EDST6784 Science and Technology (K-6) - 2024

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General Course Information

Course Code : EDST6784
Year : 2024
Term : Term 2
Teaching Period : T2C
Is a multi-term course? : No
Faculty : Faculty of Arts, Design and Architecture
Academic Unit : School of Education
Delivery Mode : Multimodal
Delivery Format : Non Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate, Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

In this course you will understand the syllabus, curriculum planning, appropriate assessment strategies, classroom management and development/selection of activities and resources relevant to the teaching of science and technology in the primary school classroom. You will

engage in evaluation and selection/development/evaluation of activities and resources relevant to the teaching of science and technology in the primary (K-6) classroom to enable you to harness children's natural curiosities to develop interest and enthusiasm as well as knowledge for science and technology.

This course is complemented by a minimum of 5 days of supervised professional experience.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Identify and apply appropriate ways to harness children's natural curiosities to develop interest and enthusiasm for science and technology.
CLO2 : Apply knowledge of how the skills, knowledge and understanding of the Science and Technology syllabus documents relate across strands and sub-strands for all Stages.
CLO3 : Critically examine and evaluate relevant research and pedagogies to enable primary-aged students to engage and learn the skills and concepts of science and technology effectively.
CLO4 : Apply knowledge of the nature of science, as well as knowledge of areas of scientific and technological content
CLO5 : Integrate digital literacies into Science and other ley learning areas effectively as well as understand the pedagogy behind this
CLO6 : Develop a unit of work which incorporates skill development embedded in effective learning experiences

Course Learning Outcomes	Assessment Item
CLO1 : Identify and apply appropriate ways to harness children's natural curiosities to develop interest and enthusiasm for science and technology.	• Inquiry and focus questions • Design and production
CLO2 : Apply knowledge of how the skills, knowledge and understanding of the Science and Technology syllabus documents relate across strands and sub-strands for all Stages.	• Inquiry and focus questions • Design and production
CLO3 : Critically examine and evaluate relevant research and pedagogies to enable primary-aged students to engage and learn the skills and concepts of science and technology effectively.	• Inquiry and focus questions • Design and production
CLO4 : Apply knowledge of the nature of science, as well as knowledge of areas of scientific and technological content	• Inquiry and focus questions • Design and production
CLO5 : Integrate digital literacies into Science and other ley learning areas effectively as well as understand the pedagogy behind this	• Inquiry and focus questions • Design and production
CLO6 : Develop a unit of work which incorporates skill development embedded in effective learning experiences	• Inquiry and focus questions • Design and production

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

Teaching Strategies

The course will run as a series of workshops including lecturer input, practical hands-on tasks, structured and collaborative discussions, computer-based activities (including simulations) and on-line activities. Students will also critically observe and evaluate lessons on-site with school students. Participation in an ICT-focused workshop is a hurdle requirement for this course.

Rationale

The course structure allows students to explore and understand the content and organisation of the NSW K-6 Science and Technology curriculum. Students will develop and demonstrate the skills they need to plan programs, lessons and activities suitable for different learning styles and stages of development. Teaching and assessment tasks provide opportunities to develop resources and apply them to record and present their findings for an investigation into a scientific question. The importance of literacy and numeracy skills for science is demonstrated, along with opportunities to integrate science and technology with other KLAs.

Other Professional Outcomes

AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS

Standard		Assessment/s
1.1.1	Demonstrate knowledge and understanding of physical, social, and intellectual development and characteristics of students and how these may affect learning.	1, 2
1.2.1	Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.	1, 2
1.5.1	Demonstrate knowledge and understanding of strategies for differentiating teaching to meet the specific learning needs of students across the full range of abilities.	1, 2
2.1.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.	1, 2
2.2.1	Organise content into an effective learning and teaching sequence.	1
2.3.1	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans.	1
2.6.1	Implement teaching strategies for using ICT to expand curriculum learning opportunities for students.	1, 2
3.2.1	Plan lesson sequences using knowledge of student learning, content, and effective teaching strategies.	1, 2
3.3.1	Include a range of teaching strategies in teaching.	1, 2
3.6.1	Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning.	1
4.5.1	Demonstrate an understanding of the relevant issues and the strategies available to support the safe, responsible, and ethical use of ICT in learning and teaching.	1, 2

