Level 4 Course Outline

Unit 1

1 **Tolerance and Accuracy (Include Sig. Fig.'s) MNU 4-01a, 4-11a**

- I can round to any number of significant figures.
- I am aware that error and inaccuracy rounding can be caused by inappropriate rounding for the context.
- I can explain the meaning of tolerance in measure.
- I can use and interpret the notation for tolerance.
- I can identify the upper and lower bounds of a single measurement.
- I can discuss why some occupations rely on an increased level of accuracy when rounding.

2 **Volume and nets of 3D Shapes MTH 4.11b, MTH 4.11c**

- I can explain what a net is.
- I can draw a net of a simple 3D object.
- I can explain what the surface area of a 3D object is.
- I can calculate the surface area of simple 3D objects.
  [cube, cuboid, triangular prism, cylinders]
- I can recognise and name prisms.
- I can find the volume of a prism, including cuboid, triangular prism and compound prisms made of these.
- I can calculate the volume of a pyramid, cone and sphere. (N5)
- I can apply my knowledge of volume to solve basic problems.
  (working backwards etc covered in National 5)

3 **Time Management MTH 4.10a**

- I can discuss why time management is important in my life and the way it may impact on my decision making.
- I can work within the parameters of time in life.
- I can recognise that my decisions impact on others.

4 **Raw data** **MNU 4-20a** **MTH 4-21a**

(Revision of scattergraphs, pie charts, stem and leaf and averages for N4 students)

- I can work complete pie chart questions without the use of a calculator.
- I can write a five figure summary and calculate SIQR or IQR.
- I can calculate SIQR and IQR and make valid comparisons between median and range.
- I can evaluate data in raw and graphical form.
- I can interpret data in raw and graphical form.
- I can consider many factors when interpreting data.
- I can communicate my findings in context.
- I can group data into class intervals, choosing the size of the class intervals. (standard deviation covered in N5).

5 **Probability** **MNU 4-22a**

- I can use probability to predict how likely an event is to occur.
- I can calculate how many times I expect an event to occur.
- I can use my information about expectation to make informed choices and decisions.
- I can compare sets of data using probability (fractions N5 and decimal N4).

6 **Straight Line (y = mx + c and gradient)**
MTH 4-13b, MTH 4-13c, MTH 4-13d

- I can find the equation of a horizontal/vertical line.
- I can construct a table of values to help draw a straight line.
- I can draw and label axes for my graph.
- I can plot points and join them up to make a straight line.
- I can use my graph to answer related questions.

Unit 2

7 **Rearranging Formulae (N5 Intro.)**

- I can change the subject of a linear formula.
- I can change the subject of a function involving fractions.
- I can change the subject of a function involving powers.

8 **Trigonometry MTH 4.16a**

- I can label the hypotenuse, opposite and adjacent sides of a right-angled triangle.
- I know the trig ratios using SOHCAHTOA.
- I can find the size of an angle in a right-angled triangle using trigonometry.
- I can find the length of a side in a right-angled triangle using trigonometry: Simple case (x is the numerator), Advanced case (x is the denominator).
- I can use trigonometry to solve side and angle problems for right-angled triangles.

9 **Circle and Angles MTH 4.17a Credit Bk1**
(Recap parallel lines for N4 candidates.)

- I can identify and draw a tangent to a circle.
- I can identify the right angle where a tangent meets a radius (and tangent kite).
- I can create a right-angled triangle using a radius, tangent and another line.
- I can create a triangle within a semi-circle.
- I can label the right angle in a triangle in a semi-circle.
- I can use the different properties of circles to calculate missing angles.

Extension (Right-angled Triangles in circles & tangents etc)

10 **Proportion MNU 4.08a Credit Bk2**

- I can recognise quantities which are in direct proportion.
- I can carry out calculations involving quantities in direct and indirect proportion.
- I can draw and recognise graphs of quantities that are in direct and indirect proportion.

11 **Famous Mathematicians Presentation MTH 4.12a**

12 **Dilation & similar Figures MTH 4.17b (MIAs1^3)**

- I can identify similar and congruent figures.
- I can identify corresponding sides in a pair of similar shapes.
- I can understand how to use the scale factor.
- I can calculate the scale factor for a pair of similar shapes.
- I can use the scale factor to find unknown sides.
- I can calculate the area factor for a pair of similar figures.
- I can find the unknown area for a pair of similar figures.
- I can find the unknown volume for a pair of similar figures.
  (Similar triangles and working backwards covered in N5).

Unit 3

13 **Angles in Polygons**

- I can find the exterior and interior angles of regular polygons
- I know that angles inside a quadrilateral add to 360^0.
- I can use my angle knowledge to find missing angles within shapes.

14 **Transformations MTH 4-18b**

- I can identify the image of transformation.
- I can reflect points in a given line.
- I can draw a line of reflection for a point/shape given the points and their image.
- I can give the coordinates of a point/shape after reflection.
- I can translate a point/shape given instructions.
- I can give the coordinates of a point/shape after translation.
- I can rotate a point/ shape given the direction and angle of rotation.
- I can give the coordinates of a point/shape after rotation.

15 **Percentages MNU 4-07a**

- I can use compound interest to find the amount of interest over a repeated period of time.
- I can work backwards to find the initial value.

16 **Scientific Notation & Indices MTH 4-06a**

- I can use scientific notation in calculator questions.
- I can understand the relation between powers and roots.
- I can find the square root (and cube root) of numbers mentally.
- I can recognise and interpret the notation for the nth root and use my calculator to find the n^{th} root.
- I know that $a^0 = 1$ (a can be any number except zero).
- I can multiply two indices together using the multiplication rule.
- I can divide two indices using the divison rule.

17 **Equations with fractions MTH 4-15a**

- I can construct equations to model real life situations.
- I can use inequalities to model real life situations.
- I can solve equations and inequalities using a suitable method (including fractions).

18 **Intro. To graphs of quadratic functions**
(Sketching a graph given a table of values)

- I can use a table of values to find y-coordinates for given x-coordinates.
- I can choose appropriate x-coordinates for my table of values.
- I know that a quadratic is an expression involving a squared term as its highest power.
- I know the general shape of the graph of a quadratic function.

Covered in Level 3 course:
MTH 4-03b (BODMAS)
MTH 4-06b (Scientific notation)
MTH 4-07b (Fractions operations)
MNU 4-09a, MNU4-09b, MNU 4-09c (Financial Maths)
MNU 4-10b (DST - decimal times)
MTH 4-13a (Linear Number Patterns)
MTH 4-14a (Multiplying out brackets and evaluating algebraic expressions)
MTH 4-14b (Factorising by common factor)
MTH 4-16b (Area and circumference of a circle)
MTH 4-19a (Rotational symmetry)
MTH 4-18a (Coordinates)
MTH 4-20b (Finding averages and range)