 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-F1.2Inequalities | MA-F1.2-1.4Working with functions | ME-F2 Polynomials | MA-C1Introduction 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-C1Introduction to differentiation | MA-T1Trigonometry and measure of angles | ME-C1.1 Rates of change with respect to time | ME-F1.1Graphical relationships | MA-T2Trigonometric functions and identities | ME-T2Further 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-F1.4Parametric form | MA-E1 Logarithms and exponentials  | ME-C1.2Exponential growth and decay | ME-C1.3Related 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-F1.3Inverse functions | ME-T1Inverse trigonometric functions | MA-F2Graphing techniques | MA-C2.1Differentiation of trigonometry, exponential and logarithmic functions | MA-C2.2Rules of differentiation | MA-C4.1The anti-derivative  | ME-V1.1Introduction to vectors | ME-V1.2Further 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-P1Proof by Mathematical Induction  | MA-C3.1The first and second derivatives | MA-C3.2Applications of the derivative | MA-C4.2Areas and the definite integrals | ME-C2Further calculus skills | ME-C3.1Further area and volumes of solids of revolution | MA-T3Trigonometric 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-T3Trigonometric equations | ME-C3.2Differential equations | ME-V1.3Projectile motion | MA-S2.1Data (grouped and ungrouped) and summary statistics | MA-S2.2 Bivariate data analysis | MA-S3.1Continuous random variables  | MA-S3.2The 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-S1.1Bernoulli and binomial distributions | ME-S1.2Normal approximation for the sample proportion  | MA-M1.1Modelling investments and loans | MA-M1.2Arithmetic sequences and series | Trial examination period | MA-M1.3Geometric sequences and series | MA-M1.4Financial 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.