

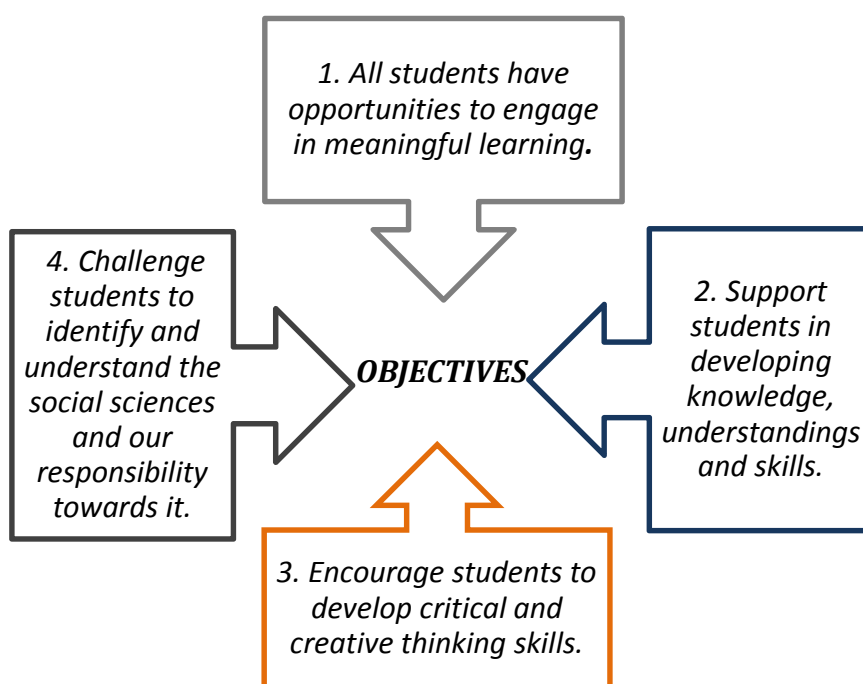
AUSTRALIAN ISLAMIC COLLEGE 2017

MATHEMATICS CURRICULUM PLAN

Years 7 – 12

Rationale:

The Mathematics learning area curriculum Plan is aligned to the Australian curriculum. It outlines the teaching and learning of Mathematics along with assessment and reporting across the years 7 – 12 at the Australian Islamic College.

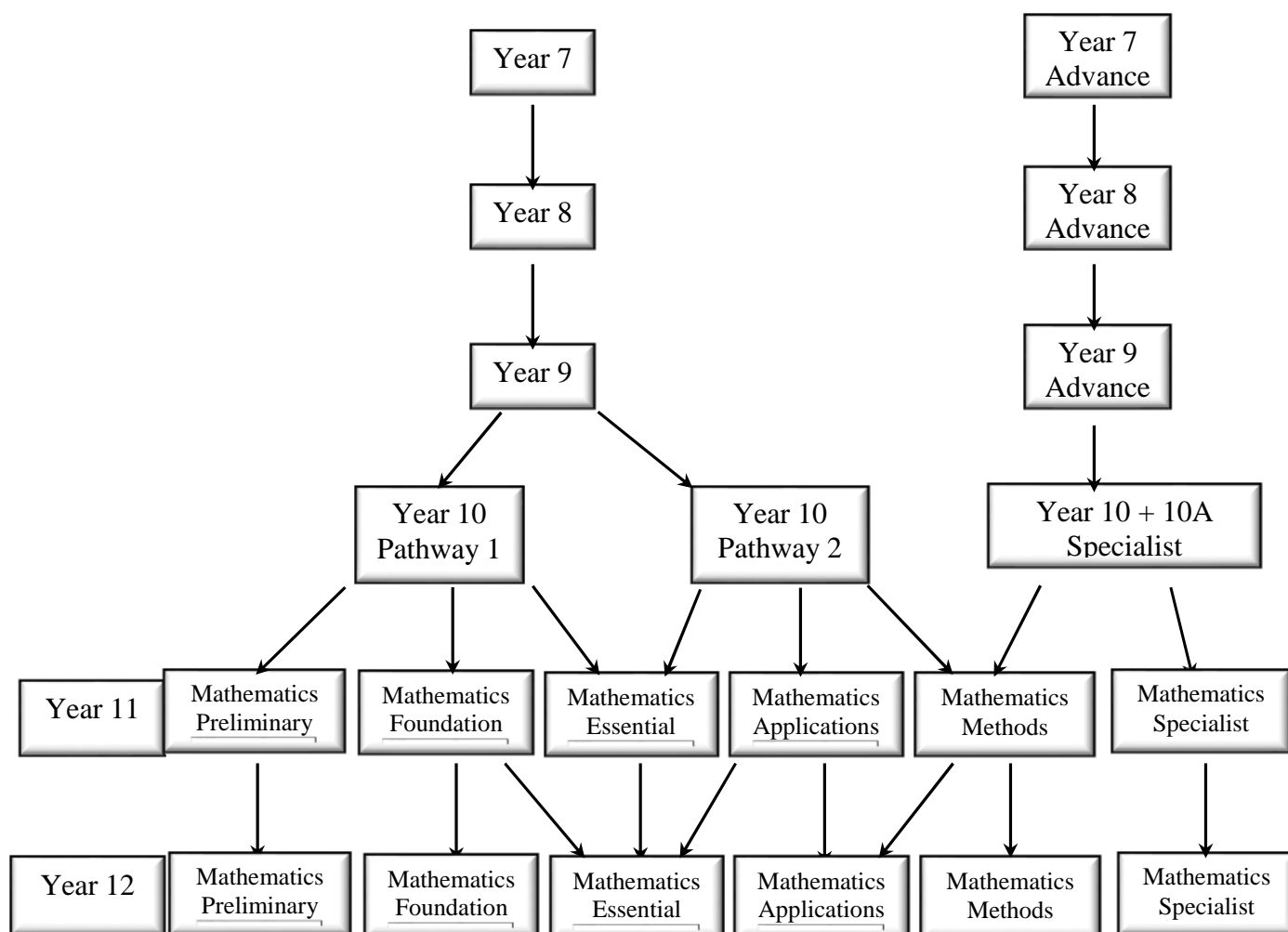


Learning Mathematics creates Opportunities

Curriculum Offering: Year 7-12

<i>Year - Course</i>	<i>Hours a week</i>	<i>2017 Number of classes</i>
Lower school		
7 – Mathematics	5	5
8 – Mathematics	5	5
9 – Mathematics	5	5
10 – Mathematics	5	5
Secondary Year 11		
11 – Mathematics Essential(General)	5	2
11 – Mathematics Applications (ATAR)	5	2
11- Mathematics Methods(ATAR)	5	2
11 – Mathematics Specialist(ATAR)	5	1
Secondary Year 12		
12 – Mathematics Essential(General)	5	2
12 – Mathematics Applications (ATAR)	5	2
12- Mathematics Methods(ATAR)	5	1
12 – Mathematics Specialist(ATAR)	5	1
12 – Mathematics Preliminary unit 3 and 4 for students with disability	5	1
Total classes		34

Year 7 to 12 Mathematics Pathways from 2017



Note:

1. Year 7 to 12 are Australian Curriculum
2. The senior Preliminary are for students with disabilities

Differentiated Learning

1. Year 7, 8, 9: More on understanding and fluency; less on problem solving/reasoning
2. Advance: Less on understanding and fluency; more on problem solving/reasoning

Teaching and Learning: Year 7 - 12

Rationale

The Australian Curriculum: Mathematics provides students with essential mathematical skills and knowledge in Number and Algebra, Measurement and Geometry, and Statistics and Probability. Mathematics aims to instill in students an appreciation of the elegance and power of mathematical reasoning. The curriculum focuses on developing increasingly sophisticated and refined mathematical understanding, fluency, logical reasoning, analytical thought and problem-solving skills.

In the Australian Curriculum, the general capabilities encompass the knowledge, skills, behaviours and dispositions that, together with curriculum content in each learning area and the cross-curriculum priorities, will assist students to live and work successfully in the twenty-first century. This is in line with what has been and continues to be developed at the Australian Islamic College

Seven areas of general capabilities:

- *Literacy*
- *Numeracy*
- *Information and communication technology (ICT) capability*
- *Critical and creative thinking*
- *Personal and social capability*
- *Ethical understanding*
- *Intercultural understanding.*

Literacy expectations

Students become literate as they develop the knowledge, skills and dispositions to interpret and use language confidently for learning and communicating in and out of school and for participating effectively in society. Literacy involves students in listening to, reading, viewing, speaking, writing and creating oral, print, visual and digital texts, and using and modifying language for different purposes in a range of contexts.

Literacy is an important aspect of mathematics. Students develop literacy in mathematics as they learn the vocabulary associated with number, space, measurement and mathematical concepts and processes. This vocabulary includes synonyms (minus, subtract), technical terminology (digits, lowest common denominator), passive voice (If 7 is taken from 10) and common words with specific meanings in a mathematical context (angle, area). They develop the ability to create and interpret a range of texts typical of Mathematics ranging from calendars and maps to complex data displays.

Students use literacy to understand and interpret word problems and instructions that contain the particular language features of mathematics. They use literacy to pose and answer questions, engage in mathematical problem solving, and to discuss, produce and explain solutions.

Making Connections

- *Teachers must regularly make connections by choosing a context for learning.*
- *Encourage students to make connection with their prior knowledge*

Assessment: Year 7 - 10

Assessment consistency

All year 7-10 students across the three AIC campuses will conduct the same main assessments per term. These assessments will be changed/modified each year according to any changes/needs of the students/program and other school circumstances.

Monitoring of the intended learning targets

The following assessment types will be used throughout years 7-10 to give students multiple opportunities to demonstrate knowledge and understanding, skills and processes.

Year 7-9	Assessment type	Per term	Per year	Time
	Midterm test / End of the term Test	2	8	Mid-term & End of term
	Investigation in the form of holiday homework test	1	4	Beginning of the term

Year 10	Assessment/Activity	Per term	Per year
	Midterm test / End of the term Test/ Investigation	3	12
	Common Semester Exam	During sem1and Sem2	

Format and assessment guidelines

Tests/ Investigations/Exams

Tests and Investigations will be written by allocated teachers and submitted to HOLA to be reviewed by all teachers by each term. Teachers preparing tests must use the same format provided by the HOLA.

An assessment task roster is provided to all the teachers in the beginning of the term where there are more than 2 classes.

Reporting: Year 7 – 10

Student Portfolios

Teachers need to keep marked assessments filed in individual student portfolios. These will regularly be checked by HOLA and need to be organised and ready for parent meetings.

School reports

Teachers must enter student test mark and accumulated mark on to the schools data base mark book twice per term, mid-term and end of term. Teacher need to publish the reports themselves. These results along with teacher's comments on performance will be communicated with parents. The assessments and their weightages to report on for each reporting cycle and year are indicated in the teaching programs for years 7 – 10.

Parent meetings

Parents of each year group are given the opportunity once a term to talk to the teacher and view their child's assessment portfolio during parent teacher afternoons. All teachers must attend the parent teacher meeting sessions.

