General Mathematics
Level 2-3

Overview and Key Features

Years 9 to 12 Learning 2020

Department of Education

Tasmanian Government

The purpose of this paper

The purpose of this paper is to provide information regarding the overview and key features of the proposed *General Mathematics Level 2-3.*

It is designed to enable all interested stakeholders to reflect and provide feedback on key features including learning outcomes, structure, sequencing and likely content. This feedback will be considered in writing the draft course.

Consultation

Throughout the course development process there will be four opportunities for formal stakeholder consultation:

- Course Scope
- Structural Overview and Key features (Nov/Dec 2020)
- Initial Draft Course (March 2021)
- Final Draft Course (June 2021)

This paper represents the second of four course consultation points for teachers to engage in the course development process for *General Mathematics Level 2-3.*

Course Rationale

The *General Mathematics Level 2-3* course is designed to develop learners' understanding of concepts and techniques drawn from number including finance and algebra including sequences, trigonometry and geometry, networks and decision mathematics, and statistics. This breadth of mathematical experience will enable learners to apply mathematical concepts and perform techniques to solve applied problems, synthesise mathematical information, and design and conduct mathematical investigations to calculate and communicate possible solutions. The *General Mathematics* course will enable learners the opportunity to develop the foundations for study in many disciplines at tertiary level and engage in applications of those disciplines. Mathematics and numeracy provide a way of interpreting everyday practical situations, and provide the basis for many informed personal decisions.

This course will enable learners to develop their mathematical expertise such that they may contribute productively in an ever-changing global economy, with both rapid revolutions in technology and global and local social challenges. This is a key factor in ensuring Tasmania and Australia's current and emerging needs are met as an economy competing globally requires substantial numbers of mathematically expert professionals such as teachers, engineers, economists, scientists, social scientists and planners.

Years 9 to 12 Curriculum Framework

Years 9 to 12 Education Framework informs the design of *General Mathematics* course and it fits within the Discipline-based focus area of the Years 9 to12 Curriculum Framework.

Pathways in

The *General Mathematics Level 2-3* course enables learning continuity from: Years 9-10 Australian Curriculum Mathematics. Additionally, learners who have undertaken the currently accredited TASC course Workplace Maths – MTW215120 could progress into this course or students who have undertaken the currently accredited General Mathematics – Foundation MTG215114 could progress into Level 3 of this course.

Level 2

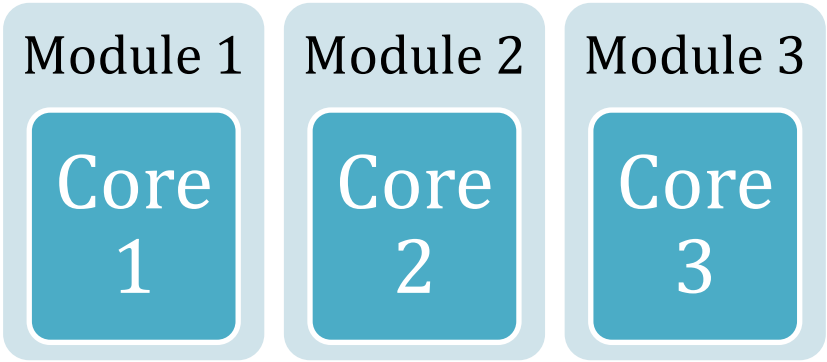
Learning Outcomes

On successful completion of this course learners will be able to:

- Communicate mathematical ideas, information and arguments purposefully and appropriately
- Use symbolic, formal and technical language and operations
- Apply metacognitive and reflective thinking to individual and collaborative learning experiences
- Select or devise and implement a mathematical strategy to solve problems
- Apply reasoning in order to justify or check justification of ideas, actions and results
- Interpret mathematical concepts and apply associated techniques
- Use mathematics to represent and model real-world situations and problems

Course Structure

General Mathematics Level 2 will consist of three compulsory modules that can be studied in any order or through an integrated approach. The three modules combined articulate all aspects of the Australian Curriculum: General Mathematics Units 1 – 2. The three modules are as follows.



Modules Available

Core 1: Practical Applications of Measurement

Core 2: Algebraic Techniques and Modelling

Core 3: Finance and Statistical Investigations

Course Delivery

To be developed through consultation.

Module content

Module 1: Practical Applications of Measurement - including the topics of:

- Shape and measurement
  - Review of Pythagoras' theorem

- Mensuration
- Similar figures and scale factors

- Applications of trigonometry
  - Review of right-angled trigonometry
  - Non-right angled trigonometry
  - Area of triangles
  - Practical problems involving angles of elevation and depression and bearings in navigation

Module 2: Algebraic Techniques and Modelling - including the topics of:

- Algebra and matrices
  - Linear and non-linear expressions
  - Matrices and matrix arithmetic
- Linear equations and graphs
  - Linear equations
  - Straight-line graphs and their applications
  - Simultaneous linear equations and their applications
  - Piece-wise linear graphs and step graphs

Module 3: Finance and Statistical Investigations - including the topics of:

