VCE Unit Plan (*Adapted from sample weekly planner provided by VCAA)*

Study Design: VCAA 2023-2026 version 1.1 **Unit:** Algorithmics (HESS) – Unit 3 **Area of Study:** 1 – Data modelling with abstract data types

Outcomes/Learning Objectives: Students should be able to define and explain the representation of information using abstract data types, and devise formal representations for modelling various kinds of real-world information problems using appropriate abstract data types

Focus text/s: An Introduction Algorithmic Thinking by Gouros Georgia

Key assessment strategies: Diagnostic, Formative, & Summative assessment

School context/student cohort: *[redacted]*: Year 12. (13 students) **Duration of unit:** 6 weeks

Annotations Key (*colour coded)*:

1. Learning outcomes or objectives, including any relevant adjustments for students working below and above standard
2. Alignment with subject-specific syllabus/curriculum
3. Information about the nature, content and conditions of the summative assessment
4. Pedagogical sequencing of content and activities appropriate for your teaching area
5. Pedagogical strategies relevant to teaching in your subject area, the needs of learners, and including support for higher order learning
6. A variety of formative assessment strategies suitable for tracking and supporting student learning
7. Resourcing for selected teaching and assessment pedagogies
8. Planning for the development of students' subject-specific literacy, numeracy and digital skills
9. Diagnostic, formative and summative approaches to tracking and assessing student learning
10. Differentiation of teaching and assessment to consider implications for students with cognitive, physical, socio-economic, cultural, linguistic and religious diversity.

Week/ Lesson	**Links to outcome (knowledge, skills as per Study Design)**	**Topic/Lesson focus**	**Student activities and tasks What will the students do?**	**Required resources**	**Monitoring and assessment linked to Outcome** (formative and summative)
1	Key Knowledge: - N/A for Aos 1 Key Skills: - N/A for Aos 1 *These learning activities are more fitted to AoS 2; however, it develops the algorithmic thinking required for the entire unit, and is a better entry point*	Solving Problems	• Discuss the outcomes and inform students of Unit 3 SAC and SAT dates and conditions, as per school guidelines. • Introduction to real-world problem-solving, following recipes, flowcharts, representations of algorithms. • Show student with ASD a quiet space they can use when feeling overwhelmed	- Lesson presentations - Learning tasks - An Introduction Algorithmic Thinking (book) - have a copy of presentation for S w/ hearing impairment & EAL - Provide key terminology lists for EAL student to study and refer to - Noise cancelling headphones if student with ASD requires them - ROGER microphone and speaker system for S hearing aide to connect to	- Pre-class quiz - In class Kahoot - Think Pair share - Observations - Completion of learning activities

2	Key Knowledge: - N/A for AoS 1 Key Skills: - N/A for Aos 1 *These learning activities are more fitted to AoS 2; however, it develops algorithmic thinking required for the entire unit, and is a better entry point*	Algorithms in Pseudocode	• Class activities to introduce the writing of structured pseudocode algorithms for solving puzzles and games. (Allow S with ASD to work independently if they have issues with working with a group) • Use sequence, conditional and iterative actions in structured pseudocode to control steps actioned in algorithms.	- Lesson presentations - Learning tasks - Exemplars - An Introduction Algorithmic Thinking (book) - have a copy of presentation for S w/ hearing impairment & EAL	- Think Pair share - Observations - Exit ticket - Completion of learning activities

3	Key Knowledge: - Motivation for using ADTs - Signature specifications of ADTs using operator names, argument types and result types - Specification and uses stacks, queues, and dictionaries Key Skills: - Explain the role of ADTs for data modelling - Read and write ADT signature specifications - Use ADTs in accordance with their specifications - Apply ADTs to model real-world	ADTs	• Introduction to ADTs for holding information for actions and computations in variables, lists, stacks, queues, priority queues, dictionary ADTs. • Explore how real-world problem-modelling can be done using simple ADTs. • Review the formal signatures and standard operations of simple ADTs.	- Lesson presentations - Learning tasks - An Introduction Algorithmic Thinking (book) - have a copy of presentation for S w/ hearing impairment & EAL	- Exit tickets - Observations - Kahoot - Completion of learning activities - Those observed to be above standard will be given the opportunity to look at further ADTs and implementation such as priority queues, circular linked lists, heaps, and hash tables

	problems by selecting appropriate ADT and justifying suitability				
4	Key Knowledge: - features of graphs, including paths, weighted path lengths, cycles and subgraphs - categories of graphs, including complete graphs, connected graphs, directed acyclic graphs and trees, and their properties Key Skills: - identify and describe properties of graphs	ADTs (Graphs, directed graphs, trees)	• Discuss the features of graphs and how they are holding information for actions and computation in graph ADTs • Explore how real-world problem-modelling can be done using graphs. • Class activities on graph representations and properties. (Allow S with ASD to work independently if they have issues with working with a group) • Review the formal	- Lesson presentations - Learning tasks - Exemplars - An Introduction Algorithmic Thinking (book) - have a copy of presentation for S w/ hearing impairment & EAL	- In class quiz - Think Pair Share - Exit tickets - Observations - Completion of learning activities - Ss observed to be above standard will be given the opportunity to look at further types of trees, e.g. prefix trees & n-ary trees

			signatures of graph ADTs.		
5	Key Knowledge: - the structure of decision trees and state graphs - Modularisation and abstraction of information representation with ADTs Key Skills: - identify and describe properties of graphs - model basic network and planning problems with graphs, including the use of decision trees and state graphs - identify and describe properties of graphs	Searching/Traversing Graphs	• Apply graph traversal and searching algorithms (depth-first search, breadth-first search) on graph ADTs. • Discuss the merits of each traversal algorithm and compare traversal methods progression.	- Lesson presentations - Learning tasks - An Introduction Algorithmic Thinking (book) - have a copy of presentation for S w/ hearing impairment & EAL	- Group Discussions - Observations - Completion of learning activities - Those identified to be above standard will be provided the opportunity to implement these algorithms using python

6	Key Knowledge: - All associated with AoS 1 Key Skills: - All associated with AoS 1	Unit 3 Outcome 1 SAC	• Revision • Unit 3 outcome 1 School Assessed Coursework	- Revision materials - An Introduction Algorithmic Thinking (book) - EAL Student will be permitted a translation dictionary and 20 minutes extra-time if permitted by VCAA - Allow student with ASD extra break time if permitted/required	- Revision quiz - Mind maps - Key terminology/ definition resource - Provide opportunity for self-assessment