Middle High Reasoning & Aptitude Course

Who should enroll?
This course is designed for students who are:
Preparing for school transfer examinations
Getting ready for Year 9 Mathematics streaming assessments
Starting early preparation for the University Clinical Aptitude Test (UCAT)

Course details :
Class format: Small group instruction
Duration: 2 hours per class
Eligible grades: Years 9-10 only
Prerequisites: Entrance test required for enrollment
Grade restrictions: Students below Year 9 are not eligible

What's included :
Weekly instruction in small group setting
Comprehensive study materials
Weekly practice test

Curriculum :

Grades 9/10 Reasoning & Aptitude	Course outline
Term 1	**Abstract Reasoning** - Pattern Recognition: Identifying patterns in shapes, sequences, and visual cues. - Analogies in Non-Verbal Information: Developing skills to understand relationships between objects without verbal prompts. - Series Completion: Determining the next element in visual series. - Spatial Orientation and Visualization: Understanding object rotation, mirror images, and perspectives. - Figure Classification and Categorization: Classifying shapes based on given attributes. - Logical Sequences: Understanding cause-effect patterns in non-verbal setups.
Term 2	**Decision Making & Quantitative Reasoning** *Decision Making* - Evaluating Choices: Techniques for listing, analyzing, and prioritizing options. - Risk Assessment: Basic probability in decision-making contexts. - Cause-Effect Relationships: Identifying outcomes based on specific choices. - Evaluating Arguments and Assumptions: Understanding bias, identifying assumptions in reasoning. *Quantitative Reasoning* - Numerical Patterns and Series: Arithmetic, geometric sequences, and missing-number problems. - Ratio and Proportion: Solving real-life problems using proportional reasoning. - Data Interpretation: Understanding charts, graphs, and tables for decision making. - Basic Statistics: Mean, median, mode, and basic probability problems.
Term 3	**Verbal Reasoning** - Comprehension and Analysis: Extracting information from texts, summarizing key points. - Analogies and Relationships: Finding connections and relationships between words. - Critical Reading: Identifying the main idea, inferences, and conclusions.

	- Logical Deductions: Drawing conclusions based on verbal information. - Statement and Assumptions: Differentiating between facts and assumptions in text. - Cause and Effect in Text: Identifying logical connections in verbal arguments.
Term 4	**Situational Judgement** - Ethical Decision-Making: Understanding moral principles in problem-solving. - Behavioral Analysis: Identifying the best response to situational cues. - Interpersonal Judgement: Analyzing social situations and choosing appropriate responses. - Scenario-Based Reasoning: Real-life problem-solving with a focus on empathy, teamwork, and integrity. - Conflict Resolution: Approaches to resolving differences in hypothetical scenarios. - Risk Management in Situations: Judging high-stakes scenarios and mitigating potential outcomes.

Middle High EMS

This program is designed to give students a head start on their HSC studies. It focuses on advanced Mathematics and Science subjects, which are expected to be chosen for the HSC exams.

What's included:

Class Structure: Small group classes, each lasting 2.5 hours

Weekly study materials: Comprehensive notes for both Maths and Science.

Additional Accelerated Science notes: Concise and fast-tracked notes to help students grasp key concepts quickly.

Weekly trial tests: Practice tests covering Reading, Writing, Mathematics, and Science to assess progress and exam readiness.

Labvision homework modules: Interactive online modules with 10 attempts per term to reinforce learning.

Curriculum :

Grade 9 EMS	Literacy	Mathematics	Science

Grade 9 Term 1	*Persuasive Writing and Literary Foundations*
	
	Poetry
	- "The Road Not Taken" - Robert Frost
	- "Sonnet 18" - William Shakespeare
	- "Still I Rise" - Maya Angelou
		Foundations and Core Algebraic Concepts
		
		1. Quadratic Equations
		  - Solving quadratic equations by factorization, completing the square, and the quadratic formula
		  - Applications of quadratic equations in word problems
			Life Sciences and Human Biology
			
			1. Food and Living Things
			Nutrients and their functions
			Balanced diet and nutrition
			Food chains and food webs
			Energy flow in ecosystems
			Photosynthesis and cellular

	- "If" - Rudyard Kipling
	
	Prose
	- Novel Study: "To Kill a Mockingbird" by Harper Lee
	- Short Stories:
	  - "The Gift of the Magi" by O. Henry
	  - "The Last Leaf" by O. Henry
	
	Writing Skills
	1. Persuasive Writing Fundamentals
	  - Understanding argument structure
	  - Developing thesis statements
	  - Using evidence effectively
	  - Counter-arguments and rebuttals
	
	2. Grammar and Style
	  - Advanced punctuation
	  - Sentence variety and structure
	  - Transitional phrases
	  - Active vs. passive voice
		2. Trigonometry Review
		  - Basics of trigonometric ratios (sine, cosine, tangent)
		  - Applications in right-angled triangles
		  - Introduction to sine and cosine rules for non-right triangles
		3. Financial Mathematics
		  - Simple and compound interest calculations
		  - Introduction to annuities and loan amortization
		  - Real-life applications and calculations
		4. Probability Review
		  - Basic probability rules and concepts
		  - Independent and dependent events
		  - Conditional probability and Venn diagrams
		5. Further Indices
		  - Laws of indices, fractional indices, and negative indices
		  - Simplification of algebraic expressions using indices
		6. Coordinate Geometry Review
		  - Distance between two points and midpoint formulas
			respiration
			
			2. Sensing the World Around You
			Structure and function of human sensory organs
			The nervous system
			  Central and peripheral nervous system
			  Neurons and nerve impulses
			Stimulus and response
			Common sensory disorders
			
			3. Animal Reproduction
			Sexual and asexual reproduction
			Male and female reproductive systems
			Fertilization and embryo development
			Reproductive hormones
			Birth and parental care
			
			4. Infectious Diseases
			Types of pathogens
			Disease transmission
			Immune system response
			Prevention and treatment
			Vaccines and antibiotics

		- Slope of a line and equation of a line - Introduction to parallel and perpendicular lines	Global health challenges

Grade 9 Term 2	*Comparative Studies and Creative Expression*
	
	Poetry Comparison
	- "Dulce et Decorum Est" - Wilfred Owen
	- "The Soldier" - Rupert Brooke
	- "Chicago" - Carl Sandburg
	- "London" - William Blake
	
	Prose
	- Novel Study: "Lord of the Flies" by William Golding
	- Short Stories:
	  - "The Yellow Wallpaper" by Charlotte Perkins Gilman
	  - "The Tell-Tale Heart" by Edgar Allan Poe
	
	Writing Skills
	1. Creative Writing
	  - Character development
	  - Setting and atmosphere
	  - Dialogue writing
		Polynomial Operations and Advanced Geometry
		
		1. Factorisation Revision
		  - Factorization of algebraic expressions (common factor, grouping, trinomials)
		  - Special factorization techniques: difference of squares, perfect square trinomials
		2. Polynomials and Further Polynomials
		  - Polynomial functions and their graphs
		  - Operations on polynomials (addition, subtraction, multiplication, division)
		  - Remainder theorem and factor theorem applications
		3. Advanced Probability
		  - Probability distribution, mean, variance, and standard deviation
		  - Probability applications in real-world contexts
			Chemistry and Matter
			
			1. Chemical Reactions
			Atomic structure and bonding
			Types of chemical reactions
			  Combination
			  Decomposition
			  Single displacement
			  Double displacement
			  Acid-base reactions
			Balancing chemical equations
			Factors affecting reaction rates
			Energy changes in reactions
			
			2. Matter and Materials
			States of matter
			Physical and chemical changes
			Properties of materials
			Solutions and mixtures
			Separation techniques
			
			3. Acids, Bases, and Salts

	- Narrative perspectives
	- Descriptive techniques
	
	2. Comparative Analysis
	  - Theme comparison
	  - Style analysis
	  - Context evaluation
	  - Literary devices
		4. Coordinate Geometry
		  - Equation of circles and its properties
		  - Locus of points and geometric proofs
		5. Further Trigonometry
		  - Trigonometric identities and simplifying expressions
		  - Solving trigonometric equations
		  - Applications of trigonometry in 3D problems
			Properties and indicators
			pH scale
			Neutralization
			Common acids and bases in daily life

Grade 9 Term 3	*Critical Studies and Modernist Poetry*
	
	Modernist Poetry
	- "The Love Song of J. Alfred Prufrock" - T.S. Eliot
	- "This Is Just To Say" - William Carlos Williams
	- "The Red Wheelbarrow" - William Carlos Williams
	- "Dreams" - Langston Hughes
	
	Prose
	- Novel Study: "Of Mice and Men" by John Steinbeck
	- Short Stories:
	  - "The Cask of Amontillado" by Edgar Allan Poe
		Logarithmic and Exponential Functions, Series
		
		1. Indices and Logarithms
		  - Laws of logarithms and change of base formula
		  - Solving exponential and logarithmic equations
		  - Applications in growth and decay problems
		2. Further Logarithmic Applications
		  - Real-world applications: pH, Richter scale, population growth
		  - Transformations and graphing of exponential and logarithmic functions
		3. Graphs - Applications of
			Earth and Space Sciences
			
			1. The Universe
			Solar system structure
			Stars and galaxies
			Light years and astronomical distances
			Life cycle of stars
			Origin of the universe
			Space exploration
			
			2. Earth Sciences
			Earth's structure
			Plate tectonics
			Earthquakes and volcanoes
			Rock cycle
			Minerals and their properties

	- "The Story of an Hour" by Kate Chopin
	
	Writing Skills
	1. Discursive Writing
	  - Balanced arguments
	  - Objective analysis
	  - Research methods
	  - Citation techniques
	
	2. Critical Analysis
	  - Literary criticism
	  - Historical context
	  - Author's purpose
	  - Stylistic analysis
		Logarithms and Exponents
		  - Exponential growth and decay graphs
		  - Logarithmic graphs and their interpretations
		4. Arithmetic and Geometric Series
		  - Sum of finite arithmetic and geometric series
		  - Infinite geometric series and convergence
		5. Application of Series
		  - Real-life applications of series (finance, sequences in nature)
		  - Using series in problem-solving contexts
			3. Human Impact on the Biosphere
			Climate change and global warming
			Pollution types and effects
			Conservation of resources
			Biodiversity and extinction
			Sustainable development

Grade 9 Term 4	*Close Reading, Visual Analysis, and Advanced Writing Skills*
	
	Poetry
	- "Ozymandias" - Percy Bysshe Shelley
	- "The Tiger" - William Blake
	- "Mother to Son" - Langston Hughes
	- "Fire and Ice" - Robert Frost
	
	Prose
	- Novel Study: "The Pearl" by John Steinbeck
		Functions, Advanced Problem Solving, and Preparation for Further Studies
		1. Functions
		  - Definition and types of functions (linear, quadratic, absolute, exponential)
		  - Domain, range, and function notation
		2. Inverse Functions & Further Graphs
		  - Finding the inverse of a function and graphing inverses
		  - Transformation of graphs
			Physics
			
			1. Wave Motion
			Types of waves
			Wave properties
			  Amplitude
			  Frequency
			  Wavelength
			  Speed
			Sound waves
			Light waves
			Electromagnetic spectrum
			
			2. Forces and Motion

| | - Short Stories:
  - "The Necklace" by Guy de Maupassant
  - "The Open Window" by Saki

Writing Skills
1. Close Reading
  - Detailed textual analysis
  - Interpretation skills
  - Evidence-based arguments
  - Literary devices identification

2. Visual Analysis
  - Media literacy
  - Visual rhetoric
  - Advertisement analysis
  - Film analysis techniques | (translations, reflections, stretches)
3. Regions and Graphical Solutions
  - Introduction to inequalities in two variables
  - Shading regions to represent solutions of inequalities
4. The Discriminant
  - Understanding the discriminant in quadratic equations and its significance
  - Real-life applications and interpretation of roots
5. Simultaneous Equations
  - Solving simultaneous linear and quadratic equations algebraically and graphically
6. Problem Solving on the Coordinate Plane
  - Complex problem-solving involving multiple concepts (geometry, algebra, trigonometry) | Newton's laws of motion
Types of forces
Momentum and impulse
Work, energy, and power
Simple machines

3. Electricity and Magnetism
Electric charges and fields
Current and voltage
Circuits
Magnets and magnetic fields
Electromagnetic effects |

Grade 10 EMS	Literacy	Mathematics	Science

Grade 10 Term 1	*Mock HSC Common Module - Richard III*
	
	Core Text
	- William Shakespeare's "Richard III"
	
	Supporting Contexts
	1. Historical Context
	  - Wars of the Roses
	  - Tudor England
	  - Shakespeare's History Plays
	
	2. Poetry Focus: Power and Ambition
	  - "Ozymandias" by Percy Bysshe Shelley
	  - "The Man He Killed" by Thomas Hardy
	  - "The Conquest of Granada" by Lord Byron
	
	3. Related Texts
	  - Short Story: "The Cask of Amontillado" by Edgar Allan Poe
	  - Novel Excerpts: "Animal
		Foundations in Trigonometry and Polynomial Analysis
		
		Further Trigonometry:
		Review of basic trigonometric ratios (sine, cosine, tangent)
		Unit circle definition of trigonometric functions
		Graphs of trigonometric functions (sine, cosine, tangent)
		Amplitude, period, phase shift, and vertical shift of trigonometric functions
		Solving trigonometric equations
		Applications of trigonometry (e.g., finding angles and sides of triangles, modeling periodic phenomena)
		
		Functions Review:
		Concept of a function
		Domain and range
		Function notation
		Types of functions (linear, quadratic, polynomial, exponential, logarithmic)
		Inverse functions
			Life Sciences - Evolution and Genetics
			
			1: Introduction to Genetics
			DNA structure and function
			Genes, alleles, and chromosomes
			Genotypes and phenotypes
			
			2: Mechanisms of Inheritance
			Mendelian inheritance patterns (dominant, recessive, codominance, incomplete dominance)
			Sex-linked inheritance
			Pedigree analysis
			Mutations and their effects
			
			3: Evolutionary Theory
			History of evolutionary thought (Darwin, Lamarck, etc.)
			Evidence for evolution (fossil record, comparative anatomy, embryology, molecular biology)

	Farm" by George Orwell Key Skills Development - Character analysis - Understanding dramatic irony - Shakespearean language and devices - Historical context analysis - Comparative analysis of texts	Polynomials: Polynomial expressions and operations (addition, subtraction, multiplication, division) Factoring polynomials Solving polynomial equations Remainder and Factor Theorems Graphing polynomial functions	Natural selection and adaptation Speciation and extinction

Grade 10 Term 2	*Mock HSC Critical Study*
	
	Core Focus: Poetry Analysis
	1. Romantic Poetry Collection
	  - "The Tyger" by William Blake
	  - "Ode on a Grecian Urn" by John Keats
	  - "I Wandered Lonely as a Cloud" by William Wordsworth
	  - "She Walks in Beauty" by Lord Byron
	
	2. Modern Poetry
	  - "The Road Not Taken" by Robert Frost
	  - "Do Not Go Gentle Into That Good Night" by Dylan Thomas
	  - "Still I Rise" by Maya Angelou
	
	Novel Study
		Calculus and Logarithmic Concepts
		
		Applications of Coordinate Geometry:
		Distance formula
		Midpoint formula
		Slope of a line
		Equations of lines (slope-intercept, point-slope, standard form)
		Parallel and perpendicular lines
		Circles and their equations
		
		Limits and First Principles:
		Concept of a limit
		Evaluating limits graphically and algebraically
		One-sided limits
		Limits at infinity
		Definition of the derivative using first principles
			Physical Sciences and Cosmology
			
			1: Structure of Matter
			Atomic structure (protons, neutrons, electrons)
			Periodic table trends
			Isotopes and radioactivity
			
			2: Chemical Reactions
			Types of chemical bonds (ionic, covalent, metallic)
			Chemical equations and balancing
			Reaction rates and factors affecting them
			Acids, bases, and pH
			
			3: The Big Bang and the Universe

	"To Kill a Mockingbird" by Harper Lee Short Stories 1. "The Yellow Wallpaper" by Charlotte Perkins Gilman 2. "The Tell-Tale Heart" by Edgar Allan Poe Key Skills Development - Critical analysis techniques - Understanding poetic devices - Contextual analysis - Comparative writing - Literary criticism	Differential Calculus: Rules of differentiation (power rule, sum and difference rule, constant multiple rule) Derivatives of trigonometric functions Chain rule Product rule Quotient rule Applications of Differential Calculus: Rates of change Tangents and normals to curves Increasing and decreasing functions Maximum and minimum values Optimization problems Indices and Logarithms: Laws of indices Exponential functions Logarithmic functions Solving exponential and logarithmic equations Applications of Indices and Logarithms: Compound interest Exponential growth and decay	Origin and evolution of the universe Formation of stars and galaxies The solar system and its planets *4: Earth Systems* Earth's structure and composition Plate tectonics and geological processes The rock cycle
Grade 10 Term 3	*Mock HSC Reading to Write*	*Probability, Combinatorics, and*	*Physics and Environmental*

	Creative Writing Focus	*Advanced Graphing*	*Science*
	1. Short Story Writing	Probability and Set Notation:	*1: Motion and Forces*
	- Study of "The Lottery" by Shirley Jackson	Basic probability concepts	Describing motion (speed, velocity, acceleration)
	- "The Gift of the Magi" by O. Henry	Set notation (union, intersection, complement)	Newton's laws of motion
	- "The Last Leaf" by O. Henry	Venn diagrams	Types of forces (gravity, friction, etc.)
		Conditional probability	
	2. Poetry Writing	Independent and dependent events	*2: Energy*
	- Study of Contemporary Poets		Forms of energy (kinetic, potential, thermal, etc.)
	- "Morning Song" by Sylvia Plath	Counting Methods and Permutations:	Energy transformations and conservation
	- "The Colonel" by Carolyn Forché	Fundamental Counting Principle	Work and power
		Permutations	
	Novel Study	Permutations with repetition	*3: Energy in Ecosystems*
	"Lord of the Flies" by William Golding	Circular permutations	Food chains and food webs
		Further Permutations and Combinations:	Energy flow and pyramids
	Writing Techniques	Combinations	Biogeochemical cycles (carbon, nitrogen, water)
	- Narrative perspective	Applications of permutations and combinations	
	- Character development		*4: Global Issues*
	- Setting and atmosphere	Graphing Absolutes:	Climate change
	- Symbolism and metaphor	Graphs of absolute value functions	Pollution
	- Voice and style	Solving absolute value equations and inequalities	Resource depletion
			Sustainability
		Further Non-linear Graphs:	
		Graphs of rational functions	

		Graphs of exponential and logarithmic functions Transformations of graphs (translations, reflections, stretches, compressions)	

Grade 10 Term 4	*Mock HSC Unseen Text Exam Techniques*
	
	Skills Focus
	1. Analysis Techniques
	  - Quick reading strategies
	  - Annotation methods
	  - Structure identification
	  - Language analysis
	  - Context interpretation
	
	2. Response Writing
	  - Essay planning under time constraints
	  - Thesis development
	  - Evidence selection
	  - Analysis paragraph structure
	
	Practice Texts
	1. Poetry
	  - Various unseen poems from different periods
	  - Focus on contemporary poetry
		Geometry, Statistics, and Network Theory
		
		Circle Geometry:
		Parts of a circle (radius, diameter, chord, tangent, secant)
		Angles in a circle (central angle, inscribed angle, angle between a tangent and a chord)
		Cyclic quadrilaterals
		Tangents from an external point
		
		Radians:
		Definition of a radian
		Converting between degrees and radians
		Arc length and sector area using radians
		
		Statistics:
		Types of data (categorical, numerical)
		Measures of central tendency (mean, median, mode)
			Advanced Physics and Biology (Review and Extension)
			
			1: Motion (Advanced)
			Projectile motion
			Circular motion
			Momentum and collisions
			
			2: Genetics (Advanced)
			Gene expression and regulation
			Biotechnology (genetic engineering, cloning)
			Human genome project
			
			3: Evolution (Advanced)
			Population genetics (Hardy-Weinberg equilibrium)
			Mechanisms of evolution (genetic drift, gene flow, etc.)
			Human evolution

	2. Prose - Short story excerpts - Novel excerpts - Non-fiction articles 3. Visual Texts - Political cartoons - Advertisements - Photo essays	Measures of dispersion (range, interquartile range, standard deviation) Box plots Histograms Discrete Statistics: Discrete random variables Probability distributions Expected value and variance Graphing and Transformations: Review of graphing techniques Transformations of functions (translations, reflections, stretches, compressions) Networks: Basic concepts of networks (nodes, edges, paths, cycles) Trees and their properties Minimum spanning trees Applications of networks (e.g., transportation networks, social networks)	