MATHEMATICS

Grades 10 and 11

RATIONALE:

The curriculum framework is geared towards preparing students to sit the International General Certificate of Secondary Education (IGCSE) examinations in extended Mathematics in Grade 11. The bulk of the work should be completed in Grade 10 to allow adequate time for revision and examination practice from past IGCSE papers.

The Mathematics curriculum encourages the student to develop intellectual curiosity, critical thinking skills and creativity. An enquiry based and interactive approach to instruction will be used as the abilities to be assessed cover a single objective "technique with application".

The content to be covered includes topics involving arithmetic, algebra, geometry, functions, statistics and probability. Students will be expected to apply this knowledge and will be tested on how well the following objectives have been grasped:

- Organizing, interpreting and presenting information accurately in written, tabular graphical and diagrammatic forms.
- Performing calculations by suitable methods
- Using an electronic calculator
- Understanding systems of measurement in everyday use and making use of them in the solution of problems
- Estimating, approximating and working to degrees of accuracy appropriate to the context
- Using mathematical and other instruments to measure and to draw to an acceptable degree of accuracy.
- Interpreting, transforming and making appropriate use of mathematical statements expressed in words or symbols.
- Recognizing and using spatial relationships in two and three dimensions, particularly in solving problems.
- Recalling, applying and interpreting mathematical knowledge in the context of everyday situations
- Making logical deductions from given mathematical data
- Recognizing patterns and structures in a variety of situations, and form generalizations
- Responding to a problem relating to a relatively unstructured situation by translating it into an appropriately structured form.
- Analysing a problem, select a suitable strategy and apply an appropriate techniques to obtain its solution
- Applying combinations of mathematical skills and techniques in problem solving.
- Setting out mathematical work, including the solution of problems, in a logical and clear form using appropriate symbols of terminology.

Though the aims and objectives of the course are general for every student, this course embraces two curricula – Core and Extended. Initially, all students will be introduced to the Extended curriculum, unless advised otherwise.

REQUIRED TEXT:

Cambridge IGCSE International Mathematics (0607) Extended (Haese & Harris) Grade 10

OR

Extended Mathematics for IGCSE (David Rayner) Grade 10

OR

Cambridge IGCSE International Mathematics (0607) Core (Haese & Harris) Grade 10

Extended Mathematics for IGCSE (David Rayner) Grade 11

REQUIRED MATERIAL FOR CLASS:

Notebook, Folder Paper, Graph Paper, Pens & Pencils, Sharpener, Eraser, Geometry set and a scientific calculator.

NB: Graphing calculators are NOT permitted in exams

GRADE 10 – TERM 1	
TOPIC	CONTENT/ LEARNING OUTCOMES
UNIT 1 ALGEBRA 1	• Introduction (REVISION) –definition, order of operations, the four basic operations. • Review of H.C.F. grouping distributive law, factorizing, algebraic fractions and expressions. • Solving equations with unknown in the index. • Solving linear equations and inequations including worded problems. • Solving quadratics using formula and by completing the square.
UNIT 2 VARIATION	• Direct variation • Indirect variation
UNIT 3 FUNCTIONS, RELATIONS & GRAPHS	• Function notation • Computations, inverse and composite functions • Table of values • Review of drawing and interpreting linear graphs • Introduction to different types of graphs – quadratics, cubic, reciprocal, exponential, kinematics • Draw and interpret graphs – gradient, distance travelled, +/- acceleration, turning points • Solving linear and quadratic equations graphically

GRADE 10 –TERM 2	
UNIT 4 MENSURATION	• Review areas of plane shapes • Find areas of triangles – using semi-perimeter formula and the sine formula • Volume and Surface areas of Solids • Solve Problems involving length of arcs and areas of sectors
UNIT 8 LOCUS	• Locus of a point • Intersecting Loci of a set of points in 2-D o At a given distance from a given point o At a given distance from a given straight line. o Equidistant from two given points o Equidistant from two given intersecting straight lines.
GRADE 10 - TERM 3	
UNIT 7 TRIGONOMETRY	• Revision: Pythagoras, Trig ratios, angle of elevation and depression • Bearings • Sine and Cosine rules • Area of triangle using ½ ab sin C • Solve simple trigonometrical problems in three dimensions including angle between a line and a plane
UNIT 6 MATRICES	• Types of Matrices • Matrix operations • Inverse Matrices • Determinants
GRADE 11 –TERM 1	
UNIT 3 STATISTICS	• Collect, classify and tabulate data • Read, interpret and draw simple inferences from tables and statistical diagrams • Construct and use pie charts, pictograms, simple frequency distributions, histograms with equal and unequal intervals • Scatter Diagrams and Correlation • Calculate mean, mode and median for individual and discrete data, grouped and continuous data and distinguish between their purpose and the averages. • Calculate range • Construct and use cumulative frequency diagrams • Estimate median, percentiles, quartiles and inter-quartiles • Identify modal class from grouped frequency distribution • SIMPLE PROBABILITY o Scale 0 to 1 o Certain and impossibility

	○ Practical probability • Calculate simple probability of events and combined events • Probability trees and grids.
UNIT 1 TRANSFORMATIONS	• Perform: ○ Translation given translation vector ○ Reflection given the mirror line. ○ Rotation given centre, direction and angle of rotation ○ Enlargement given scale factor and centre of enlargement. • Identify and describe simple transformations and their combinations • Transformation using matrices
UNIT 2 VECTORS	• Represent vectors graphically using directed line segment • Add and subtract vectors geometrically and algebraically • Multiply a vector by a scalar • Calculate the magnitude of a vector • Represent position vectors geometrically and use algebraically • Vector Diagrams
Grade 11- Term 2	
UNIT 6 LINEAR PROGRAMMING	• Graphing inequalities • Using graphs to solve simple linear programming problems • Convention – use broken lines for strict inequalities and shading unwanted regions
REVISION AND PAST PAPERS PRACTICE	REVISION OF ALL TOPICS PAST PAPER DRILLS AND MOCK EXAMS