# Unit Outline (Higher Education)

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|---|---|
| **Institute / School:** | Institute of Education, Arts & Community |
| **Unit Title:** | ADVANCED MATHEMATICAL PEDAGOGIES |
| **Unit ID:** | EDBED4111 |
| **Credit Points:** | 15.00 |
| **Prerequisite(s):** | (EDBED3112) |
| **Co-requisite(s):** | (EDBED4112) |
| **Exclusion(s):** | Nil |
| **ASCED:** | 070103 |

**Description of the Unit:**

This course extends PSTs understanding of advanced pedagogies that are used to develop mathematical skills and cater for the diverse range of learners in any primary classroom. Thinking routines will be explored with a focus on using thinking routines as a regular feature of mathematics classes to strengthen links between mathematical concepts. Rich assessment tasks will be developed using real world contexts that engage students. These tasks will then be evaluated to understand the richness of data that is obtained from such tasks. Differentiation will be another focus of the course examining different ways that work can be differentiated in line with current theoretical research on differentiation. This course will explore pedagogies such as point of need teaching, inquiry and grouping within the classroom through data use. Writing accurate reports based on data and coding using both spreadsheets and commercially available software will also be explored.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

**Work Experience:**

Not wholly work experience: Student is not undertaking work experience in industry or student is undertaking work experience in industry where learning and performance is directed by the provider.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

**Course Level:**

| Level of Unit in Course | AQF Level of Course | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Introductory | | | | | | |
| Intermediate | | | | | | |
| Advanced | | | ✔ | | | |

**Learning Outcomes:**

**Knowledge:**

**K1.** Examine effective differentiation strategies for Mathematics at a primary level to meet the specific learning needs of students.

**K2.** Examine the links between curriculum assessment and reporting.

**K3.** Analyse point of need teaching and its links to differentiation.

**K4.** Explore a range of resources, including ICT resources that engages students.

**K5.** Recognise how thinking routines can provide activities that have multiple entry points.

**Skills:**

**S1.** Adapt work to differentiate for learners with specific learning needs.

**S2.** Write accurate reports based on a range of assessments data.

**S3.** Reflect on the thinking processes associated with the teaching and learning of Mathematics.

**S4.** Incorporate appropriate technology in the learning of Mathematics.

**S5.** Develop classroom activities that engage and meet learning needs.

**Application of knowledge and skills:**

**A1.** Develop a fully differentiated lesson plan incorporating theoretical understandings about the teaching and learning of Mathematics.

**A2.** Design classroom resources that use thinking routines as their basis.

**A3.** Write simple code for mathematical situations and develop coding for classroom use.

**A4.** Write accurate reports based on assessment data and other evidence.

**Unit Content:**

Topics to be covered:

**Differentiation**

- Differentiation techniques for use in the primary mathematics classroom.
- Examining how current curriculum documents build learning sequences.
- Documenting differentiation in topic, term and yearly plans.
- Using assessment data as a tool to differentiate.
- Using evidence to construct reports based on evidence including assessment data.
- Using point of need teaching to differentiate instruction.

**Thinking**

- Linking thinking routines to the content strands of mathematics as listed in current curriculum documents.

- Designing learning activities and sequences in mathematics using thinking routines.
- The purpose and uses of rich assessment tasks.
- Writing rich assessment tasks with real world contexts for mathematics.
- Using inquiry in mathematics to extend all students.

**Coding**

- Coding through spreadsheets.
- Coding using commercially available software.
- Developing coding activities for classroom use.

## FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

| **FEDTASK attribute and descriptor** | | **Development and acquisition of FEDTASKS in the Unit** | |
|---|---|---|---|
| | | **Learning Outcomes (KSA)** | **Assessment task (AT#)** |
| FEDTASK 1<br>Interpersonal | Students will demonstrate the ability to effectively communicate, interact and work with others both individually and in groups. Students will be required to display skills in-person and/or online in:<br>• Using effective verbal and non-verbal communication<br>• Listening for meaning and influencing via active listening<br>• Showing empathy for others<br>• Negotiating and demonstrating conflict resolution skills<br>• Working respectfully in cross-cultural and diverse teams. | S2, A4 | AT3 |
| FEDTASK 2<br>Leadership | Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in:<br>• Creating a collegial environment<br>• Showing self -awareness and the ability to self-reflect<br>• Inspiring and convincing others<br>• Making informed decisions<br>• Displaying initiative | K1, S1, A1 | AT2 |
| FEDTASK 3<br>Critical Thinking and Creativity | Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in:<br>• Reflecting critically<br>• Evaluating ideas, concepts and information<br>• Considering alternative perspectives to refine ideas<br>• Challenging conventional thinking to clarify concepts<br>• Forming creative solutions in problem solving | K1, S1, A1 | AT2 |