- Consumer arithmetic
  - Applications of rates and percentages
  - Use of spreadsheets
- Univariate data analysis
  - The statistical investigation process
  - Interpretation of data relating to a single statistical variable
  - Representation and comparison of data for a numerical variable across two or more groups

Level 3

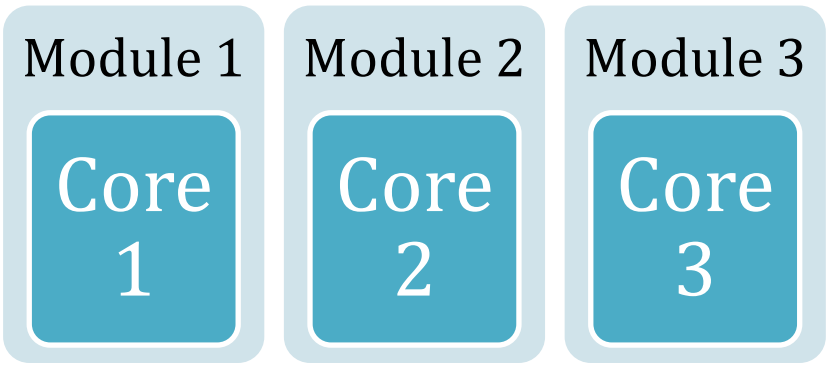
Learning Outcomes

On successful completion of this course learners will be able to:

- Communicate mathematical ideas, information and arguments purposefully and appropriately
- Use symbolic, formal and technical language and operations
- Apply metacognitive and reflective thinking to individual and collaborative learning experiences
- Select or devise and implement a mathematical strategy to solve problems
- Apply reasoning in order to justify or check justification of ideas, actions and results
- Interpret mathematical concepts and apply associated techniques
- Use mathematics to represent and model real-world situations and problems

Course Structure

General Mathematics Level 3 will consist of three compulsory modules that can be studied in any order or through an integrated approach. The three modules combined articulate all aspects of the Australian Curriculum: General Mathematics Units 3 – 4. The three modules are as follows.



Modules Available

Core 1: Graphs, Networks and Decision Mathematics

Core 2: Mathematical Modelling

Core 3: Statistical Investigation Process

Course Delivery

To be developed through consultation.

Module content

Module 1: Graphs, Networks and Decision Mathematics - including the topics of:

- Graphs and networks
  - The definition of a graph and associated terminology
  - Planar graphs
  - Paths and cycles
- Networks and decision mathematics
  - Trees and minimum connector problems
  - Project planning and scheduling using critical path analysis
  - Flow networks
  - Assignment problems

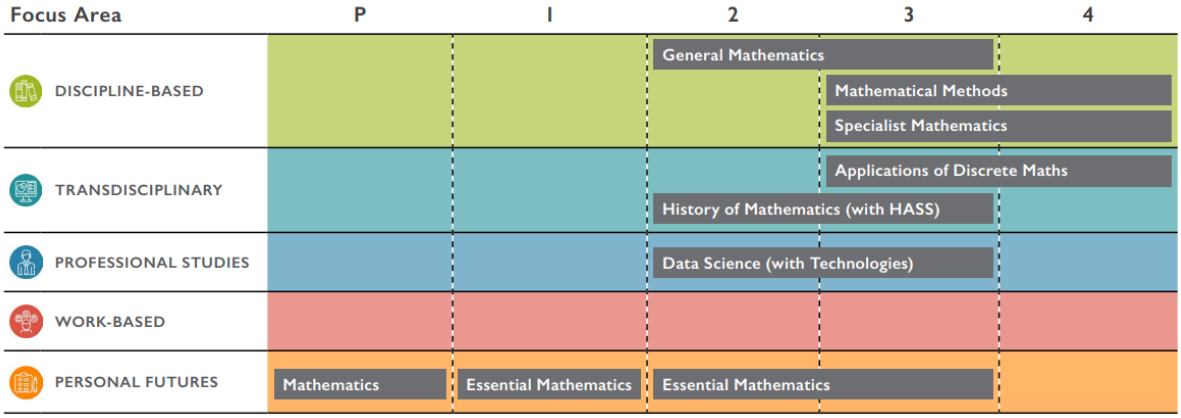
Module 2: Mathematical Modelling - including the topics of:

- Growth and decay in sequences
  - The arithmetic sequence
  - The geometric sequence
  - Sequences generated by first-order linear recurrence relations
- Loans, investments and annuities
  - Compound interest loans and investments
  - Reducing balance loans (compound interest loans with periodic repayments)
  - Annuities and perpetuities (compound interest investments with periodic payments made from the investment)

Module 3: Statistical Investigation Process - including the topics of:

- Bivariate data analysis
  - Identifying and describing associations between two categorical variables
  - Identifying and describing associations between two numerical variables
  - Fitting a linear model to numerical data
  - Association and causation
  - The statistical investigation process
- Time series analysis
  - Describing and interpreting patterns in time series data
  - Analysing time series data
  - The statistical investigation process

Relationship to possible Future Provision



Note: Subject to ongoing accreditation considerations in line with the Accreditation Framework