School of Education

EDUC6744: K-6 Science and Technology

Callaghan
Trimester 2 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

In this course Initial Teacher Education Students (ITES) will explore the content and organisation of the NSW K-6 Science and Technology curriculum, incorporating the Australian Curriculum; strategies and resources for programming, teaching and assessing primary Science and Technology; the role and value of Science and Technology; the place of Science and Technology in the K-12 Science and Technology continuum (particularly the links between Stage 3 and 4); the literacy and numeracy demands of Science and Technology curriculum; ways of differentiating curriculum to meet the diverse needs of learners; and the use of the internet as a teaching tool in the Science and Technology classroom, and ways of developing positive attitudes and motivation techniques for developing intellectual and problem solving skills in all students.

Requisites

This course replaces EDUC6800. If you have successfully completed EDUC6800 you cannot enrol in this course.

Contact Hours

Callaghan
Computer Lab
Face to Face On Campus
12 hour(s) per Term Full Term

Lecture
Online – Pre-Recorded
12 hour(s) per Term Full Term

Tutorial
Face to Face On Campus
12 hour(s) per Term Full Term

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Callaghan
Dr Katie Waters
Katie.Waters@newcastle.edu.au
Consultation: Please email to arrange an appointment

Teaching Staff

Other teaching staff will be advised on the course Canvas site.

School Office

School of Education
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SYLLABUS

Course Content

- Principles and practices of teaching and learning K-6 Science & Technology.
- The role and value of Science & Technology in the broader school curriculum, and its place in the K-10 Science & Technology continuum (particularly the links between Stage 3 and 4).
- The content, structure, and organisation of the NSW K-6 Science & Technology syllabus (2017)
- Ways of differentiating curriculum to meet the diverse needs of learners.
- Integrating digital technologies into the Science and Technology classroom.
- Developing positive attitudes and motivation to learn more about scientific fields.
- Developing intellectual and problem-solving skills in students at all ability levels

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Demonstrate knowledge of the principles and practices of teaching and learning K-6 Science & Technology.
2. Discuss the role and value of Science & Technology in the broader school curriculum, and its place in the K-10 Science & Technology continuum (particularly the links between Stage 3 and 4)
3. Navigate the content, structure and organisation of the NSW K-6 Science & Technology syllabus (2017)
4. Understand the literacy and numeracy demands of Science and Technology;
5. Differentiate curriculum to meet the diverse needs of learners;
6. Use a range of digital technologies to enhance teaching and learning

Course Materials

Recommended Reading:

Board of Studies NSW. (2017) Science & Technology K-6 Syllabus. https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/science/science-and-technology-k-6-new-syllabus

Devereux, J. (2000). Primary Science. Thousand Oaks, US: Sage Publications.

Fitzgerald, A. (2013). Learning and Teaching Primary Science. New York, NY: Cambridge University Press. Chapters 1-12

Peters, J. M., & Stout, D. L. (2014). Concepts and Inquiries for Teaching Elementary School Science (11 ed.). Essex, UK: Pearson.

Australian Academy of Science. (2008.) Primary Connections. https://primaryconnections.org.au/

Contact Hour Requirements:
Tutorials: There is a compulsory attendance requirement in this course.
Minimum attendance is 80%. A roll will be taken during tutorials.

SCHEDULE

Week	Week Begins	Lecture	Science Lab	Computer Lab
1	13 May	Introduction | Syllabus	Sound	Coding 1 (Scratch Jr)
2	20 May	Process Skills	The Senses	Coding 2 (Scratch Jr)
3	27 May	Lesson Structure	Assessing by Observing	Coding 3 (Scratch Jr)
4	03 Jun	Misconceptions/Water	Water	**Assessment 1 – (In Class)**
5	10 Jun	**Public Holiday**	**Public Holiday**	**Public Holiday**
6	17 Jun	Programming	Living Things	Unplugged Coding 1
7	24 Jun	Teaching Techniques	Designing & Making	Coding 4 (Scratch 3.0)
8	01 Jul	Design and Production	Air | Flight	Coding 5 (Scratch 3.0)
9	08 Jul	Quality Teaching	**Assessment 2 (G1 & G2)**	MAKERSPACE Workshop
10	15 Jul	Programming/Light	**Assessment 2 (G3 & G4)**	MAKERSPACE Workshop
11	22 Jul	Working Scientifically	**Assessment 2 (G5 & G6)**	Digital Technologies
12	29 Jul	Exam Prep (no lecture)	Magnets	**Examination (In-Class)**
Examination Period				

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Assessment 1	3 June	Individual	30%	6
2	Assessment 2	5 July (written components)	Group	30%	1, 2, 3, 4, 5
	Team-Teaching	Weeks 9,10,11	Group/ Individual		
3	In Class Exam	29 July	Individual	40%	1, 2, 3, 4, 5

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 – Coding Lesson

Assessment Type Written | Practical Assessment

Purpose To assess syllabus knowledge, digital technology & basic coding skills

Description Students will be required to design and prepare a digital coding lesson for Stage 2. Working independently, each student will submit a lesson overview of the coding exercise, including science & technology syllabus outcomes, content descriptors and an overview of the coding lesson. An additional page will be submitted, demonstrating two screenshots of the coding sequences carried out. It must be clear how the product supports critical and creative thinking. The program will be graded according to key requirements, including coding knowledge and implementation, originality, motivational interest, appropriate length and suitability for Stage 2 children. Details will be provided in full detail on CANVAS.