NATIONAL PRIORITY AREA ELABORATIONS

	Priority area		Assessment/s
A	Aboriginal and Torres Strait Islander Education.	1, 5, 8	1, 2
B	Classroom Management.	1, 4-5	1, 2
C	Information and Communication Technologies.	1-10, 12	1, 2
D	Literacy and Numeracy.	1-19	1, 2

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Inquiry and focus questions Assessment Format: Individual	40%	Due Date: See Moodle
Design and production Assessment Format: Individual	60%	Due Date: See Moodle

Assessment Details
Inquiry and focus questions

Assessment Overview

Develop your own skills of Working Scientifically, and Design and Production by developing and addressing 5 inquiry or focus questions (1 per strand of the syllabus). Submit a critical synthesis that draws together the five strands using the appropriate literature. 2500 words. See Moodle for a template and details.

Course Learning Outcomes

- CLO1 : Identify and apply appropriate ways to harness children's natural curiosities to develop interest and enthusiasm for science and technology.
- CLO2 : Apply knowledge of how the skills, knowledge and understanding of the Science and Technology syllabus documents relate across strands and sub-strands for all Stages.
- CLO3 : Critically examine and evaluate relevant research and pedagogies to enable primary-aged students to engage and learn the skills and concepts of science and technology effectively.
- CLO4 : Apply knowledge of the nature of science, as well as knowledge of areas of scientific and technological content
- CLO5 : Integrate digital literacies into Science and other ley learning areas effectively as well as understand the pedagogy behind this
- CLO6 : Develop a unit of work which incorporates skill development embedded in effective learning experiences

Detailed Assessment Description

See Moodle for a template and details.

Assessment Length

2500 words

Assessment information

• RUBRIC/FEEDBACK SHEET EDST6784 UNSW SCHOOL OF EDUCATION • Assessment Task 1: Inquiry and Focus Questions • Specific Criteria and Grading (FL/PS/CR/DN/HD)	
• Understanding of the question or issue and the key concepts involved • Inquiry and focus questions are clear and provide a good basis for investigation • Aspects of student safety, interest, and activity engagement addressed	
• Depth of analysis and critique in response to the task • Appropriate implementation of either Working Scientifically or Design and Production • Uses evidence of learning and relevant literature to conduct a critical analysis that presents both points and counterpoints	
• Familiarity with and relevance of professional and/or research literature used to support response • Appropriate research references to support responses • Sound range of research references	
• Structure and organisation of response • Logical and coherent structure (see template for requirements) • Clear presentation of ideas and images to enhance readability	
• Presentation of response according to appropriate academic and linguistic conventions • Clarity, consistency, and appropriateness of conventions for quoting, paraphrasing, attributing sources and information and listing references (APA style) • Clarity and appropriateness of sentence structure, vocabulary use, spelling, punctuation, and word length	
• General comments/recommendations for next time:	
• Lecturer: • Recommended: /20 (FL PS CR DN HD)	• Date: • Weighting: 40%
• NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualise and/or amend these specific criteria. The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.	

Hurdle rules

A hurdle requirement or hurdle rule is a course requirement that must be fulfilled in order to pass the course. In all courses within the School of Education, all assessments (regardless of their weighting) are hurdle requirements. That is, all assessments in a course must receive a pass mark in order to pass the course. Where a student has failed to meet the requirements of an assessment, they may still be deemed to have met the hurdle requirement if the failure was due to a late penalty and if the overall mark for the course is still greater than 50.

Design and production

Assessment Overview

You will select a Stage and develop a resource used for investigating a relevant section of the Physical World syllabus. Your submission will include an outline of 6 lessons and supporting images that explain and demonstrate the development process. 3000 words (equivalent). See Moodle for a template and details.

Course Learning Outcomes

- CLO1 : Identify and apply appropriate ways to harness children's natural curiosities to develop interest and enthusiasm for science and technology.
- CLO2 : Apply knowledge of how the skills, knowledge and understanding of the Science and Technology syllabus documents relate across strands and sub-strands for all Stages.
- CLO3 : Critically examine and evaluate relevant research and pedagogies to enable primary-aged students to engage and learn the skills and concepts of science and technology effectively.
- CLO4 : Apply knowledge of the nature of science, as well as knowledge of areas of scientific and technological content
- CLO5 : Integrate digital literacies into Science and other ley learning areas effectively as well as understand the pedagogy behind this
- CLO6 : Develop a unit of work which incorporates skill development embedded in effective learning experiences

Detailed Assessment Description

See Moodle for a template and details.

