 Year 11 and 12 Mathematics Advanced and Extension 1 – scope and sequence (sample 1)

All outcomes referred to in this unit come from the [Mathematics Advanced](http://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-advanced-2017) and [Mathematics Extension](https://www.educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-extension-1-2017) 1 Syllabuses

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| **Term 1** | **Week 1** | **Week 2** | **Weeks 3-6** | **Weeks 7-8** | **Weeks 9-10** |
| ****Unit**** | MA-F1.1  Algebraic techniques | ME-F1.2  Inequalities | MA-F1.2-1.4  Working with functions | ME-F2  Polynomials | MA-C1  Introduction to differentiation |
| ****Outcomes**** | MA11-1,  MA11-2,  MA11-8,  MA11-9 | ME11-1,  ME11-2,  ME11-6,  ME11-7 | MA11-1, MA11-2, MA11-8, MA11-9 | ME11-1, ME11-2, ME11-6, ME11-7 | MA11-1, MA11-5, MA11-8, MA11-9 |
| ****Mathematics Advanced assessment**** |  |  |  | Topic test (week 7) |  |
| ****Mathematics Extension 1 assessment**** |  |  |  |  | Topic test (week 9) |

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| **Term 2** | **Week 1** | **Weeks 2-3** | **Week 4** | **Week 5** | **Weeks 6-7** | **Week 8** | **Week 9-10** |
| ****Unit**** | MA-C1  Introduction to differentiation | MA-T1  Trigonometry and measure of angles | ME-C1.1  Rates of change with respect to time | ME-F1.1  Graphical relationships | MA-T2  Trigonometric functions and identities | ME-T2  Further trigonometric identities | MA-S1  Probability and discrete probability distributions |
| ****Outcomes**** | MA11-1, MA11-5, MA11-8, MA11-9 | MA11-1, MA11-3, MA11-8, MA11-9 | ME11-1, ME11-4, ME11-6, ME11-7 | ME11-1, ME11-2, ME11-6, ME11-7 | MA11-1, MA11-4, MA11-8, MA11-9 | ME11-1, ME11-3, ME11-6, ME11-7 | MA11-7, MA11-8, MA11-9 |
| ****Mathematics Advanced assessment**** |  | Assignment – how are outdoor concert spaces designed? (weeks 3-5) |  |  |  |  |  |
| ****Mathematics Extension 1 assessment**** |  |  | Assignment – can speed be measured perfectly?  (weeks 6-7) |  |  |  |  |

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| **Term 3** | **Week 1** | **Weeks 1-3** | **Week 3** | **Weeks 4-6** | **Weeks 7-8** | **Week 8** | **Weeks 9-10** |
| ****Unit**** | MA-S1  Probability and discrete probability distributions | ME-A1  Combinatorics | ME-F1.4  Parametric form | MA-E1  Logarithms and exponentials | ME-C1.2  Exponential growth and decay | ME-C1.3  Related rates of change | Examination period |
| ****Outcomes**** | MA11-7, MA11-8, MA11-9 | ME11-5, ME11-6, ME11-7 | ME11-1, ME11-2,  ME11-6, ME11-7 | MA11-6, MA11-8, MA11-9 | ME11-1, ME11-4, ME11-6, ME11-7 | ME11-1, ME11-4, ME11-6, ME11-7 |  |
| ****Mathematics Advanced assessment**** |  |  |  |  |  |  | Yearly examination |
| ****Mathematics Extension 1 assessment**** |  |  |  |  |  |  | Yearly examination |

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| **Term 4** | **Week 1** | **Week 2** | **Weeks 3-4** | **Weeks 4-5** | **Weeks 5-7** | **Weeks  7-8** | **Weeks  8-9** | **Weeks 9-10** |
| ****Unit**** | ME-F1.3 Inverse functions | ME-T1  Inverse trigonometric functions | MA-F2  Graphing techniques | MA-C2.1  Differentiation of trigonometry, exponential and logarithmic functions | MA-C2.2  Rules of differentiation | MA-C4.1  The anti-derivative | ME-V1.1  Introduction to vectors | ME-V1.2  Further operations with vectors |
| ****Outcomes**** | ME11-1, ME11-2, ME11-6, ME11-7 | ME11-1, ME11-3, ME11-6, ME11-7 | MA12-1, MA12-9, MA12-10 | MA12-3, MA12-6, MA12-9, MA12-10 | MA12-3, MA12-6, MA12-9, MA12-10 | MA12-3, MA12-7, MA12-9, MA12-10 | ME12-2, ME12-6, ME12-7 | ME12-2, ME12-6, ME12-7 |
| ****Mathematics Advanced assessment**** |  |  |  |  |  |  |  | Topic test  (week 9) |
| ****Mathematics Extension 1 assessment**** |  |  |  |  |  |  |  | Topic test  (week 10) |