Weighting 30%
Length 2 pages (ONLY)

Due Date Week 4
Submission Method Canvas

Assessment Criteria Demonstrates syllabus knowledge, digital technology and coding skills

- demonstrates understanding of the syllabus and digital technology strand
- designs an original, creative and engaging coding lesson for stage 2
- successfully integrates digital technology with a Key Learning Area
- exhibits understanding and correct sequencing of broadcasting blocks
- develops a sequence of steps and algorithms to create a program
- demonstrates advanced digital technology ability
- meets literacy standards

** Detailed requirements will be available on CANVAS, explained in tutorials | lectures

Return Method Canvas
Feedback Provided Canvas

Assessment 2 – Group Team Teaching

Assessment Type Written | Practical Assessment

Purpose To assess research, teaching, science & syllabus knowledge

Description

Part A: Lesson Plan and Assessment (15%)
In groups, students collaborate to research and prepare a 20-minute, hands-on scientific-based investigative lesson in readiness to team-teach to their peers. Students will be required to design and prepare a lesson plan of the investigation including syllabus outcomes, content descriptors and an overview of the science lesson. They will prepare a data record worksheet that can be used to access children's process skills in relation to that activity. Groups will submit all written components to CANVAS.

Part B: Group (10%) / Individual Teaching (5%)
Groups will team-teach the lesson during allocated tutorials.

**Details of the requirements will be available in full detail on CANVAS.

Weighting 30%
Length 1 Page Lesson Plan | 1 Page Handout (templates provided)

Due Date Weeks 9,10,11
Submission Method Written component (Canvas) Teaching component (In Class)

Assessment Criteria Demonstrates scientific syllabus knowledge, teaching and collaboration skills

- demonstrates understanding of the science syllabus
- designs an engaging, hands-on scientific-based investigative lesson plan
- creates a student assessment task based on scientific process skills
- works collaboratively as a group to team-teach a scientific investigation/experiment
- demonstrates organisation, resources, time management and preparation skills
- exhibits individual involvement, enthusiasm, encouragement

All requirements will be available on CANVAS, explained in tutorials | lectures

Return Method Canvas and In-Class
Feedback Provided In Class

Assessment 3 – In-Class Examination

Assessment Type In Term Examination
Purpose To assess content knowledge (lectures and tutorials)
Description Examination

Weighting 40%
Length 1 hour

Due Date Week 12
Submission Method Online – In Class

Assessment Criteria The requirements will be available on Canvas

Knowledge and understanding of science & technology course content

Return Method Canvas
Feedback Provided No Feedback

ADDITIONAL INFORMATION

Grading Scheme This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:
- canvas announcements
- email

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. Please see the Student Academic Integrity Policy for more information.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure.

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System.

Students should familiarise themselves with the policies and procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

Assignment 1 – Coding Rubric | Grade /30					
	5	**4**	**3**	**2**	**1-0**
Syllabus Knowledge /5	An Outstanding understanding of the syllabus and the key requirements for digital technologies | coding.	A very good understanding of the syllabus and the key requirements for digital technologies | coding.	A satisfactory understanding of the syllabus and the key requirements for digital technologies | coding.	A minimal understanding of the syllabus and the key requirements for digital technologies | coding.	A limited / no understanding of the syllabus and the key requirements for digital technologies | coding.
Originality + KLA link /5	Excellent originality and creativity with an engaging integrated KLA theme suitable for Stage 2.	Very good originality and creativity with an engaging integrated KLA theme suitable for Stage 2.	Satisfactory originality and creativity with an engaging integrated KLA theme suitable for Stage 2.	Minimal originality or creativity with a non-integrated across KLA theme for Stage 2.	Little to no originality or integrated KLA link aimed at Stage 2.
Broadcasting Skills /5	Excellent understanding, use and sequencing of broadcasting blocks.	Very good understanding, use and sequencing of broadcasting blocks.	Satisfactory understanding, use and sequencing of broadcasting blocks.	Minimal understanding and sequencing of broadcasting blocks.	Little to no understanding and sequencing of broadcasting blocks.
Algorithm Originality /5	An excellent sequencing of a simple algorithm using the set variety of blocks and functions.	A very good sequence of a simple algorithm using the set variety of blocks and functions although a minimal flaw was detected.	A satisfactory use of sequencing a simple algorithm. The required set of blocks and functions were not adhered to.	A minimal understanding of sequencing a simple algorithm. Blocks were missing or the required set of blocks and functions were not adhered to.	Little to no understanding of sequencing a simple algorithm using the set variety of blocks and functions.
Digital Technology Skills /5	Excellent use of template, screenshots, insert image from iPad to Word, include text boxes and meet all other key requirements.	Very good use of template, ability to screenshot, transfer image from iPad to Word, include text boxes and meet most other key requirements.	Satisfactory use of template and skills. Ability to screenshot, transfer image from iPad to Word, although some flaws or limitations were found.	Minimal ability to use the set template. Numerous flaws or does not meet all requirements.	Set template was not used and / or used ineffectively for the required task. Images, screenshots were unclear and did not meet requirements.
Literary Quality /5	Outstanding. Addressed and included all literary requirements.	Very good. Addressed and included most literary requirements.	Satisfactory. Moderate quality in addressing literary requirements.	Showed little quality and clarity in addressing literary requirements.	Very poor. Shows very little quality and clarity in addressing literary requirements.