Assessment Length

3000 words

Assessment information

• RUBRIC/FEEDBACK SHEET EDST6784 UNSW SCHOOL OF EDUCATION • Assessment Task 2: Design and Production • Specific Criteria and Grading (FL/PS/CR/DN/HD)	
• Understanding of the question or issue and the key concepts involved • Design and Production folio is comprehensive	
• Depth of analysis and critique in response to the task • Use of literature and clear links to the syllabus to justify choices • Uses learning from investigation activities to inform design solutions • Develops an informed design solution	
• Familiarity with and relevance of professional and/or research literature used to support response • Appropriate research references to support responses • Sound range of research references	
• Structure and organisation of response • Logical and coherent structure (see template for requirements) • Clear presentation of ideas, images, video to enhance readability and viewing	
• Presentation of response according to appropriate academic and linguistic conventions • Clarity, consistency, and appropriateness of conventions for quoting, paraphrasing, attributing sources and information and listing references (APA style) • Clarity and appropriateness of sentence structure, vocabulary use, spelling, punctuation, and word length (and max length of video)	
• General comments/recommendations for next time:	
• Lecturer: • Recommended: /20 (FL PS CR DN HD)	• Date: • Weighting: 60%
• NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualise and/or amend these specific criteria. The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.	

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General Assessment Information

Students are required to follow their course convenor's instructions when submitting their work for assessment. All assessment task/s are to be submitted online via Moodle by 5pm. Students are also required to retain all drafts, original data, and other evidence of the authenticity of the work for at least one year after submission/examination. For more detailed information about submission, late penalties, special consideration, and the like, visit the School of Education website on policies and procedures: [SED Policies and Procedures (unsw.edu.au)](unsw.edu.au).

