Dawood Public School
Course Outline 2017-18
Mathematics
Class IX

Books:

Seng, T.et al, 2006, New Syllabus Mathematics 1(6th Edition), Singapore; Oxford University Press Seng, T.et al, 2006, New Syllabus Mathematics 2(6th Edition), Singapore; Oxford University Press Seng, T.et al, 2008, New Syllabus Mathematics 3(6th Edition), Singapore; Oxford University Press

Introduction

This syllabus provides a comprehensive set of progressive learning objectives for mathematics. The objectives detail what the learner should know or what they should be able to do in each year of education. The learning objectives provide a structure for teaching and learning and a reference against which learners' ability and understanding can be checked.

This syllabus designed to promote continuity, coherence and progression within the study of Mathematics. The syllabus builds on the knowledge, understanding and skills developed within the Key Stage of Study for Mathematics.
This syllabus has been designed to meet the requirements of the GCSE regulations.

In studying a course based on this specification, students should be encouraged to make appropriate use of Information and Communications Technology (ICT), for example, spreadsheets and databases.

It has been designed to be as free as possible from ethnic, gender, religious, political or other forms of bias.

Cambridge O level Mathematics (Syllabus D) Syllabus Code 4024 Assessment:
All candidates take two papers.
Each paper may contain questions on any part of the syllabus and questions will not necessarily be restricted to a single topic.

Paper 1	**2 hours**
Paper 1 has approximately 25 short answer questions. Candidates should show all working in the spaces provided on the question paper. Essential working must be shown for full marks to be awarded. No calculators are allowed for this paper.	
	80 marks
This paper will be weigh**ted at 50% of the total qualifi**cation.	

Paper 2	**2 hours 30 minutes**
Paper 2 has approximately 11 structured questions. Candidates should answer all questions. Electronic calculators may be used and candidates should have access to a calculator for this paper. Candidates should show all working in the spaces provided on the question paper. Essential working must be shown for full marks to be awarded.	
	100 marks
This paper will be weighted at 50% of the total qualification	

Assessment at a Glance

Calculating aids:

Paper 1 – the use of all calculating aids is prohibited.
Paper 2 – all candidates should have a silent electronic calculator. A scientific calculator with trigonometric functions is strongly recommended.
Unless stated otherwise within an individual question, three figure accuracy will be required. This means that four figure accuracy should be shown throughout the working, including cases where answers are used in subsequent parts of the question. Premature approximation will be penalised, where appropriate.
In Paper 2, candidates with suitable calculators are encouraged to use the value of π from their calculators.
The value of π will be given as 3.142 to 3 decimal places for use by other candidates. This value will be given on the front page of the question paper only.

Units

SI units will be used in questions involving mass and measures: the use of the centimetre will continue. Both the 12-hour clock and the 24-hour clock may be used for quoting times of the day. In the 24-hour clock, for example, 3.15 a.m. will be denoted by 03 15; 3.15 p.m. by 15 15, noon by 12 00 and midnight by 24 00.

Students will be expected to be familiar with the solidus notation for the expression of compound units, e.g. 5 cm/s for 5 centimetres per second, 13.6 g/cm3 for 13.6 grams per cubic centimetre.

Mathematical Instruments

Apart from the usual mathematical instruments, candidates may use flexi curves in this examination.

Syllabus Aims and Assessment:

The syllabus demands understanding of basic mathematical concepts and their applications, together with an ability to show this by clear expression and careful reasoning.

In the examination, importance will be attached to skills in algebraic manipulation and to numerical accuracy in calculations.

