EDCU20040 *Teaching Mathematics*
Term 2 - 2021

Profile information current as at 11/04/2024 11:18 am

General Information

Overview

In this unit, students build on the knowledge previously acquired in numeracy and mathematical learning to develop deep understanding of the structure, sequencing and links between critical concepts and skills in content across the year levels in the Australian Curriculum: Mathematics. Students will examine current research of mathematics teaching and learning and apply apply this knowledge to identify issues or challenges to mathematical understanding and problem-solving in key stages of the learning sequence as a guide for developing diagnostic assessment tools. Students develop resources to prevent or overcome difficulties in the development of mathematical knowledge and skills and design and justify approaches to using physical and digital resources to teach specific sub-strands of the curriculum to overcome barriers to learning and improve the transfer of mathematical reasoning, logic and analysis to problem-solving situations. Personal numeracy competence is enhanced in this unit as students develop suggested marking guides for diagnostic assessment using appropriate and accurate mathematical procedures and communication.

Details

Career Level: *Postgraduate*
Unit Level: *Level 9*
Credit Points: *6*
Student Contribution Band: *7*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Pre-requisite - EDCU20037 Numeracy Learning
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 2 - 2021

- Online

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**
Weighting: 50%
2. **Written Assessment**
Weighting: 50%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Student Unit and Teaching Evaluation survey

Feedback
Assessment tasks

Recommendation
Maintain relevance of assessment tasks

Feedback from Student Unit and Teaching Evaluation survey

Feedback
Assessment feedback

Recommendation
Ensure feedback is focused on areas that need to be up-skilled and sufficient direction for how to improve is included.

Unit Learning Outcomes

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

1. Analyse the structure and organisation of content in the mathematics curriculum to identify key stages in concept development as a focus for learning and diagnostic assessment
2. Examine mathematics content and current literature to identify possible approaches to teaching mathematics and misconceptions or barriers to learning for diverse student groups
3. Distinguish evidence-based approaches to teaching mathematics that promote engagement, understanding and mathematical proficiency for students from diverse backgrounds including Aboriginal and Torres Strait Islander students
4. Design diagnostic tools and reliable guides for assessing students' knowledge and skills in mathematics
5. Gather and use information on learners' numeracy skills for planning learning experiences
6. Justify the selection and use of resources that scaffold students' understanding of core mathematical concepts
7. Identify opportunities for students to use ICTs purposefully to gain mathematical knowledge and proficiency

Successful completion of this unit provides opportunities for students to demonstrate the Australian Professional Standards for Teachers focus areas of:
1.1 Physical, social and intellectual development and characteristics of students
1.2 Understand how students learn
1.5 Differentiate teaching to meet the specific learning needs of students across the full range of abilities
2.1 Content and teaching strategies of the teaching area
2.2 Content selection and organisation
2.3 Curriculum, assessment and reporting
2.5 Literacy and numeracy strategies
2.6 Information and Communication Technology (ICT)
3.2 Plan, structure and sequence learning programs
3.3 Use teaching strategies
3.4 Select and use resources
3.6 Evaluate and improve teaching programs
4.1 Support student participation
4.5 Use ICT safely, responsibly and ethically
5.1 Assess student learning
5.2 Provide feedback to students on their learning
5.3 Make consistent and comparable judgements
5.4 Interpret student data
5.5 Report on student achievement

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | ∘ Introductory Level | • Intermediate Level | • Graduate Level | ∘ Professional Level | ∘ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes							
	1	2	3	4	5		6	7
1 - Knowledge	∘	∘	∘	∘	∘	∘	∘	
2 - Communication					∘	∘		
3 - Cognitive, technical and creative skills	∘	∘	∘	∘	∘	∘	∘	
4 - Research	∘	∘	∘					
5 - Self-management					∘	∘	∘	
6 - Ethical and Professional Responsibility	∘	∘		∘	∘	∘	∘	
7 - Leadership								
8 - Aboriginal and Torres Strait Islander Cultures								

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Written Assessment - 50%	∘	∘	∘	∘	∘	∘		
2 - Written Assessment - 50%	∘	∘	∘	∘	∘	∘		

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: American Psychological Association 7th Edition (APA 7th edition)
For further information, see the Assessment Tasks.