<u>Grading Basis</u>

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1	Lecture	• Introduction to the structure and organisation of the Science and Technology K-6 Syllabus Unpacking the integration of pedagogical approaches of Science and Technology Overview of inquiry questions and focus questions
	Reading	• NESA (2017). Guide New K-6 Science and Technology Syllabus. Sydney https://www.educationstandards.nsw.edu. au/wps/wcm/connect/dac0b1f9-b943-486b -96fb-6ed6c44cadee/guide-science-and-te chnology-k-6-new-syllabus.pdf? MOD=AJPERES&CVID= • NESA (2017). Science and Technology K-6 Syllabus. Sydney. https://educationstandards.nsw.edu.au/wp s/portal/nesa/k-10/learning-areas/science/ science-and-technology-k-6-new-syllabus • Brown, R. A., & Brown, J. W. (2010). What is Technology Education? A Review of the "Official Curriculum". The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83(2), 49-53. doi:10.1080/00098650903505449 • Forbes, A.; Chandra, V.; Pfiffer, L.; Sheffield, R (2021). STEM education in the primary school a teacher's toolkit Cambridge University Press ch 2 p.22-39
Week 2a	Lecture	• Working Scientifically, Design and Production and the Cross Curriculum Priorities Focus on the Skill Strands - Working Scientifically and Design and Production Look at the Cross Curriculum Priorities
	Reading	• Skamp, K. & Preston,C. (2021). Teaching primary science constructively 7th Edition Cengage Chapter 4 p.142-187
Week 2b	Lecture	• Physical World Deep dive into the Physical World strand Look at the continuum of learning Unpack the use of inquiry and focus questions to frame learning
	Reading	• Preston, C. M. (2019). Effect of a diagram on primary students' understanding about electric circuits. Research in Science Education, 49(5), 1433-1456. • King, D., & English, L. D. (2016). Engineering design in the primary school: applying stem concepts to build an optical instrument. International Journal of Science Education, 38(18), 2762-2794. doi:10.1080/09500693.2016.1262567
Week 3	Lecture	• Material World Deep dive into the Material World strand Look at the continuum of learning Unpack the use of inquiry and focus questions to frame learning
	Reading	• Skamp, K. (2011). Teaching chemistry in primary science: what does the research suggest? Teaching Science., 57(4), 37−43. • Hudson, P., English, L., Dawes, L., King, D., & Baker, S. (2015). Exploring Links between Pedagogical Knowledge Practices and Student Outcomes in STEM Education for Primary Schools. Australian Journal of Teacher Education, 40(6). http://dx.doi.org/10.14221/ajte.2015v40n6.8
Week 4a	Lecture	• Earth and Space Deep dive into the Earth and Space strand Look at the continuum of learning Unpack the use of inquiry questions to frame learning
	Reading	• Thornburgh, B., Tretter, T., & Duckwall, M. (2015). Seeing the solar system through two perspectives: Primary students explore Earth and space science by modeling and observing patterns. Science and Children, 53(4), 42-51.
Week 4b	Lecture	• Living World Deep dive into the Living World strand Look at the continuum of learning Unpack the use of inquiry questions to frame learning
	Reading	• Vikström, A. (2008). What is intended, what is realized, and what is learned? Teaching and learning biology in the primary school classroom. Journal of Science Teacher Education, 19(3), 211-233. doi:10.1007/s10972-008-9090-y • Jones, M., Weitkamp, E., Kimberlee, R., Salmon, D., & Orme, J. (2012). Realizing a holistic approach to food through school gardens and growing activities. Children, Youth and Environments, 22(1), 75-98. doi:10.7721/chilyoutenvi.22.1.0075
Week 5	Lecture	• Assessing student progress in Science and Technology The importance of the continuum of learning in science and technology and how to plan for effective assessment
	Reading	• Forbes, A.; Chandra, V.; Pfiffer, L.; Sheffield, R (2021) STEM education in the primary school a teacher's toolkit Cambridge University Press ch 12 p.301-321 • Strimel, G. J., Kim, E., Grubbs, M. E., & Huffman, T. J. (2019). A meta synthesis of primary and secondary student design cognition research. International Journal of Technology and Design Education. doi:10.1007/s10798-019-09505-9 • Loughland, T., & Kilpatrick, L. (2015). Formative assessment in primary science. Education 3-13, 43(2), 128-141. doi:10.1080/03004279.2013.767850
Week 6a	Lecture	• Digital Technologies Deep dive into the Digital Technologies strand Look at the continuum of learning Unpack the use of inquiry questions to frame learning
	Reading	• Forbes, A.; Chandra, V.; Pfiffer, L.; Sheffield, R (2021) STEM education in the primary school a teacher's toolkit Cambridge University Press ch 9 p.211-244
Week 6b	Lecture	• Setting real-world problems in Science and Technology Using real-world problems to engage students in learning

	Reading	• Skamp, K. & Preston,C. (2021). Teaching primary science constructively 7th Edition Cengage Chapter 2 p.34-83.

Attendance Requirements

The School of Education has a minimum attendance requirement of 80% for classes, including lectures, tutorials, seminars, and other learning activities – irrespective of delivery mode. The attendance requirement is a minimum threshold for engagement and ensures that programs meet the requirements of external accreditation authorities (i.e., NESA), and for a range of programs (e.g., initial teacher education programs and other accredited postgraduate coursework specialisations). Students must register their attendance according to the course convenor's directions.

General Schedule Information

This course outline sets out the description of classes at the date the outline is published. The nature of classes may change during the term after the course outline is published. Moodle should be consulted for up-to-date class descriptions. If there is an inconsistency in the description of activities between the University timetable and the course outline (as updated in Moodle), the description in the course outline on Moodle applies.

Course Resources

Prescribed Resources

See Leganto on Moodle for access to required readings and additional recommendations.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Shirley Casper				See Moodle for Convenor email and availability.	No	Yes

Other Useful Information

Academic Information

Due to evolving advice by NSW Health, students must check for updated information regarding online learning for all Arts, Design and Architecture courses this term (via Moodle or course

information provided).

Please see: https://www.unsw.edu.au/arts-design-architecture/student-life/resources-support/protocols-guidelines for essential student information relating to:

- UNSW and Faculty policies and procedures;
- Student Support Services;
- Dean's List;
- review of results;
- credit transfer;
- cross-institutional study and exchange;
- examination information;
- enrolment information;
- Special Consideration in the event of illness or misadventure;
- student equity and disability;

And other essential academic information.