Aims

The course should enable students to:
- develop their mathematical knowledge and oral, written and practical skills in a manner which encourages confidence;
- read mathematics, and write and talk about the subject in a variety of ways;
- develop a feel for number, carry out calculations and understand the significance of the results obtained;
- apply mathematics in everyday situations and develop an understanding of the part which mathematics plays in the world around them;
- solve problems, present the solutions clearly, check and interpret the results;

- develop an understanding of mathematical principles;
- recognise when and how a situation may be represented mathematically, identify and interpret relevant factors and, where necessary, select an appropriate mathematical method to solve problems;
- use mathematics as a means of communication with emphasis on the use of clear expression;
- develop the abilities to reason logically, to classify, to generalise and to prove;

Assessment objectives:

The examination tests the ability of candidates to:
- recall, apply and interpret mathematical knowledge in the context of everyday situations;
- set out mathematical work, including the solution of problems, in a logical and clear form using appropriate symbols and terminology;
- organise, interpret and present information accurately in written, tabular, graphical and diagrammatic forms;
- perform calculations by suitable methods;
- use an electronic calculator;
- understand systems of measurement in everyday use and make use of them in the solution of problems;
- estimate, approximate and work to degrees of accuracy appropriate to the context;
- use mathematical and other instruments to measure and to draw to an acceptable degree of accuracy;
- recognise patterns and structures in a variety of situations and form generalisations;
- interpret, transform and make appropriate use of mathematical statements expressed in words or symbols;
- Interpret, use and present information in written, graphical, diagrammatic and tabular forms;

Monthly Syllabus

MONTHS	CHAPTERS	DURATION
AUGUST	• Trigonometric Ratios. • Coordinate Geometry.	2 WEEKS. 2WEEKS.
SEPTEMBER	• Mensuration. • Matrices.	3WEEK. 1WEEK.
OCTOBER	• Linear graphs and their applications. • Area and volume of similar figures.	2WEEKS. 2WEEKS.
NOVEMBER	**REVISION FOR MID TERM**	
DECEMBER	**MID TERM EXAMS**	
JANUARY	• Solution of Quadratic Equations. • Graphical Solution of equations(Ex#8a).	3WEEKS. 1WEEK.
FEBRUARY	• Functions. • More on probability(ex#6a,6b,6c)	2WEEKS. 2WEEKS.
MARCH	• Continuation of probability(ex#6a,6b,6c) • Frequency Distribution. • Scatter Diagram.	1WEEK. 2WEEKS 1WEEK.
APRIL	**REVISION FOR FINAL TERM.**	
MAY	**FINAL TERM EXAMS.**	

Syllabus Content:

AUGUST

• **Trigonometric Ratios**
  Book 3, Chap No.10
  Pg No.(261-288)

• **Coordinate Geometry**
  Book 3, Chap No.4
  Pg No.(75- 86)

Month	Theme or Topic	Subject Content	Notes/Examples
August	**Trigonometric Ratios** **Book 3, Chap No.10** **Pg No.(261-288)**	Students should be able to: • Define the three basic trigonometrical ratios in terms of the lengths of the hypotenuse side, opposite side and adjacent side with respect to an acute angle of a right-angled triangle. • Find the value of a trigonometrical ratio using a calculator. • Find the length of a side of a right-angled triangle using trigonometrical ratios. • Find the value of an angle of a right-angled triangle using trigonometrical ratios. • Solve problems involving angles and lengths of a right-angled triangle. • Solve practical everyday life problems using trigonometrical ratios • solve trigonometrical problems in two dimensions including those involving angles of elevation and depression and bearings;	
	Coordinate Geometry **Book 3 , Chap No.4** **Pg No.(75- 86)**	• Locate the position of a coordinate point on a graph and find the length of a line segment. • Find the gradient of a line joining two given points. • Find the equation of a straight line given its gradient m and one point on the line. • Find the equation of a straight line joining two • given	e.g. fi nd the equation of a line parallel to y = 4x – 1 that passes through (0, –3) e.g. fi nd the gradient of a line perpendicular to y = 3x + 1 e.g. fi nd the equation of a line perpendicular to one passing through the coordinates (1, 3) and (–2, –9)

SEPTEMBER

• **Mensuration**
Book 3, Chap No.12
Pg No.(335-358)