Teaching Contacts

Reyna Zipf Unit Coordinator
r.zipf@cqu.edu.au

Schedule

Week 1 - 12 Jul 2021

Module/Topic	Chapter	Events and Submissions/Topic
Overview - The Mathematics Curriculum	*The Australian Curriculum: Mathematics* (ACARA, 2014)	

Week 2 - 19 Jul 2021

Module/Topic	Chapter	Events and Submissions/Topic
Teacher planning and the curriculum	*The Australian Curriculum: Mathematics* (ACARA, 2014)	

Week 3 - 26 Jul 2021

Module/Topic	Chapter	Events and Submissions/Topic
Planning for thinking: Open-ended problems		

Week 4 - 02 Aug 2021

Module/Topic	Chapter	Events and Submissions/Topic
Measurement and Geometry	Chapter 8 & 9	

Week 5 - 09 Aug 2021

Module/Topic	Chapter	Events and Submissions/Topic
Statistics and probability	Chapter 10	

Vacation Week - 16 Aug 2021

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 23 Aug 2021

Module/Topic	Chapter	Events and Submissions/Topic
Diagnostic assessment tools for numeracy and mathematics		**Planning for effective teaching and learning in Mathematics** Due: Week 6 Monday (23 Aug 2021) 12:00 am AEST

Week 7 - 30 Aug 2021

Module/Topic	Chapter	Events and Submissions/Topic
Diagnosis of numeracy and mathematics learning misconceptions		

Week 8 - 06 Sep 2021

Module/Topic	Chapter	Events and Submissions/Topic
Remediation of mathematics and numeracy misconceptions		

Week 9 - 13 Sep 2021

Module/Topic	Chapter	Events and Submissions/Topic
Developing individual learning plans to remediate student mathematics and numeracy misconceptions		

Week 10 - 20 Sep 2021

Module/Topic	Chapter	Events and Submissions/Topic
Professional learning responsibilities of mathematics and numeracy teachers.	Chapter 1 & 11	

Week 11 - 27 Sep 2021

Module/Topic	Chapter	Events and Submissions/Topic
ICTs in Mathematics teaching and learning		

Week 12 - 04 Oct 2021

Module/Topic	Chapter	Events and Submissions/Topic
Review and reflection - Putting theory into practice.		**Numeracy teaching, diagnosis and remediation** Due: Week 12 Monday (4 Oct 2021) 12:00 am AEST

Review/Exam Week - 11 Oct 2021

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 18 Oct 2021

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Planning for effective teaching and learning in Mathematics

Assessment Type
Written Assessment

Task Description
Rationale:
You are to develop a teaching plan for four weeks for mathematics for a designated primary school year level and term. e.g. Year 2, Term 1. The plan must use the *Australian Curriculum: Mathematics* (ACARA, 2014) and focus on content descriptions from Number and Algebra and one other Content Strand (i.e. Measurement and Geometry or Statistics and Probability).
The plan must be comprehensive and include details of content, key learning experiences, resources and assessment. You need to prepare to teach the planned topic/s by researching common learning misconceptions and gathering resources.
The assessment task submission should use a presentation-style appropriate for a primary school curriculum planning document (e.g. *Prep to Year 10 Unit Overview: Mathematics Template* available from QCAA website)
*You are **NOT** permitted to submit a planning document from a school or C2C units*.
The submission should include:

- **Introduction**- brief outline of the context and key considerations for planning mathematics units and lessons. (approx. 200-250 words)
- **Planning document** for mathematics (**NOT** counted in word limit)
- Discussion of the research on **common learning misconceptions** for ONE of the mathematics areas in the plan (e.g. measurement) (approx. 300-350 words)
- Discussion of the ways that **digital resources and tools** could be used to complement

teaching strategies and promote deep learning of, and engagement with, the content of the chosen mathematics topic area/s for the weekly lessons. (approx. 200-250 words)
- **Justification** of the pedagogy and resources chosen to develop the identified content and skills for the topic/s and year level (approx. 400-450 words)
- References (**NOT** counted in word limit)
- Appendices - **Resources** (or evidence of) to support learning in the plan (**NOT** counted in word limit)

Word count: 1200 words maximum
WORD COUNT for written assignments:
The word count is considered from the first word of the introduction to the last word of the conclusion. It excludes the cover page, abstract, contents page, reference page and appendices. It includes in-text references and direct quotations.
Teacher Graduate Standards addressed in marking criteria
2.2 Content selection and organisation - Organise content into an effective learning and teaching sequence
2.3 Curriculum, assessment and reporting - Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans
3.3 Use teaching strategies - Include a range of teaching strategies
3.2 Plan, structure and sequence learning programs - Plan lesson sequences using knowledge of student
learning, content and effective teaching strategies
2.6 Information and Communication Technology (ICT) - Implement teaching strategies for using ICT to expand curriculum learning opportunities for students.
3.4 Select and use resources - Knowledge of a range of resources, including ICT, that engage students in their learning
2.1 Content and teaching strategies - Knowledge and understanding of the concepts, substance and
structure of mathematics content and teaching strategies.

Assessment Due Date
Week 6 Monday (23 Aug 2021) 12:00 am AEST
Please submit the task as one document with your name in the file name it is saved under

Return Date to Students
Week 8 Monday (6 Sept 2021)
Assignments will be returned after the moderation process has been completed.

Weighting
50%

Assessment Criteria
The full rubric for this assessment task can be downloaded from the Moodle site for this unit.
Curriculum planning

- ***2.2 Content selection and organisation -*** Organise content into an effective learning and teaching sequence
- ***2.3 Curriculum, assessment and reporting -*** Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans

Teaching strategies

- ***3.3 Use teaching strategies -*** Include a range of teaching strategies

Learning misconceptions

- ***3.2 Plan, structure and sequence learning programs -*** Plan lesson sequences using knowledge of student learning, content and effective teaching strategies

Digital resources and tools

- ***2.6 Information and Communication Technology (ICT)*** - Implement teaching strategies for using ICT to expand curriculum learning opportunities for students.

- ***3.4 Select and use resources -*** Knowledge of a range of resources, including ICT, that engage students in their learning

Justification of the pedagogy and resources

- ***2.1 Content and teaching strategies -*** Knowledge and understanding of the concepts, substance and structure of mathematics content and teaching strategies

Communication and referencing - Use of language conventions, clarity and conciseness of communication, and compliance with the APA Style Guide.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Submission Instructions
Please submit the task as one document with your name in the file name it is saved under.

Learning Outcomes Assessed

- Analyse the structure and organisation of content in the mathematics curriculum to identify key stages in concept development as a focus for learning and diagnostic assessment
- Examine mathematics content and current literature to identify possible approaches to teaching mathematics and misconceptions or barriers to learning for diverse student groups
- Distinguish evidence-based approaches to teaching mathematics that promote engagement, understanding and mathematical proficiency for students from diverse backgrounds including Aboriginal and Torres Strait Islander students
- Design diagnostic tools and reliable guides for assessing students' knowledge and skills in mathematics
- Justify the selection and use of resources that scaffold students' understanding of core mathematical concepts
- Identify opportunities for students to use ICTs purposefully to gain mathematical knowledge and proficiency