Academic Honesty and Plagarism

Plagiarism is using the words or ideas of others and presenting them as your own. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement.

UNSW groups plagiarism into the following categories:

- Copying: Using the same or very similar words to the original text or idea without acknowledging the source or using quotation marks. This includes copying materials, ideas or concepts from a book, article, report or other written document, presentation, composition, artwork, design, drawing, circuitry, computer program or software, website, internet, other electronic resource, or another person's assignment without appropriate acknowledgement.
- Inappropriate paraphrasing: Changing a few words and phrases while mostly retaining the original information, structure and/or progression of ideas of the original without acknowledgement. This also applies in presentations where someone paraphrases another's ideas or words without credit and to piecing together quotes and paraphrases into a new whole, without appropriate referencing.
- Collusion: Working with others but passing off the work as a person's individual work. Collusion also includes providing your work to another student for the purpose of them plagiarising, paying another person to perform an academic task, stealing or acquiring another person's academic work and copying it, offering to complete another person's work or seeking payment for completing academic work.
- Inappropriate citation: Citing sources which have not been read, without acknowledging the "secondary" source from which knowledge of them has been obtained.

- Duplication ("self-plagiarism"): Submitting your own work, in whole or in part, where it has previously been prepared or submitted for another assessment or course at UNSW or another university.

The UNSW Academic Skills support offers resources and individual consultations. Students are also reminded that careful time management is an important part of study. One of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and proper referencing of sources in preparing all assessment items. UNSW Library has the ELISE tool available to assist you with your study at UNSW. ELISE is designed to introduce new students to studying at UNSW, but it can also be a great refresher during your study.

Completing the ELISE tutorial and quiz will enable you to:

- analyse topics, plan responses and organise research for academic writing and other assessment tasks
- effectively and efficiently find appropriate information sources and evaluate relevance to your needs
- use and manage information effectively to accomplish a specific purpose
- better manage your time
- understand your rights and responsibilities as a student at UNSW
- be aware of plagiarism, copyright, UNSW Student Code of Conduct and Acceptable Use of UNSW ICT Resources Policy
- be aware of the standards of behaviour expected of everyone in the UNSW community
- locate services and information about UNSW and UNSW Library

Use of AI for assessments

As AI applications continue to develop, and technology rapidly progresses around us, we remain committed to our values around academic integrity at UNSW. Where the use of AI tools, such as ChatGPT, has been permitted by your course convener, they must be properly credited and your submissions must be substantially your own work.

In cases where the use of AI has been prohibited, please respect this and be aware that where unauthorised use is detected, penalties will apply.

[Use of AI for assessments | UNSW Current Students](#)

Submission of Assessment Tasks

Turnitin Submission

If you encounter a problem when attempting to submit your assignment through Turnitin, please telephone External Support on 9385 3331 or email them on externalteltsupport@unsw.edu.au

Support hours are 8:00am – 10:00pm on weekdays and 9:00am – 5:00pm on weekends (365 days a year). If you are unable to submit your assignment due to a fault with Turnitin, you may apply for an extension, but you must retain your ticket number from External Support (along with any other relevant documents) to include as evidence to support your extension application. If you email External Support, you will automatically receive a ticket number, but if you telephone, you will need to specifically ask for one. Turnitin also provides updates on their system status on Twitter.

Generally, assessment tasks must be submitted electronically via either Turnitin or a Moodle assignment. In instances where this is not possible, alternative submission details will be stated on your course's Moodle site. For information on how to submit assignments online via Moodle: https://student.unsw.edu.au/how-submit-assignment-moodle

Late Submission Penalty

UNSW has a standard late submission penalty of:

- 5% per calendar day,
- for all assessments where a penalty applies,
- capped at five calendar days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Students are expected to manage their time to meet deadlines and to request Special Consideration as early as possible before the deadline. Support with Time Management is available here.

School-specific Information

Policies and Procedures

For more detailed information about School of Education policies and procedures visit the following website: SED Policies and Procedures (unsw.edu.au).

School Contact Information

School of Education. Arts, Design and Architecture. Ground Floor, Morven Brown Building (Map

Reference F20).

- T: +61 2 93851977
- E: education@unsw.edu.au
- W: https://www.arts.unsw.edu.au/education