• **Matrices**
Addendum, Chap No.3

Month	Theme or Topic	Subject Content	Notes/Examples
September	**Mensuration Book 3, Chap No.12 Pg No.(335-358)**	• Find the area and circumference of a circle, a quadrant and a semi-circle. • Find the length and area of a sector. • solve problems involving (i) the perimeter and area of a rectangle and triangle. (ii) the circumference and area of a circle. (iii) the area of a parallelogram and a trapezium. (iv) the surface area and volume of a cuboids, cylinder, prism, sphere, pyramid and cone (formulae will be given for the sphere, pyramid and cone) (v) arc length and sector area as fractions of the circumference and area of a circle.	Formulae will be given for the surface area and volume of the sphere, pyramid and cone.
	Matrices Addendum, Chap No.3	Students should be able to: • display information in the form of a matrix of any order; • solve problems involving the calculation of the sum and product (where appropriate) of two matrices, and interpret the results; • calculate the product of a scalar quantity and a matrix; • use the algebra of 2 × 2 matrices including the zero and identity 2 × 2 matrices; • calculate the determinant and inverse of a non- singular matrix. (A^{-1} denotes the inverse of **A**.)	

OCTOBER

- **Linear graphs and their applications.**
Book3, Chap No.7.
Pg No.(169-194)

- **Area and volume of similar figures.**
Book3, Chap No.9.
Pg No.(239-256)

Month	Theme or Topic	Subject Content	Notes/Examples
October	**Linear graphs and their applications.**	Students should be able to: • Interpret and use graphs in practical situations. • Draw graphs using data from practical situations. • Read Travel Graphs.	
	Area and volume of similar figures.	Students should be able to: • Solve problems using the relationship between areas of similar figures. • Solve problems using the relationship between volumes of similar solids.	

NOVEMBER

REVISION FOR MID TERM EXAMS

DECEMBER

MID TERM EXAMS

JANUARY

- **Solution of Quadratic Equations**
Book 3, Chap No.1
Pg No.(1-20)

- **Graphical Solution of equations (Ex#1a).**
Book 4, Chap No.1
Pg No.(1-36)

Month	Theme or Topic	Subject Content	Notes/Examples
January	**Solution of Quadratic Equations Book 3, Chap No.1 Pg No.(1-20)**	Students should be able to: • use letters to express generalised numbers and express basic arithmetic processes algebraically, substitute numbers for words and letters in formulae; • transform simple and more complicated formulae; • construct equations from given situations. • solve quadratic equations by factorisation and either by use of the formula or by completing the square; • use letters to express generalised numbers and express basic arithmetic processes algebraically, substitute numbers for words and letters in formulae; • transform simple and more complicated formulae; • construct equations from given situations. • solve quadratic equations by factorisation and either by use of the formula or by completing the square;	e.g. factorise $9x2 + 15xy$ e.g. expand $3x(2x - 4y)$, $(x + 4)(x - 7)$
	Graphical Solution of equations (Ex#1a). Book 4,Chap No.1 Pg No.(1-36)	Students should be able to: Construct a table of values of x and y for (i) a cubic function, $y = ax^3 + bx^2 + cx +d$ (ii) a reciprocal function, $y = x a$ and $y = x a^2$ (iii) an exponential function, $y = ax$ and plot the graphs of these functions on graph paper. • Find the value(s) of x for a given value of y and the value of y for a given value of x from the given graphs. • Sketch graphs of quadratic functions of the form $y = ax2$, $y = \pm(x - a)(x - b)$ and $y = \pm(x - p)2 + q$ where a, b, p, and q are constants. • Draw the graphs of a quadratic function and use it to solve related quadratic equations graphically. • Draw the graphs of cubic, reciprocal	

FEBRUARY

- **Functions.**
Book 3. Addendum.

- **More on Probabilty**
Book 4.Chap No 6
Page # (207-247)

Month	Theme or Topic	Subject Content	Notes/Examples
February	**Functions.** **Book 3.** **Addendum.** **More on Probabilty** **Book 4 .Chap No 6** **Page #(207-247)**	Students should be able to: • use function notation, e.g. f(x) = 3x − 5, f: x a3x − 5 to describe simple functions, and the notation $f^{-1}(x) = x + 5$ 3 and f^{-1}: x a= x +53 describe their inverses. • demonstrate familiarity with cartesian coordinates in two dimensions; Students should be able to: • Define experiments and sample space. • Define the classical definition of probability of an event E occurring as P(E)= No.of Possible Outcomes No.of Favourable Outcomes for Event E • Use the above results to calculate the probability of occurrence of simple events • Define the experimental probability of the event E happening as P(E)= Total No. of times of performing the experiment No. of times Event E occurs	Probabilities should not be given as ratios. Problems could be set involving extracting information from tables or graphs. e.g. P(blue) = 0.8, find P(not blue) e.g. use results of experiments with a spinner to estimate the probability of a given outcome e.g. use probability to estimate from a population In possibility diagrams outcomes will be represented by points on a grid and in tree diagrams outcomes will be written at the end of branches and probabilities by the side of the branches