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

2 Numeracy teaching, diagnosis and remediation

Assessment Type
Written Assessment

Task Description
Rationale:
Assessment tasks for diagnostic purposes require an understanding of how students learn mathematics, the hierarchical nature of mathematical concepts and the sequence for developing understanding in a topic area.
Detailed Description:
The task requires you to **work one-on-one with a learner** in a primary school year level to progress their mathematical learning.
You are to determine the sequence of learning appropriate to the year level of the learner and **develop** a diagnostic assessment task that will assist you to determine the learner's level of understanding of **numeration** and **two** of the four **mathematical operations**. The diagnostic assessment task sheet should be referenced to the *Australian Curriculum: Mathematics* (ACARA, 2014) and structured such that you are able to diagnose the level the learner is working at.
The diagnostic task must be **justified** through reference to curriculum documents, other relevant sources and the sequence for developing understanding.
The diagnostic task must be **administered** to the learner, **marked**, **diagnosed**, and **evaluated** in terms of its usefulness for the purpose.
After reviewing the learner's response to the diagnostic task, you need to **develop** an **Individual Learning Plan (ILP)** to address any misconceptions the learner has. If your learner demonstrated thorough understanding, then you need to show how you plan to extend the learner.

In addition, you need to share your diagnostic assessment and learner response with either a peer **or** a practising teacher and initiate a **moderation conversation**. From this professional conversation **report** whether your marking and diagnosis of the learners' needs was consistent with that of your peer or practising teacher and how you could approach student assessment to ensure comparable judgements of student learning.
Finally, you need to develop a **strategy for communicating** the ILP to students and parents/carers.
Your submission should include:
· An overview outlining topic area, year level, *Australian Curriculum: Mathematics* (ACARA, 2014) learning statements, sequence for developing understanding of the topic area, and any other information you believe is relevant to the context you are working in.
· A diagnostic task for the topic area and year level.
· Justification of the diagnostic task.
· Copy of the learner's response that you have assessed (N.B. *All identification must be removed from the copy and where necessary pseudonyms for the school site and learner must be used to ensure anonymity*).
· An evaluation of the effectiveness of the diagnostic task and any changes you would make to it.
· Report from the moderation conversation
· An ILP for the diagnosed mathematics needs of the learner.
· An appropriate justification of the ILP with which to discuss the learner's needs with their parent/guardian.
· Appropriate terminology and referencing.

Assessment Due Date
Week 12 Monday (4 Oct 2021) 12:00 am AEST
Submit the task as one document with your surname in the file name.

Return Date to Students
Exam Week Monday (18 Oct 2021)

Weighting
50%

Assessment Criteria
The full rubric for this assessment task can be downloaded from the Moodle site for this unit.
Sequence for developing understanding of a topic area in mathematics

- ***1.2 Understand how students learn*** - Knowledge and understanding of research into how students learn and the implications for teaching.

Diagnostic assessment task

- ***5.1 Assess student learning*** - Understanding of assessment strategies, including informal and formal, and diagnostic approaches to assess student learning.

Assessment of Learner

- ***5.4 Interpret student data*** - Interpret student assessment data to evaluate student learning and modify teaching practice

Evaluation of the diagnostic task

- ***3.6 Evaluate and improve teaching programs*** - Knowledge of strategies that can be used to evaluate teaching programs to improve student learning.
- ***5.3 Make consistent and comparable judgements*** - Demonstrate understanding of assessment moderation and its application to support consistent and comparable judgements of student learning.

Justified Individual Learning Plan (ILP) for diagnosed mathematics learning needs

- ***5.2 Provide feedback to students on their learning*** - Demonstrate an understanding of the purpose of providing timely and appropriate feedback to students about their learning.
- ***5.5 Report on student achievement*** - Understanding of strategies for reporting to students and parents/carers.

Communication and referencing - Use of language conventions, clarity and conciseness of communication, and compliance with the APA Style Guide.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online

Submission Instructions
Submit the task as one document with your surname in the file name.

Learning Outcomes Assessed

- Examine mathematics content and current literature to identify possible approaches to teaching mathematics and misconceptions or barriers to learning for diverse student groups
- Design diagnostic tools and reliable guides for assessing students' knowledge and skills in mathematics
- Gather and use information on learners' numeracy skills for planning learning experiences
- Justify the selection and use of resources that scaffold students' understanding of core mathematical concepts

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.
Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.
When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.
Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.
As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem