning outcomes of this unit and to meet the AITSL Graduate Teacher Standards and/or ACECQA requirements. **Attendance at all tutorials and/or on campus days is expected and will be recorded.** Make up tasks *may* be given if attendance is missed to ensure all content is covered to meet accreditation requirements.

Students are required to attend the tutorial in which they are enrolled. Any changes to tutorial enrolments must be completed officially through e-Student. Please do not contact the unit convenor to request a change.

Infrequent Attendance Students

Information about the dates of the on-campus sessions can be found in the university timetable. [Creating your timetable - Enrolling | Macquarie University, Sydney \(mq.edu.au\)](#)

- **The on campus sessions are essential to student engagement and learning and attendance is expected.** Failure to attend or not to have an approved Special Consideration may result in a Fail grade.
- Prior to the on campus sessions, students should have read the prescribed readings and listened to the lectures, summarise the main points, and make notes of the key terms and definitions. Prepare any discussion questions of your own that you wish to share.
- Please make effective use of the online component of the unit and access iLearn regularly. Keep up to date with listening to the lectures on a weekly basis.
- Further details and any updates about times and locations will be posted on iLearn as an Announcement during first half of the semester.

Academic Progression Policy

This unit is a part of a professional course listed on Schedules 2 and 3 of the Academic Progression Policy. This course has additional requirements that are applicable for the full duration of the course, including course-specific Inherent Requirements, Fitness to Practice requirements and other compulsory course requirements. It also has rigorous academic

progression standards. Inability to meet these requirements may result in a withdrawal of offer of admission and/or permanent exclusion from the course in accordance with the General Coursework Rules.

Unit information based on version 2025.01R of the [Handbook](#)