Parents are also encouraged to book appointments with teachers if extra time is needed to discuss their child's progress or difficulties.

Student result analysis

All teachers must provide an analysis of students results after each reporting cycle to the HOLA. This will give teachers the opportunity to evaluate student results and provide suggestions and plans of action for any improvements.

HOLA will use this analysis to track student progress in each class and this will become a reflection on teachers teaching strategies.

Teacher feedback

HOLA will visit teacher's class (some or all) each term and provide feedback and evaluation with the teacher about the lesson.

Procedures, Practices and Strategies: Year 7 – 12

	Procedures, Practices and Strategies	
	Years 7-10	Year 11-12
TEACHING	<p>1. Common teaching programs - Teachers are required to follow the set programs agreed upon by the HOLA. Teachers are required to collaborate in creating effective programs based on the content specified in the Australian Curriculum. Educators will have the flexibility within their classes to differentiate to meet the needs of their students.</p> <p>2. Curriculum delivery - Effective curriculum planning and a distributed leadership model provide the basis for quality instruction guided by the AITSL Australian Professional Standards for Teachers.</p> <p>3. Clear lesson objectives - communicated with the students each lesson</p> <p>4. Establishing prior knowledge - Forming a baseline of knowledge prior to instruction</p> <p>5. Engaging students - Using a variety of teaching styles incorporated into lesson plans</p> <p>6. Innovative lessons plans - Set the learning outcome: Make the objectives of the lesson clear at the beginning of each lesson - Clarify the activities within the body: Student centered activities - Conclude by consolidating: Recap and review of learning objectives. - Teacher reflection: Evaluate lesson and plan for follow-up requirements.</p> <p>7. Explicit teaching instruction</p> <p>8. Embedded Islamic values</p> <p>9. Real-life application of content regularly given</p> <p>10. Scaffolding- Through extension and differentiated homework</p> <p>11. Establishing a link between classwork and homework given</p> <p>12. Student centered learning - Providing group learning and peer teaching</p> <p>13. Encouraging literacy involvement and follow-up in all subject areas</p> <p>14. Educational excursions, incursions and camps</p> <p>15. Encouraging student skills - Critical thinking - Problem solving - High order thinking</p> <p>16. ICT integration - Encouraging responsible usage</p> <p>17. Cross curricula connections established between different learning areas</p> <p>18. Continuous re- capitulation - Ensuring students are gaining from instruction and are learning</p>	<p>In addition...</p> <p>1. Teaching programs - reflects content specified by the ACARA syllabus provided to all teachers and schools. Programs must comply and meet all the syllabus requirements.</p> <p>2. Implicit teaching instructions</p> <p>3. Developing critical thinking skills</p> <p>4. Student centered learning through group activities</p> <p>5. Analytical practices</p> <p>6. Stringent follow-up on homework</p>

Procedures, Practices and Strategies: Year 7 – 12

	Procedures, Practices and Strategies	
	Years 7-10	Year 11-12
DIFFERENTIATING	<p>1. Identify students into learning abilities</p> <p>2. Sequencing students accordingly- allow for differentiation based on learning difficulties/disabilities /GATE/IEP/EALD/NESB</p> <p>3. Inclusivity for all students through,</p> <ul style="list-style-type: none"> - specific tasks, resources, assessments, homework <p>4. Relevant assessments for differentiated groups: Year 7, 8, 9: More on understanding and fluency; less on problem solving/reasoning Advance: Less on understanding and fluency; more on problem solving/reasoning</p> <p>5. Modifying lesson plans to incorporate scaffolding</p> <p>6. Catering for IEP Students</p> <p>7. Educational assistance for IEP students</p> <p>8. Smaller class numbers- Catering for differentiated needs of students and IEP</p> <p>9. Providing different lesson materials</p> <ul style="list-style-type: none"> - simplified language, modified versions, extension problems <p>10. Remedial extension classes- Created for specific learning needs of students i.e. literacy/OLNA classes</p> <ul style="list-style-type: none"> - In addition to ongoing literacy support within the classroom by all teachers, students with major literacy deficiency are catered for with separate literacy engagement program. Such programs involve removing students during the week from regular classes and focus is provided in improving their literacy levels. On assessment, students are slowly re-introduced into the main stream classes. This may take a course of three to six months depending on the student's literacy and entry level. <p>11. Assessment Differentiation- Establish student base-line by setting pre-tests</p> <ul style="list-style-type: none"> - Element of flexibility to cater for the various learning ability students <p>12. Streaming. Students are streamed into 2 to 3 levels, depending on availability within their cohort to allow for more focused instruction to meet the differentiated needs of the students. The levels include:</p> <ul style="list-style-type: none"> - Extension classes (GATE or BG), catering for around 25-30 students <p>Students displaying high achievement within a learning area are given the opportunity to move into the GATE or upper streamed level (BG) for that year within each subject. This catered class aims at advancing student who are educationally inclined to advance further and help them develop additional skills in addition to their current learning program. For these students it means providing enrichment and extension to develop in-depth knowledge and understanding and it may also mean introducing some elements of the curriculum from a higher year level.</p> <ul style="list-style-type: none"> - General level, most of the students fall in this general category. Students in these classes enter at a similar level with similar learning needs. Differentiation within this level through scaffolding and focused learning are still required to meet the individual needs of the learners. - Remedial classes, provides more focus on student needs to fast track improvements. <p>When available a small number of students are withdrawn into a class where instruction can be more explicit. The aim is to maximize student learning through instruction further differentiated towards the learners needs.</p>	<p><i>In addition...</i></p> <p>1. Offering after hour tuition for students needing support for WACE courses</p> <p>2. External links provided for extension works</p> <p>3. Offering various stages within a course i.e. stages 1, 2 and 3</p>

Core Procedures, Practices and Strategies: Year 7 – 12

	Core procedures, practices and strategies	
	Years 7-10	Year 11-12
MONITORING	<p>1. Regular checking- Completion of tasks - Classwork and homework</p> <p>2. Monitoring via common tests - Comparisons can be made across cohorts by use of common tests</p> <p>3. Progress maps- tracking students educational achievements throughout the year in each learning area</p> <p>4. Portfolios- Folders for each students used to collate and track student task in each learning area</p> <p>5. Teachers use of excel books- Maintained and checked as evidence of records for student assessment</p> <p>6. IWISE- entering, storing and monitoring student results</p> <p>7. Performance monitored by setting targets- Targets set prior to tests and post assessments each term</p> <p>8. Regular analysis of results- after mid-term and end of term reports - using results to set targets for individual, class and cohorts by teachers and HOLA's</p> <p>9. NAPLAN/OLNA and ACER analysis - Used to plan for student learning and introduce remedial classes</p> <p>10. Using collected data- to evaluate learning - make collaborative decisions to plan for improvement</p> <p>11. Communication with parents and HOLA's - via email and diaries to enable monitoring of student studying habits at school and at home</p> <p>12. Intervention strategies based on evidence to provide information on students lack of performance or achievement</p>	<p>In addition...</p> <p>1. Performance monitored by setting targets for each course on a semester basis for individual students</p>
	<p>1. Pre-Assessment Criteria - Fair, valid and reliable sources of assessments - Common marking keys - Common assessment procedures and policy across the school</p> <p>2. Assessment Types - Formal assessment: tests, exam, research assignments, practical investigations or oral presentations - Informal assessments: tests on homework, classwork or practical investigations, oral presentations, peer assessments, quiz questions - Summative: Mid Term, End of Term, Semester Exams - External diagnostic assessments: OLNA, NAPLAN, ACER tests, ICAS</p> <p>3. Assessment Differentiation - Establish student base-line by setting pre-tests - Element of flexibility to cater for the various learning ability students</p>	<p>In addition...</p> <p>1. WACE exams</p>
ASSESSING		

Core Procedures, Practices and Strategies: Year 7 – 12

	Core procedures, practices and strategies	
	Years 7-10	Year 11-12
MODERATING	<p>1. Curriculum guidelines are provided by ACARA are followed</p> <p>2. Reviewing and assessing assessments regularly for standardizing</p> <p>3. Common processes/procedures for departmental moderating of assessments - Teaching teams generate new assessments - Common answer keys are provided for moderating marking - HOLA's check all assessment</p> <p>4. internal moderation to ensure consistent program/syllabus delivery</p> <p>5. Flexibility in allocating grades based on cohort performances i.e. scaling results</p> <p>6. Ensure a minimum standard for tests.</p> <p>7. Ensure all students/teachers have equal access to resources.</p> <p>8. Cross campus departmental moderation of assessments (both when creating and marking/reviewing assessments).</p> <p>9. Portfolio Checking (HOLA and teacher) – [Semester based]</p> <p>10. Inter and intra departmental meetings</p> <p>11. Peer observation by fellow colleagues</p> <p>12. Lesson observations conducted by HOLA'S - Twice per term</p>	<p>1. Cross marking - between teachers teaching the same course if more than 1 class exists</p> <p>2. Consensus moderation, - Cross marking through external moderation - Following curriculum SCSA guidelines</p> <p>3. Reviewing and assessing tasks/tests and standardizing the tasks/tests.</p> <p>4. ATAR moderation</p>

Curriculum Offering: Year 7-10

The Australian Curriculum:

Content and Proficiency structures

Mathematics is organized around the interaction of three content strands and four proficiency strands.

The content strands (are what the students learn)

1. Number and Algebra
2. Measurement and Geometry
3. Statistics and Probability

The proficiency strands (are the levels of skills and breadth)

1. Understanding (basic skills and terminology)
2. Fluency (manipulation of skills)
3. Problem Solving (application of skills in everyday context)
4. Reasoning (making judgement, prove, generalization and interpreting)

Achievement Standards

Across Foundation to Year 10, achievement standards indicate the quality of learning that students should typically demonstrate by a particular point in their schooling. Achievement standards comprise a written description and student work samples. An achievement standard describes the quality of learning (the extent of knowledge, the depth of understanding, and the sophistication of skills) that would indicate the student is well placed to commence the learning required at the next level of achievement.

Years 7 – 10

Year 10 is the only year group that has two separate curriculums: the Year 10 and the Year 10A programs. The 10A programs is optional and is intended for able students who require more content to enrich their mathematical study whilst completing the common Year 10 content. The 10A contains advanced topics for able students intending to pursue Mathematical Methods (Course C) and Specialist Mathematics (Course D) in the senior secondary years. The Year 10 programs prepare students for Mathematics Applications or Mathematics Methods in their senior secondary year.











Sub-strands

Content descriptions are grouped into sub-strands to illustrate the clarity and sequence of development of concepts through and across the year levels. They support the ability to see the connections across strands and the sequential development of concepts from Foundation to Year 10.

Sub-strands :

Number and Algebra	Measurement and Geometry	Statistics and Probability
<i>Number and place value (F-8)</i>	<i>Using units of measurement (F-10)</i>	<i>Chance (1-10)</i>
<i>Fractions and decimals (1-6)</i>	<i>Shape (F-7)</i>	<i>Data representation and interpretation (F-10)</i>
<i>Real numbers (7-10)</i>	<i>Geometric reasoning (3-10)</i>	
<i>Money and financial mathematics (1-10)</i>	<i>Location and transformation (F-7)</i>	
<i>Patterns and algebra (F-10)</i>	<i>Pythagoras and trigonometry (9-10)</i>	
<i>Linear and non-linear relationships (7-10)</i>		

ICONS Used:

ACARA icon	Abbreviation	Cross-curriculum priorities
	ATSI	<i>Aboriginal and Torres Strait Islander histories and cultures</i>
	ASIA	<i>Asia and Australia's engagement with Asia</i>
	SUST	<i>Sustainability</i>
		General capabilities
	LIT	<i>Literacy</i>
	NUM	<i>Numeracy</i>
	ICT	<i>Information and communication technology (ICT) competence</i>
	CRIT	<i>Critical and creative thinking skills</i>
	ETH	<i>Ethical behaviour</i>
	PER	<i>Personal and social competence</i>
	INT	<i>Intercultural understanding</i>

Year 7 -10 Assessment Design Brief:

1) Cover page

- *Strands (Number and Algebra, Measurement and Geometry or Probabilities and statistics)*
- *instructions to student*
- *Weighing*

2) Year level achievement standards - feedback

- *Separate table for each strands*

3) Part 1: Understanding (skill test/general capabilities-literacy)

- *Skill test basic*
- *Keep repeat questions to maximum of 3*
- *Questions on literacy and keywords*
- *About 30% - 35%*

4) Part 2: Fluency (skill test)

- *Skill test multi-steps*
- *Formula usage, re-arranging*
- *About 30% - 35%*

5) Part 3: Problem solving

- *Context problem, accuracy, appropriate units*
- *Inverse calculation, mixed units*
- *About 20%*

6) Part 4: reasoning (open ended)

- *Ranking, proving, generalization, decision making*
- *About 15%*

7) Structure of test

- *Session 1: No Calculator(parts 1 + Part 2 + Part 3), 25 – 30 minutes*
- *Session 2: Calculator(parts 3 + Part 4), 25 – 30 minute*
- *Or it could be any part depends upon the content*
- *1 to 2 pages for cover page and achievement standard*

Teaching and Learning: Resources

Book List

1. Year 7 to 9 (Australian Curriculum)
 - a. *Essential Maths* (CAMBRIDGE)
 - b. *CASIO Calculator fx-82AU*
2. Year 10PW1 (Australian Curriculum)
 - a. *Essential Maths 10*(CAMBRIDGE)
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
3. Year 10PW2 (Australian Curriculum)
 - a. *Essential Maths 10* (CAMBRIDGE)
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
4. Year 10 Specialist (10 Australian Curriculum)
 - a. *Essential Maths 10*(CAMBRIDGE)
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
5. Year 11 Essential Maths – Australian Curriculum
 - a. *Maths Essentials Units 1 & 2*, P.Ellery & L. Strickland
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
6. Year 11 Applications – Australian Curriculum
 - a. *Maths Applications Units 1 & 2*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
7. Year 11 Methods – Australian Curriculum
 - a. *Maths Methods Units 1 & 2*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
8. Year 11 Specialist – Australian Curriculum
 - a. *Maths Specialist Units 1 & 2*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
9. Year 12 Essential Maths – Australian Curriculum
 - a. *Maths Essentials Units 3 & 4*, P.Ellery & L. Strickland
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
10. Year 12 Applications – Australian Curriculum
 - a. *Maths Applications Units 3 & 4*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
11. Year 12 Methods – Australian Curriculum
 - a. *Maths Methodss Units 3 & 4*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*
12. Year 12 Specialist – Australian Curriculum
 - a. *Maths Specialist Units 3 & 4*, AJ Sadler
 - b. *CASIO Calculator fx-82AU and ClassPAD II*

Curriculum Offering: Year 11-12-2017

Overview of mathematics courses

There are six mathematics courses, three General and three ATAR. Each course is organized into four units, with Unit 1 and Unit 2 being taken in Year 11 and Unit 3 and Unit 4 in Year 12. The Western Australian Certificate of Education (WACE) examination for each of the three ATAR courses is based on Unit 3 and Unit 4 only. The courses are differentiated, each focusing on a pathway that will meet the learning needs of a particular group of senior secondary students.

Mathematics Preliminary is a General course which focuses on the practical application of knowledge, skills and understandings to a range of environments that will be accessed by students with special education needs. Grades are not assigned for these units. Student achievement is recorded as 'completed' or 'not completed'. This course provides the opportunity for students to prepare for post-school options of employment and further training.

Mathematics Foundation is a General course which focuses on building the capacity, confidence and disposition to use mathematics to meet the numeracy standard for the WACE. It provides students with the knowledge, skills and understanding to solve problems across a range of contexts, including personal, community and workplace/employment. This course provides the opportunity for students to prepare for post-school options of employment and further training.

Mathematics Essential is a General course which focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This course provides the opportunity for students to prepare for post-school options of employment and further training.

Mathematics Applications is an ATAR course which focuses on the use of mathematics to solve problems in contexts that involve financial modelling, geometric and trigonometric analysis, graphical and network analysis, and growth and decay in sequences. It also provides opportunities for students to develop systematic strategies based on the statistical investigation process for answering statistical questions that involve analysing univariate and bivariate data, including time series data.

Mathematics Methods is an ATAR course which focuses on the use of calculus and statistical analysis. The study of calculus provides a basis for understanding rates of change in the physical world, and includes the use of functions, their derivatives and integrals, in modelling physical processes. The study of statistics develops students' ability to describe and analyse phenomena that involve uncertainty and variation.

Mathematics Specialist is an ATAR course which provides opportunities, beyond those presented in the Mathematics Methods ATAR course, to develop rigorous mathematical arguments and proofs, and to use mathematical models more extensively. Mathematics Specialist contains topics in functions and calculus that build on and deepen the ideas presented in the Mathematics Methods course as well as demonstrate their application in many areas. The Mathematics Specialist course also extends understanding and knowledge of statistics and introduces the topics of vectors, complex numbers and matrices. Mathematics Specialist is the only ATAR mathematics course that should not be taken as a stand-alone course.

Curriculum Offering: Year 11-12-2017

Mathematics ATAR Courses: TEA Bonus

Curtin University, Edith Cowan University, Murdoch University and The University of Western Australia have recently announced the introduction of a Tertiary Entrance Aggregate bonus to encourage students to undertake the more challenging Mathematics ATAR course options, Mathematics Methods and Mathematics Specialist.

The bonus will apply to the calculation of the Tertiary Entrance Aggregate (TEA) from 2017 onwards. Ten percent of the final scaled score/s in Mathematics Methods ATAR and Mathematics Specialist ATAR will be added to the TEA, from which the ATAR is derived. Bonuses from both courses may be counted and will apply even if the scaled scores from the courses are not one of the student's best four scores.

*The brochure of University Admission 2018 (for 2017 School Leavers) has been updated to reflect the introduction of the bonus and is now available from the TISC website:
<http://www.tisc.edu.au/static-fixed/guide/slar-2018.pdf>*

Mathematics ATAR Courses: Unacceptable Combination Rules

For 2019, university admission (2018 school leavers), unacceptable combination rules will apply to Mathematics ATAR courses: ☐ Mathematics Applications ATAR and Mathematics Methods ATAR will become an unacceptable combination ☐ Mathematics Applications ATAR and Mathematics Specialist ATAR will also become an unacceptable combination

Only one scaled score from the unacceptable combination can be used in the calculation of the ATAR.

Scores from Mathematics Methods ATAR and Mathematics Specialist ATAR may both be used in the calculation of the ATAR.

MATHEMATICS ESSENTIAL - GENERAL G1MAE/G2MAE

Prerequisite: Nil

Mathematics Essential is a General course which focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This course provides the opportunity for students to prepare for post-school options of employment and further training.

Unit 1 provides students with the skills and understanding to solve problems relating to calculations, use of formulas, measurement and interpretation of graphs. Contexts include Earning and Managing Money and Nutrition and Health.

Unit 2 is concerned with representing and comparing data, percentages, rates and ratios, and time and motion. Contexts are Transport and Independent living.

MATHEMATICS APPLICATIONS - ATAR A1MAA/A2MAA

Prerequisite: C grade in Year 10 Mathematics

Mathematics Applications is an ATAR course which focuses on the use of mathematics to solve problems in contexts that involve financial modelling, geometric and trigonometric analysis, graphical and network analysis, and growth and decay in sequences. It also provides opportunities for students to develop systematic strategies based on the statistical investigation process for answering questions that involve analysing univariate and bivariate data, including time series data.

Unit 1 involves consumer arithmetic, reviews concepts of rate and percentage change in the context of earning and managing money and using spread sheets. Students will use algebra and matrices in real life contexts. Shape and measurement involves concept of similarity and involves calculations with simple and compound geometric shapes.

Unit 2 examines univariate data analysis and statistical investigations will develop students' ability to summarise univariate data. Students examine applications of trigonometry to solve non-right angled triangles in both two and three dimensions, elevation, depression and bearings in navigation. This unit includes linear equations and their graphs, as well as linear-piecewise and step graphs to model practical situations.

MATHEMATICS METHODS - ATAR A1MAM/A2MAM

Prerequisite: B grade in Year 10 Mathematics

Mathematical Methods is an ATAR course which focuses on the use of calculus and statistical analysis. The study of calculus provides a basis for understanding rates of change in the physical world and includes use of functions, their derivatives and integrals in modelling physical processes. The study of statistics develops students' ability to describe and analyse phenomena that involve uncertainty and variation.

Unit 1 involves key concepts of a function and its graph. It includes the study of probability and statistics with the introduction of conditional probability and independence. Students will examine the study of trigonometric functions beginning with the unit circle and the trigonometry of triangles and its applications, degrees and radians.

Unit 2 introduces exponential functions and their properties and graphs. Arithmetic and geometric sequences are examined with recursive definitions applied. Rates and average rates of change are introduced followed by the concept of derivative as an instantaneous rate of change. This first calculus topic concludes with derivatives of polynomial functions, sketching and calculating slopes and equations of tangents, determine velocities and solve optimisation problems.

MATHEMATICS SPECIALIST - ATAR A1MAS/A2MAS

Prerequisite: A grade in Year 10 Mathematics

Mathematics Specialist is an ATAR course which must be selected in conjunction with Mathematical Methods. The Specialist course provides opportunities beyond those presented in Methods course, to develop rigorous mathematical arguments and proofs, and to use mathematical models more extensively.

The course contains topics in functions and calculus that build on and deepen the ideas presented in Methods course. The Specialist course extends understanding of statistics and introduces the topics of vectors, complex numbers and matrices.

Unit 1 involves developing mathematical arguments, Euclidean Geometry, vectors and complex numbers. The topic Combinatorics provides techniques that are useful in many areas of mathematics, including probability and algebra. The topic Vectors in the Plane provides perspectives on working in two dimensions.

Unit 2, Matrices provide new perspectives in two dimensional space and Real and Complex Numbers provides a continuation of the study of numbers.

The topic Trigonometry contains techniques used in Methods. All topics develop students' abilities to construct mathematical arguments. The technique of proof by the principle of mathematical induction is introduced.

Year 11 Assessment

ESSENTIAL (General)

Response (Tests) 50%

Investigations (Practical applications) 50%

ATAR Applications/Methods/Specialist

Response (Tests) 40%

Investigations 20%

Exams 40%

YEAR 12

MATHEMATICS ESSENTIAL - GENERAL GTMAE

Prerequisite: C Grade in Year 11 Essentials

The Mathematics Essential General course focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This course provides the opportunity for students to prepare for post-school options of employment and further training. Mathematics Essential is a General course which focuses on using mathematics effectively, efficiently and critically to make informed decisions. It provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts for a range of workplace, personal, further learning and community settings. This course provides the opportunity for students to prepare for post-school options of employment and further training.

Unit 3 This unit includes the following four topics: ☐ Measurement Scales, plans and models ☐ Graphs in practical situations ☐ Data collection

Unit 4 This unit includes the following three topics: ☐ Probability and relative frequencies ☐ Earth geometry and time zones ☐ Loans and compound interest

MATHEMATICS APPLICATIONS - (ATAR) ATMAA

Prerequisite: C grade in Year 11 Applications

Mathematics Applications is an ATAR course which focuses on the use of mathematics to solve problems in contexts that involve financial modelling, geometric and trigonometric analysis, graphical and network analysis, and growth and decay in sequences. It also provides opportunities for students to develop systematic strategies based on the statistical investigation process for answering questions that involve analysing univariate and bivariate data, including time series data.

Unit 3 contains the three topics: ☐ Bivariate data analysis which introduces students to some methods for identifying, analysing and describing associations between pairs of variables, ☐ Growth and decay in sequences which employ recursion to generate sequences that can be used to model and investigate patterns of growth and decay in discrete situations. ☐ Graphs and networks introduces students to the language of graphs and the way in which graphs, represented as a collection of points and interconnecting lines, can be used to analyse everyday situations, such as a rail or social network. **Unit 3** contains the three topics: ☐ Time series analysis ☐ Loans, investments and annuities ☐ Networks and decision mathematics.

MATHEMATICS METHODS - (ATAR) ATMAM

Prerequisite: C Grade in Year 11 Methods

Mathematical Methods is an ATAR course which focuses on the use of calculus and statistical analysis. The study of calculus provides a basis for understanding rates of change in the physical world and includes use of functions, their derivatives and integrals in modelling physical processes. The study of statistics develops students' ability to describe and analyse phenomena that involve uncertainty and variation.

Unit 3 contains the three topics: Further differentiation and applications Integrals Discrete random variables.

Unit 4 contains the three topics: The logarithmic function Continuous random variables and the normal distribution Interval estimates for proportions.

MATHEMATICS SPECIALIST - (ATAR) ATMAS

Prerequisite: C grade in Year 11 Specialist and must enrol in Mathematical Methods Units 3 & 4.

(Recommended A grade in Year 10 Mathematics)

Mathematics Specialist is an ATAR course which must be selected in conjunction with Mathematical Methods. The Specialist course provides opportunities beyond those presented in Methods course, to develop rigorous mathematical arguments and proofs, and to use mathematical models more extensively.

The course contains topics in functions and calculus that build on and deepen the ideas presented in Methods course. The Specialist course extends understanding of statistics and introduces the topics of vectors, complex numbers and matrices.

Unit 3 contains the three topics: 3.1 Complex numbers 3.2 Functions and sketching graphs 3.3 Vectors in three dimensions

Unit 4 contains the three topics: 4.1 Integration and applications of integration 4.2 Rates of change and differential equations 4.3 Statistical inference

All topics develop students' abilities to construct mathematical arguments. The technique of proof by the principle of mathematical induction is introduced.

Year 12 Assessment

ESSENTIAL (General)

Response (Tests) 40%

Investigations (Practical applications) 45%

Externally Set Task 15%

ATAR Applications/Methods/Specialist

Response (Tests) 40%

Investigations 20%

Exams 40%

Assessment & Reporting: Year 12-2017

Assessment

School-based assessment

- Response: Assignments, Tests or Examinations
- Investigation

WACE examination details

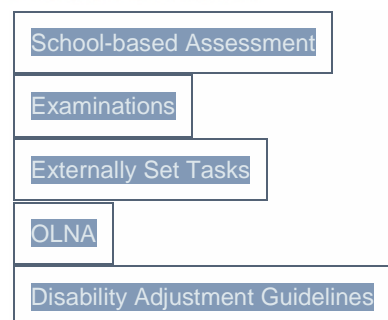
*All students who have studied unit 3 and 4 in their final year will sit an external examination.
There will be four external examinations in year 12 for the Mathematics courses:*

- **Mathematics Specialist Mathematics**
- **Mathematics methods** in Mathematics
- **Mathematics Applications** in Mathematics

Each examination will consist of two sections

- *a resource free and calculator-free section (notes are not allowed)*
- *a resource rich and calculator-assumed section (notes are allowed).*

Assessment



Please see the scsa.wa.edu.au website for details

School-based Assessment

School-based assessment tasks are developed by teachers and are required to meet the requirements of the syllabus for the course. These tasks are conducted by teachers in accordance with the school's senior secondary assessment policy. The Authority provides advice to assist schools in developing and/or reviewing their policy. See Section 2.3.1 of the [WACE Manual 2017](#).

A sample policy is provided [here](#).

At the end of a unit or pair of units, aggregate marks are used to produce a rank list of the students. The teacher uses the grade descriptions for the course/stage to assign a grade (A, B, C, D or E) to each student. Each course page provides the grade descriptions and annotated student work samples under the grading heading.

The Authority also provides [seminars/workshops](#) to assist teachers.

Year 12 students studying a Year 12 pair of ATAR course units and who sit the ATAR course examination will also receive a school mark out of 100 for each unit. For courses with a practical (oral/interview, performance, production or portfolio) examination in addition to a school mark out of 100, schools are required to provide a mark out of 100 for the written component and a mark out of 100 for the practical component.

Details about school-based assessment students in Year 11 and Year 12 are provided in Section 2 of the [WACE Manual 2017](#).

Authority moderation process

The Authority uses several methods to moderate school-based assessments to provide comparability between schools. Details of these methods are provided on the moderation page of the website and in Section 3 of the WACE Manual 2017.

Where the number of WACE examination candidates in an ATAR course examination group 2017 at a school is fewer than six, the school is required to form a partnership with another school/s. Information about this requirement is provided on the small group moderation page of the website and in Section 3.6 of the WACE Manual 2017.

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The Western Australian Certificate of Education (WACE) Manual contains essential information on principles, policies and procedures for school-based assessment that needs to be read in conjunction with this syllabus.

Teachers design school-based assessment tasks to meet the needs of students. The table below provides details of the assessment types for the Mathematics Methods ATAR Year 12 syllabus and the weighting for each assessment type.

Teachers are required to use the assessment table to develop an assessment outline for the pair of units.

The assessment outline must:

- include a set of assessment tasks
- include a general description of each task
- indicate the unit content to be assessed
- indicate a weighting for each task and each assessment type
- include the approximate timing of each task (for example, the week the task is conducted, or the issue and submission dates for an extended task).

In the assessment outline for the pair of units

- each assessment type must be included at least twice
- the response type must include a minimum of two tests.

The set of assessment tasks must provide a representative sampling of the content for Unit 3 and Unit 4.

Assessment tasks not administered under test/controlled conditions require appropriate validation/authentication processes. This may include observation, annotated notes, checklists, interview, presentations or in-class tasks assessing related content and processes.

Grading

Schools report student achievement in terms of the following grades:

Grade	Interpretation
A	Excellent achievement
B	High achievement
C	Satisfactory achievement
D	Limited achievement
E	Very low achievement

The teacher prepares a ranked list and assigns the student a grade for the pair of units. The grade is based on the student's overall performance as judged by reference to a set of pre-determined standards. These standards are defined by grade descriptions and annotated work samples. The grade descriptions for the Mathematics Methods ATAR Year 12 syllabus are provided in Appendix 1. They can also be accessed, together with annotated work samples, through the Guide to Grades link on the course page of the Authority website at www.scsa.wa.edu.au

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To be assigned a grade, a student must have had the opportunity to complete the education program, including the assessment program (unless the school accepts that there are exceptional and justifiable circumstances).

Refer to the WACE Manual for further information about the use of a ranked list in the process of assigning grades.

Examinations

ATAR course examinations are developed and conducted for all Year 12 ATAR courses. Year 12 students who are enrolled in Units 3 and 4 of an ATAR course are required to sit the ATAR course examination.

There are both written and practical examinations for some ATAR courses.

ATAR course examinations complement and support school assessment in the following ways:

a student receives an ATAR course report for each ATAR course examination completed

teachers receive diagnostic feedback from the ATAR course examinations to help them review and refine their teaching

generate an ATAR for university admissions purposes

employers and training organisations have access to meaningful and comparable data.

ATAR

An Australian Tertiary Admission Rank (ATAR) is calculated using the school assessment and WACE examination results combined.

See [TISC](#) for more information.

To complete the student permission online go to <https://www.wace.wa.edu.au> and follow the login instructions.

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Externally Set Tasks

All students enrolled in a General Year 12 course and/or a Foundation Year 12 course are required to complete the externally set task (EST) developed by the Authority for that course. The EST is compulsory and forms part of the school-based assessment and is included as a separate assessment type with a weighting of 15% for the pair of units.

The ESTs are administered in schools during designated weeks in Term 2 under standard test conditions. The EST will take 50 minutes. The Authority informs schools during Term 3, in the previous year, of the Unit 3 syllabus content on which the task will be based. This notification will enable schools to ensure that the identified content is taught prior to the administration of the EST. The ESTs are marked by teachers in each school using a marking key provided by the Authority.

Detailed information about EST is provided in the [Externally Set Tasks Handbook](#).

Information about disability adjustments can be found in the [Guidelines for disability adjustments for timed assessments](#).

[2017 EST Year 12 General and Foundation links to all courses](#)

[2017 EST course specific advice](#)

All of the OLN section is covered by the documents in the lever arch folder. This document will need to be updated to Version 3 once those changes are made.

[2017 Externally Set Tasks total marks](#)

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Other Diagnostic Tests and competitions for year 7-12

ACER Diagnostic Tests for Year 7 to 10 Cohorts

The year 7 to 10 cohorts are required to do the ACER diagnostic PAT math tests twice a year. First in term 1 and the second in term 4. Teachers analyze student progress gleaned from ACER's on line report and the data is used to improve student's learning.

UNSW ICAS Math Competition

Year 7 to 12 students are encouraged to participate in the UNSW math Competition. This gives them the opportunity to rank with students from other states.

AMT CAT Math Competition

Year 7 to 12 students are encouraged to participate in the CAT math Competition. This gives them the opportunity to rank with students from other states.

AMT challenge stage

Year 7 to 10 students are encouraged to participate in the AMT Challenge stage.