MARCH

- **More on Probabilty**
Book 4, Chap No 6
Page # (207-247)

- **Frequency Distribution**
Book 3, Addendum Chap
No. IV

Month	Theme or Topic	Subject Content	Notes/Examples
March	**More on Probabilty Book 4 .Chap No 6 Page #(207-247)**	• Use the above results to calculate the probability of occurrence of simple events. • State that for any event E, $0 \leq P(E) \leq 1$. • P(E)=0 if and only if the event E cannot possibly occur. • P(E)=1 if and only if the event E will certainly occur.	
	Frequency Distribution Book 3, Addendum Chap No. IV	• use frequency density to construct and read histograms with equal and unequal intervals; • calculate the mean, median and mode for individual data and distinguish between the purposes for which they are used;	
	Scatter Diagram	Students should be able to: -to be able to plot scatter graphs with confidence. -to be able to comment on correlation. -to be able to plot and use line of best fit.	For unequal intervals on histograms, areas are proportional to frequencies and the vertical axis is labeled 'Frequency density'.

APRIL

REVISION FOR FINAL EXAMS

MAY

FINAL EXAMS

Breadth of Study:

During the key stage, students should be taught the knowledge, skills and understanding through:

a. activities that ensure they become familiar with, and confident using, standard procedures for the range of calculations appropriate to this level of study;
b. solving familiar and unfamiliar problems in a range of numerical, algebraic and graphical contexts and in open-ended and closed form;
c. using standard notations for decimals, fractions, percentages, ratio and indices;
d. activities that show how algebra, as an extension of number using symbols, gives precise form to mathematical relationships and calculations;
e. activities in which they progress from using definitions and short chains of reasoning to understanding and formulating proofs in algebra and geometry;
f. a sequence of practical activities that address increasingly demanding statistical problems in which they draw inferences from data and consider the uses of statistics in society;

Assessment and Homework:

Students will be assessed by taking test of each and every chapter. Home Work shall be given on a daily basis.

Mathematical Notations:

The list which follows summarises the notation used

Mathematical Symbols

$=$	is equal to
$\neq$	is not equal to
$\equiv$	is identical to or is congruent to
$\approx$	is approximately equal to

Operations

$a + b$	a plus b
$a - b$	a minus b
$a \times b$, ab, $a.b$	a multiplied by b
$a \div b$, a , a/b b	a divided by b

Functions

f   function f

f (x)   the value of the function f at x

sin, cos, tan,
cosec, sec, cot } the circular functions

Resource List

Books:

Sang, T.et al, 2008, New Syllabus Mathematics Work book 1, 2 & 3 (6th Edition), Singapore; Oxford University Press
Bostock, L, S Chandler, A Shepherd, E Smith ST(P) Mathematics Books 1A to 5A (Stanley Thornes)

Book 1A	Book 2A	Book 3A	Book 4A,4B
Book 1B	Book 2B	Book 3B	

Buckwell, Geoff Mastering Mathematics (Macmillan Education Ltd) 0 333 62049 6
Collins, J, Warren, T and C J Cox Steps in Understanding Mathematics (John Murray) Book 1
Book 2
Book 3
National Mathematics Project (NMP) Mathematics for Secondary Schools Red Track Books 1 to 5 (Longman Singapore Publishers Pte Ltd)
Book 1
Book 2**1eme or t**
Book 3
Cox, C J and D Bell Understanding Mathematics Books 1–5 (John Murray) Book 1
Book 2
Book 3

Websites:

• www.nrich.com www.hoddereducation.com
• www.collinseducation.com www.pearsonschoolsandfecolleges.co.uk
• www.hoddereducation.com
• www.lettsandlonsdale.com
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