



# EDST8213

## Science, Technology and Mathematics Specialisation

Session 2, In person-scheduled-infrequent, North Ryde 2024

*Macquarie School of Education*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

John Johnstone

[john.johnstone@mq.edu.au](mailto:john.johnstone@mq.edu.au)

Credit points

10

Prerequisites

EDST8205 and EDST8211

Corequisites

Co-badged status

Unit description

This unit builds understanding of subject-based and interdisciplinary approaches to STEM education, and how STEM literacy can be developed through project, problem and scenario-based learning designs in primary classrooms. It takes a holistic perspective on the nature of STEM literacy, explores why developing it is important in terms of future learning (or 'soft' skill development) and practical and cognitive capabilities, and investigates its relationship with design thinking and the Design and Production strand of the K-6 Science and Technology syllabus. The unit will engage students in a range of practical tasks that develop understanding of the contribution of different knowledges applied to STEM-based innovations, products, services and systems in 'real world' contexts. It will also introduce different approaches to planning STEM, focusing on cross-curricula integrated models.

## 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:** Evaluate the integrated nature of STEM teaching, learning and curriculum.

**ULO2:** Analyse the research foundations of the STEM thinking of students and STEM practice in primary schools.

**ULO3:** Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.

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

**ULO5:** Demonstrate oral communication skills, listening skills, and teamwork skills appropriate to a range of professional educational purposes and audiences.

## General Assessment Information

- Students should be aware of and apply the University policy on academic honesty (see: <https://policies.mq.edu.au/document/view.php?id=3>)
- Unless a Special Consideration (see: <https://students.mq.edu.au/study/assessment-exams/special-consideration>) request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). 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 assessment (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. Special Consideration outcome may result in a new question or topic.
- Please format assessments using 12-point font and 1.5 spacing.
- All assessments are submitted electronically. Turnitin plagiarism detection software is used to check all written assessments.
- 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.
- Students should carefully 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 in error.
- Word limits are strictly applied. Work above the word limit will not be marked.
- All assessments are marked using a clear marking scheme or a rubric.
- Marking of all assessments is moderated by the Unit Convenor.
- Applications for extensions must be made via AskMQ (<https://ask.mq.edu.au/>).
- 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 make contact with the unit convenor.

## 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. For Professional Experience (PEX) units the PE Report is marked as satisfactory or unsatisfactory and the Teaching Performance Assessment (in final PE units) is marked as not meets, meets or exceeds.

### Descriptive Criteria for awarding grades in the unit

To meet the unit outcomes and successfully pass this unit, students should attempt all assessment tasks.

Grade	Descriptor
<b>HD</b> (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.
<b>D</b> (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.
<b>Cr</b> (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.
<b>P</b> (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
<b>F</b> (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 your course progression.

## 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 <https://ask.mq.edu.au>

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Understanding the rationale for STEM education in schools</a>	40%	No	23:59 20/09/2024
<a href="#">Collaborative interdisciplinary STEM investigations recorded in an e-portfolio.</a>	60%	No	23:59 25/10/2024

## Understanding the rationale for STEM education in schools

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 35 hours

Due: **23:59 20/09/2024**

Weighting: **40%**

Research and write a report (approx. 1500 words) summarising the key arguments and rationale supporting interdisciplinary STEM education in schools drawing on both the literature and your experience of STEM projects in the course. The report should communicate understanding of the relationship between interdisciplinary project and problem based approaches to STEM and development of 21st Century or future-focused skills, competencies and STEM discipline knowledge. The report draws implications from the research for teachers, particularly focusing on curriculum and learning designs and pedagogical approaches supportive of effective STEM teaching and learning in primary classrooms.

On successful completion you will be able to:

- Evaluate the integrated nature of STEM teaching, learning and curriculum.
- Analyse the research foundations of the STEM thinking of students and STEM practice

in primary schools.

- Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.
- Critically reflect upon and research the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.

## Collaborative interdisciplinary STEM investigations recorded in an e-portfolio.

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 50 hours

Due: **23:59 25/10/2024**

Weighting: **60%**

Conduct guided STEM projects in workshops and record in ePortfolio using stages of Design and Production process. Independent STEM project within specified theme conducted and recorded in ePortfolio. Concise unit of work developed based on this project.

On successful completion you will be able to:

- Evaluate the integrated nature of STEM teaching, learning and curriculum.
- Analyse the research foundations of the STEM thinking of students and STEM practice in primary schools.
- Articulate and implement pedagogical principles for planning learning that develops students' STEM capabilities with reference to educational research and practice.
- Critically reflect upon and research the efficacy of learning resources and pedagogical approaches to develop STEM capabilities.
- Demonstrate oral communication skills, listening skills, and teamwork skills appropriate to a range of professional educational purposes and audiences.

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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 [Writing Centre](#) 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

Students in this course are expected to commit fully to the following program of activities.

- View **and respond** to 2 x 1hr weekly recorded lecture
- Attend 1 x 4hr Tutorial **beginning Week 1 Monday 22 July**
- Read **and respond** to up to 6 texts per week
- Complete practical tasks to cultivate, reinforce and demonstrate skills learned in class

**This unit has a full web presence through *iLearn*.**

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

Weekly access to iLearn is compulsory for all students. Important assessment information will be posted here, as will other relevant unit notices and materials, including a reading template and guide to lecture note taking to assist your studies.

Various activities and materials for discussion and critical reflection are included and students enrolled in INFQ or online mode are especially encouraged to use this web component. Electronic links and suggested references will be included in the Resources section. Please check the iLearn unit regularly.

Weekly lectures are available on the web through the ECHO360 lecture component. You must listen to all lectures.

PowerPoint slides are available in iLearn in advance of the weekly lecture and/or are available in the Active Learning Tool.

### **Access and technical assistance**

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

Ph: 9850 4357 or 1800 67 4357

Log a request: [help.mq.edu.au](http://help.mq.edu.au).

On Campus: Ground floor at 18 Wally's Walk

Other useful information about how the teaching is structured. Suggested wording below. Please amend for your unit.

### **Structure**

The unit structure can be found in the university timetable [Creating your timetable - Enrolling | Macquarie University, Sydney \(mq.edu.au\)](#)

In the tutorial students will discuss issues and questions arising from the lectures and prescribed readings. They are expected to base their arguments/discussions on evidence from published research and other relevant material. There will be a supporting iLearn site for the unit providing additional readings, links and materials.

The weekly program for the course with the accompanying readings/ preparation is available on the unit iLearn site.

## 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](https://connect.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/>

### The Writing Centre

[The Writing Centre](#) 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/](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 of the School of Education are applicable in this unit.

### **Attendance for Master of Teaching (Primary and Secondary) units**

*Attendance at all synchronous activities, completion of non-synchronous formative/diagnostic class tasks and involvement in professional forums is **compulsory** as the Master of Teaching is a professional qualification. All students must meet the 80% attendance requirement.*

Activities completed during tutorials or on campus days 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. Attendance at all tutorials or on campus days is expected and the roll will be taken.

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 requesting a change.

## **Electronic Communication**

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

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

## **Fail Rule**

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 2024.02 of the [Handbook](#)