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| **Term 1** | **Weeks 1-2** | **Weeks 2-3** | **Weeks 4-5** | **Weeks  5-6** | **Weeks 6-7** | **Week 8** | **Weeks 9-10** |
| ****Unit**** | ME-P1  Proof by Mathematical Induction | MA-C3.1  The first and second derivatives | MA-C3.2  Applications of the derivative | MA-C4.2  Areas and the definite integrals | ME-C2  Further calculus skills | ME-C3.1  Further area and volumes of solids of revolution | MA-T3  Trigonometric functions and graphs |
| ****Outcomes**** | ME12-1, ME12-6, ME12-7 | MA12-3, MA12-6, MA12-9, MA12-10 | MA12-3, MA12-6, MA12-9, MA12-10 | MA12-3, MA12-7, MA12-9, MA12-10 | ME12-1, ME12-4, ME12-6, ME12-7 | ME12-1, ME12-4, ME12-6, ME12-7 | MA12-1, MA12-5, MA12-9, MA12-10 |
| ****Mathematics Advanced assessment**** |  |  |  |  |  |  | Assignment - can mathematics predict periodic phenomena? |
| ****Mathematics Extension 1 assessment**** |  |  |  |  |  |  | Topic test (week 10) |

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| **Term 2** | **Weeks 1-2** | **Weeks  2-3** | **Weeks 3-4** | **Weeks 5-6** | **Weeks  6-7** | **Weeks 7-8** | **Weeks 9-10** |
| ****Unit**** | ME-T3  Trigonometric equations | ME-C3.2  Differential equations | ME-V1.3  Projectile motion | MA-S2.1  Data (grouped and ungrouped) and summary statistics | MA-S2.2 Bivariate data analysis | MA-S3.1  Continuous random variables | MA-S3.2  The normal distribution |
| ****Outcomes**** | ME12-3, ME12-6, ME12-7 | ME12-1, ME12-4, ME12-6, ME12-7 | ME12-2, ME12-6, ME12-7 |  | MA12-8, MA12-9, MA12-10 | MA12-8, MA12-9, MA12-10 | MA12-8, MA12-9, MA12-10 |
| ****Mathematics Advanced assessment**** |  |  |  |  |  |  | Topic test  (week 10) |
| ****Mathematics Extension 1 assessment**** |  |  | Assignment - If you could jump on another planet, how far would you leap? |  |  |  |  |

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| **Term 3** | **Weeks 1-2** | **Week 2** | **Week 3** | **Weeks  3-4** | **Weeks 5-6** | **Weeks 7-8** | **Weeks 8-9** | **Week 10** |
| ****Unit**** | ME-S1.1  Bernoulli and binomial distributions | ME-S1.2  Normal approximation for the sample proportion | MA-M1.1  Modelling investments and loans | MA-M1.2  Arithmetic sequences and series | Trial examination period | MA-M1.3  Geometric sequences and series | MA-M1.4  Financial applications of sequences and series |  |
| ****Outcomes**** | ME12-5, ME12-6, ME12-7 | ME12-5, ME12-6, ME12-7 | MA12-2, MA12-4, MA12-9, MA12-10 | MA12-2, MA12-4, MA12-9, MA12-10 |  | MA12-2, MA12-4, MA12-9, MA12-10 | MA12-2, MA12-4, MA12-9, MA12-10 |  |
| ****Mathematics Advanced assessment**** |  |  |  |  | Trial examination |  |  |  |
| ****Mathematics Extension 1 assessment**** |  |  |  |  | Trial examination |  |  |  |

# **Note to staff**

* This sample scope and sequence is designed to incorporate the department sample year 11 assessment tasks “How are outdoor concert spaces designed?” for Mathematics Advanced and “Can speed be measured perfectly?” for Mathematics Extension 1 as well as the Year 12 assessment tasks “Can mathematics predict periodic phenomena?” for Mathematics Advanced and “If you could jump on another planet, how far would you leap?” for Mathematics Extension 1. You can find these assessment tasks on the [Mathematics Advanced](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/mathematics/stage-6/mathematics-advanced) and [Mathematics Extension 1](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/mathematics/stage-6/mathematics-extension-1) pages respectively on the department website.
* The assessments included in this scope and sequence are suggestions only. You can find other sample assessment tasks on the [Mathematics Advanced](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/mathematics/stage-6/mathematics-advanced) and [Mathematics Extension 1](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/mathematics/stage-6/mathematics-extension-1) pages of the department website or on the [Mathematics Advanced (NEW)](https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-advanced-2017) or [Mathematics Extension 1 (NEW)](http://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-extension-1-2017) pages of the NESA website.
* The duration of each unit is approximate and will need to be adapted to suit the needs of the students within your school context. The lessons developed within each unit of work have been designed to explore a key concept or main idea. The length of each lesson and number of lessons assigned to each concept will vary between school contexts and should be adapted to suit your school scope and sequence and program.