Mathematics Applications and Interpretations.

Syllabus outline (chronological)

1. Numbers and algebra
    - Number sets
    - Approximations and error
    - Standard form
    - SI units of measurement
    - Arithmetic sequences and applications
    - Geometric sequences and applications
    - Powers and basic logarithms
    - Currency conversions
    - Compound interest
    - Loans

2. Functions
    - Functions as models
        - Domain, range, inverse function, limitations
        - Sketching functions
    - Linear models
        - Equations of straight lines
        - m, c and the intercepts with the axis
    - Quadratic models
    - Exponential models
    - Polynomic models
    - Solving equations with calculator

3. Calculus
    - Slope and rate of change
    - Gradient at a given point and between two points
    - Basic differentiation
    - Meaning of the derivative function
    - Tangent and normal to a curve
    - Maximum and minimum
    - Optimization

4. Statistics
    - Basic statistical concepts (sample, average, median, range, dispersion...)
        - Sample, population, average/mean, median, range
        - Dispersion, variance, standard deviation, relative standard deviation.
    - Describing statistically a simple set of data
        - Statistical report in one variable
    - Larger sets and frequency tables
        - Meaning and purpose of frequency tables
        - Calculating statistics with frequency tables
    - Describing statistically a large set of data
        - Quartiles and box-and-whisker diagrams
        - Percentiles and cumulative frequency
        - Histogram
    - Natural statistic distributions: the normal distribution
    - 2-variable statistics

- Scatter diagrams
- Correlation, regression and Pearson's coefficient
- Deviations and chi-squared test

5. Probability
   - Basic concepts: trial, outcome, sample space, event, complementary events and probability.
   - Calculating probability and expected number of occurrences.
   - Combined events, mutually exclusive events, independent events (Venn diagrams)
   - Conditional probability and Bayes' theorem
   - Discrete probability distributions and the statistics that can be done with them.
   - Continuous probability distributions (basic)
   - Normal distribution and the statistics that can be done with it.
   - Hypothesis, p-value and chi-squared test

6. Geometry and trigonometry
   - Basic trigonometry review
     - Similar triangles
     - Trigonometric ratios
     - Angles of elevation and depression
   - Sine and cosine rule
   - Trigonometry and the circle
   - Trigonometry and the slope
   - Three-dimensional basics
     - Distance between two points
     - Middle point
   - Angle between two straight lines or between line and plane
   - Surface area of three-dimensional solids
   - Volume of three-dimensional solids