CR460

CURRICULUM AND PEDAGOGY: MATHEMATICS AND NUMERACY

This sample unit outline is provided by CHC for prospective and current students to assist with unit selection.

Elements of this outline which may change with subsequent offerings of the unit include Content, Required Texts, Recommended Readings and details of the Assessment Tasks.

Students who are currently enrolled in this unit should obtain the outline for the relevant semester from the unit lecturer.
Unit Name: Curriculum and Pedagogy: Mathematics and Numeracy

Unit Code: CR460

Award: Graduate Diploma in Education (Primary)

Core/Elective: Core

Pre/co-requisites: Nil

Mode: Internal

Weighting: 10 credit points

Delivery/Contact hrs:
- Class contact: 33 hours
- Engagement with unit materials readings: 44 hours
- Assignment preparation: 63 hours
- Total: 140 hours

Teaching Staff: Dr Peter Price

Unit Rationale:
This core unit for preservice teachers of P-7 mathematics, introduces the content and methodology of the five mathematics curriculum strands, Number, Algebra, Space, Measurement, and Chance and Data. The unit equips preservice teachers to assist P-7 students to develop numeracy and a broad understanding of mathematics, including numeration, computation, algebra, geometry, measurement, chance and data.

There is widespread agreement that development of numeracy is a current priority for education, and therefore that teachers need to have well-developed personal numeracy in order to expertly teach students. Development of numeracy is built on a firm foundation of mathematical knowledge and skills, and the ability to recognise when valid mathematical processes can be brought to bear in solving mathematical problems in other disciplines, or in everyday contexts outside the classroom.

This unit incorporates a School-based Professional Experience component, in which preservice teachers spend one day per week for five weeks in a primary school setting. Preservice teachers will be involved in observing teaching and learning for mathematics and numeracy, and planning and implementing small-group sessions in mathematics and numeracy.

This unit will equip preservice teachers to recognise opportunities to incorporate numeracy and mathematics into other curriculum areas in ways that are both ‘natural’ and meaningful.

Learning Outcomes:

On completion of this unit, preservice teachers will have provided evidence that they have:

1. Developed knowledge of current state and Australian curriculum documents in relation to mathematics and numeracy and how to apply them to planning, resourcing, teaching and assessment tasks.
2. Reflected critically on content and pedagogical issues relating to Mathematics, particularly in relation to the development of school students as numerate individuals.
3. Demonstrated personal proficiency in mathematics processes and knowledge, and in appropriate levels of numeracy in order to develop these qualities in school students.
4. Observed critically and carefully approaches and strategies for planning and resourcing learning experiences to develop mathematics and numeracy in primary classrooms.
5. Observed critically and carefully approaches and strategies for assessing learning experiences for mathematics and numeracy in primary classrooms.
6. Applied a range of pedagogical approaches to the preparation and presentation of plans and materials that are coherent, logical, useful and motivating for learners in Mathematics.
7. Written at an appropriate tertiary standard (with special attention to correct grammar, punctuation, spelling, vocabulary, usage, sentence structure, logical relations, style, referencing and presentation).
Content:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number sense and developing numeracy</td>
</tr>
<tr>
<td>2</td>
<td>Representations of numbers: concrete, symbolic and verbal; use of ICTs to represent numbers including fractions</td>
</tr>
<tr>
<td>3</td>
<td>Algebra: patterns and functions, equivalence and equations; ICT support for algebra learning</td>
</tr>
</tbody>
</table>
| 4    | Computation methods: mental, digital, written  
*School-based Professional Experience: Observe teaching and learning of number topic* |
| 5    | Teaching operations  
*School-based Professional Experience: Observe teaching and learning of algebra topic; plan and implement small-group lesson on number topic* |
| 6    | Introduction to geometry; key terminology and concepts  
*School-based Professional Experience: Observe teaching and learning of geometry topic; plan and implement small-group lesson on algebra topic* |
| 7    | Symmetry and tessellations; transformational geometry  
*School-based Professional Experience: Observe teaching and learning of measurement topic; plan and implement small-group lesson on geometry topic* |
| 8    | Introduction to measurement concepts and processes; real-world use of measurement for problem-solving  
*School-based Professional Experience: Observe teaching and learning of chance and data topic; plan and implement small-group lesson on measurement topic* |
| 9    | The SI (Metric) system of measurement units; applications of measurement and formulas |
| 10   | Data collection, analysis and representation; describing data sets; measures of central tendency; use of ICTs with data |
| 11   | Probability - qualitative and quantitative |

Set Text Requirements:


Queensland Studies Authority 2007, *Mathematics Essential Learnings* [various texts], Author, Brisbane.

Australian curriculum documentation for Mathematics, as released.

Recommended Readings:


Queensland Studies Authority 2004, QSA Years 1-10 Mathematics: Syllabus, Author, Brisbane.
Westwood, PS 2008, What Teachers Need to Know About Numeracy, ACER Press, Camberwell, VIC.

**Journals**
The Arithmetic Teacher
Mathematics Teacher
School Science and Mathematics
Teaching Children Mathematics

### Assessment:

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Topic/s</th>
<th>Learning Outcomes assessed</th>
<th>Week Due</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson and Assessment Task</td>
<td>Develop a lesson and associated assessment task on a topic from the mathematics syllabus documents. Include a detailed guide to making judgements for the teacher implementing the assessment task.</td>
<td>1-3, 6, 7</td>
<td>Week 11</td>
<td>40%</td>
</tr>
<tr>
<td>Observation Journal</td>
<td>Annotated journal of observations of professional practice from school-based professional experiences</td>
<td>1, 2, 4, 5, 7</td>
<td>Week 13</td>
<td>20%</td>
</tr>
<tr>
<td>Examination</td>
<td>Content knowledge in all mathematics curriculum strands</td>
<td>1-3, 6, 7</td>
<td>Week 16</td>
<td>40%</td>
</tr>
</tbody>
</table>

### Unit Overview:

This unit prepares preservice teachers to teach mathematics and develop school students' numeracy. Through a program of on-campus classes and school-based professional experiences, preservice teachers will receive an overview of relevant state and national curriculum documents, and learn the approaches and strategies for planning, resourcing and assessment of learning experiences in mathematics and numeracy.