Assignment 2 – Part A: Group Written Components | Grade /15					
	5	**4**	**3**	**2**	**1-0**
Criteria 1 Syllabus requirements /5	An Outstanding understanding of the syllabus requirements for working scientifically. Appropriate stage level, outcomes, content focus and inquiry questions.	A very good understanding of the syllabus requirements for working scientifically. A minor limitation or flaw was evident in terms of stage level, outcomes, content focus and /or inquiry questions.	A satisfactory understanding of the syllabus requirements for working scientifically. Some limitations or flaws were evident in terms of stage, outcomes, content focus and / or inquiry questions.	A minimal understanding of the syllabus requirements for working scientifically. Many limitations or significant flaws were evident in terms of stage, outcomes, content focus and / or inquiry questions.	A limited / no understanding of the syllabus requirements for working scientifically. This component of the lesson plan did not link to the required task.
	5	**4**	**3**	**2**	**1-0**
Criteria 2 Science Activity /5	An excellent and engaging lesson. Demonstrated understanding of the teaching phases, procedures, differentiation, assessment and appropriate resources for the assigned task.	A very good lesson plan. An adequate understanding of the teaching phases, procedures, differentiation, assessment components.	A satisfactory lesson plan with moderate understanding of the teaching phases, procedures, differentiation and assessment components.	A sound lesson plan with minimal understanding of the teaching phases, procedures, differentiation and assessment components.	Minimal or no evidence of understanding of the teaching phases, procedures, differentiation and assessment components.
	5	**4**	**3**	**2**	**1-0**
Criteria 3 Assessment Sheet Process Skills /5	Shows exemplary understanding of the assessment of scientific process skills for fair-testing / investigations. Appropriate and clear questions were presented in terms of critical thinking.	Shows significant understanding of the assessment of scientific process skills for fair-testing / investigations. Accuracy, clarity of questions and design was very good, albeit with some areas for improvement.	Demonstrates moderate understanding of the assessment of scientific process skills for fair-testing / investigations. Accuracy, clarity of questions and design was limited and/or shows some errors.	Shows some understanding of the assessment of scientific process skills for fair-testing / investigations. Accuracy, clarity of questions and design was poor and significant errors were presented.	Shows minimal or no understanding of scientific process skills for fair-testing / investigations. Accuracy, clarity of questions and design did not meet the design brief.

Assignment 2 – Part B: Group Teaching Component | Grade /10%					
	5	**4**	**3**	**2**	**1-0**
Criteria 1 Group Teaching /5	Excellent teaching of the allocated scientific investigation. Grouping strategies, active engagement, differentiation, fair testing, critical thinking opportunities present.	Very good team-teaching of the allocated scientific investigation. The orientation, explicit teaching and exploration phases were appropriate.	Adequate team-teaching of the allocated scientific investigation. The orientation, explicit teaching and exploration phases were demonstrated although lacked flow.	Sound team-teaching of the allocated scientific investigation. The orientation, explicit teaching and exploration phases require improvement.	Poor team-teaching of the allocated scientific investigation. The orientation, explicit teaching and exploration phases were not sufficiently taught.
Criteria 2 Group Organisation /5	Excellent overall organisation, resources, time management and preparation for the lesson.	Very good organisation, resources, time management and preparation for the lesson.	Satisfactory organisation, resources, time management and preparation for the lesson.	Sound organisation, resources, time management and preparation for the lesson.	Inadequate organisation, resources, time management and preparation for the lesson.

Assignment 2 – Part B: Individual Teaching Component | Grade /5%					
	5	**4**	**3**	**2**	**1-0**
Criteria 3 Individual involvement /5	Outstanding overall communication and involvement. Responsive to student questions, enthusiastic, knowledgeable, encouraging.	Very good overall communication and involvement. Mostly responsive to student questions, enthusiastic, knowledgeable, encouraging.	Satisfactory communication and involvement. Mostly responsive to student questions, enthusiastic, knowledgeable, encouraging.	Overall communication and/or confidence was sound. The individual energy, enthusiasm and involvement could have been improved upon. Development of confidence will be beneficial.	Overall communication and/or confidence was lacking. The individual energy, enthusiasm and involvement could have been improved significantly.