| FEDTASK attribute and descriptor | | Development and acquisition of FEDTASKS in the Unit | |
|---|---|---|---|
| | | **Learning Outcomes (KSA)** | **Assessment task (AT#)** |
| FEDTASK 4 Digital Literacy | Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in:<br>• Finding, evaluating, managing, curating, organising and sharing digital information<br>• Collating, managing, accessing and using digital data securely<br>• Receiving and responding to messages in a range of digital media<br>• Contributing actively to digital teams and working groups<br>• Participating in and benefiting from digital learning opportunities | K4, S4, A3 | AT1 |
| FEDTASK 5 Sustainable and Ethical Mindset | Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in:<br>• Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts<br>• Committing to social responsibility as a professional and a citizen<br>• Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses<br>• Embracing lifelong, life-wide and life-deep learning to be open to diverse others<br>• Implementing required actions to foster sustainability in their professional and personal life. | Not applicable | Not applicable |

**Learning Task and Assessment:**

| Learning Outcomes Assessed | Assessment Tasks | Assessment Type | Weighting |
|---|---|---|---|
| K4, S4, A3; APST: 3.4, 2.6 | Write code to solve simple mathematics based problems and develop a classroom coding activity for student use. | Developing classroom resources | 30-40% |
| K1, K3, K5, S1, S3, S5, A1, A2; APST: 1.5, 2.1, 2.3, 2.5 | Develop fully differentiated lesson plans (including rationale) that incorporates a range of resources including ICT and thinking routines. | Academic report, Lesson Planning | 60-70% |
| K2, S2, A4; APST: 2.3 | Write accurate student reports in mathematics based on evidence and assessment data. | Hurdle task | S/U |

**Alignment to the Minimum Co-Operative Standards (MiCS)**

The Minimum Co-Operative Standards (MiCS) are an integral part of the Co-Operative University Model. Seven criteria inform the MiCS alignment at a Course level. Although Units must undertake MiCS mapping, there is NO expectation that Units will meet all seven criteria. The criteria are as follows:

1. Co-design with industry and students
2. Co-develop with industry and students
3. Co-deliver with industry
4. FedTASK alignment
5. Workplace learning and career preparation
6. Authentic assessment

7. Industry-link/Industry facing experience

MiCS Course level reporting highlights how each Course embraces the principles and practices associated with the Co-Operative Model. Evidence of Course alignment with the MiCS, can be captured in the Course Modification Form.

**MICS Mapping has been undertaken for this Unit** No

Date:

**Adopted Reference Style:**

APA

Refer to the library website for more information

Fed Cite - referencing tool

**Professional Standards / Competencies:**

**Australian Professional Standards for Teachers (AITSL) - Graduate Teacher: Initial**

| Attribute | Assessed | Level |
|---|---|---|
| Professional Knowledge | | |
| 1. Know students and how they learn | | |
| 1.5 Differentiate teaching to meet the specific learning needs of students across the full range of abilities<br>Demonstrate knowledge and understanding of strategies for differentiating teaching to meet the specific learning needs of students across the full range of abilities. | Yes | Advanced |
| 2. Know the content and how to teach it | | |
| 2.1 Content and teaching strategies of the teaching area<br>Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area. | Yes | Advanced |
| 2.3 Curriculum, assessment and reporting<br>Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans. | Yes | Advanced |
| 2.5 Literacy and numeracy strategies<br>Know and understand literacy and numeracy teaching strategies and their application in teaching areas. | Yes | Advanced |
| 2.6 Information and Communication Technology (ICT)<br>Implement teaching strategies for using ICT to expand curriculum learning opportunities for students. | Yes | Advanced |
| Professional Practice | | |
| 3. Plan for and implement effective teaching and learning | | |
| 3.4 Select and use resources<br>Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning. | Yes | Advanced |