# 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

**Fees :**
Cost per Class: $100
Full term: $1,000 (10 classes)

**Curriculum :**

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

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| | - Logical Deductions: Drawing conclusions based on verbal information.<br>- Statement and Assumptions: Differentiating between facts and assumptions in text.<br>- Cause and Effect in Text: Identifying logical connections in verbal arguments. |
| Term 4 | **Situational Judgement**<br>- Ethical Decision-Making: Understanding moral principles in problem-solving.<br>- Behavioral Analysis: Identifying the best response to situational cues.<br>- Interpersonal Judgement: Analyzing social situations and choosing appropriate responses.<br>- Scenario-Based Reasoning: Real-life problem-solving with a focus on empathy, teamwork, and integrity.<br>- Conflict Resolution: Approaches to resolving differences in hypothetical scenarios.<br>- 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.
**Fees:**
$120 per class
$1200 per term (based on 10 classes)

**Curriculum :**

| Grade 9 EMS | Literacy | Mathematics | Science |
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| Grade 9 Term 1 | **Persuasive Writing and Literary Foundations**<br><br>*Poetry*<br>- "The Road Not Taken" - Robert Frost | **Foundations and Core Algebraic Concepts**<br><br>1. Quadratic Equations<br>  - Solving quadratic equations by factorization, completing the | **Life Sciences and Human Biology**<br><br>*1. Food and Living Things*<br>Nutrients and their functions<br>Balanced diet and nutrition |

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| | - "Sonnet 18" - William Shakespeare<br>- "Still I Rise" - Maya Angelou<br>- "If" - Rudyard Kipling<br><br>*Prose*<br>- Novel Study: "To Kill a Mockingbird" by Harper Lee<br>- Short Stories:<br>  - "The Gift of the Magi" by O. Henry<br>  - "The Last Leaf" by O. Henry<br><br>*Writing Skills*<br>1. Persuasive Writing Fundamentals<br>  - Understanding argument structure<br>  - Developing thesis statements<br>  - Using evidence effectively<br>  - Counter-arguments and rebuttals<br><br>2. Grammar and Style<br>  - Advanced punctuation<br>  - Sentence variety and structure<br>  - Transitional phrases<br>  - Active vs. passive voice | square, and the quadratic formula<br>  - Applications of quadratic equations in word problems<br>2. Trigonometry Review<br>  - Basics of trigonometric ratios (sine, cosine, tangent)<br>  - Applications in right-angled triangles<br>  - Introduction to sine and cosine rules for non-right triangles<br>3. Financial Mathematics<br>  - Simple and compound interest calculations<br>  - Introduction to annuities and loan amortization<br>  - Real-life applications and calculations<br>4. Probability Review<br>  - Basic probability rules and concepts<br>  - Independent and dependent events<br>  - Conditional probability and Venn diagrams<br>5. Further Indices<br>  - Laws of indices, fractional indices, and negative indices<br>  - Simplification of algebraic expressions using indices | Food chains and food webs<br>Energy flow in ecosystems<br>Photosynthesis and cellular respiration<br><br>*2. Sensing the World Around You*<br>Structure and function of human sensory organs<br>The nervous system<br>  Central and peripheral nervous system<br>  Neurons and nerve impulses<br>Stimulus and response<br>Common sensory disorders<br><br>*3. Animal Reproduction*<br>Sexual and asexual reproduction<br>Male and female reproductive systems<br>Fertilization and embryo development<br>Reproductive hormones<br>Birth and parental care<br><br>*4. Infectious Diseases*<br>Types of pathogens<br>Disease transmission |

| | | 6. Coordinate Geometry Review<br>  - Distance between two points and midpoint formulas<br>  - Slope of a line and equation of a line<br>  - Introduction to parallel and perpendicular lines | Immune system response<br>Prevention and treatment<br>Vaccines and antibiotics<br>Global health challenges |
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| Grade 9 Term 2 | **Comparative Studies and Creative Expression**<br><br>*Poetry Comparison*<br>- "Dulce et Decorum Est" - Wilfred Owen<br>- "The Soldier" - Rupert Brooke<br>- "Chicago" - Carl Sandburg<br>- "London" - William Blake<br><br>*Prose*<br>- Novel Study: "Lord of the Flies" by William Golding<br>- Short Stories:<br>  - "The Yellow Wallpaper" by Charlotte Perkins Gilman<br>  - "The Tell-Tale Heart" by Edgar Allan Poe<br><br>*Writing Skills*<br>1. Creative Writing | **Polynomial Operations and Advanced Geometry**<br><br>1. Factorisation Revision<br>  - Factorization of algebraic expressions (common factor, grouping, trinomials)<br>  - Special factorization techniques: difference of squares, perfect square trinomials<br>2. Polynomials and Further Polynomials<br>  - Polynomial functions and their graphs<br>  - Operations on polynomials (addition, subtraction, multiplication, division)<br>  - Remainder theorem and factor theorem applications<br>3. Advanced Probability<br>  - Probability distribution, mean, | **Chemistry and Matter**<br><br>*1. Chemical Reactions*<br>*Atomic structure and bonding*<br>Types of chemical reactions<br>  Combination<br>  Decomposition<br>  Single displacement<br>  Double displacement<br>  Acid-base reactions<br>Balancing chemical equations<br>Factors affecting reaction rates<br>Energy changes in reactions<br><br>*2. Matter and Materials*<br>*States of matter*<br>Physical and chemical changes<br>Properties of materials<br>Solutions and mixtures |

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| | - Character development<br>- Setting and atmosphere<br>- Dialogue writing<br>- Narrative perspectives<br>- Descriptive techniques<br><br>2. Comparative Analysis<br>  - Theme comparison<br>  - Style analysis<br>  - Context evaluation<br>  - Literary devices | variance, and standard deviation<br>  - Probability applications in real-world contexts<br>4. Coordinate Geometry<br>  - Equation of circles and its properties<br>  - Locus of points and geometric proofs<br>5. Further Trigonometry<br>  - Trigonometric identities and simplifying expressions<br>  - Solving trigonometric equations<br>  - Applications of trigonometry in 3D problems | Separation techniques<br><br>*3. Acids, Bases, and Salts*<br>Properties and indicators<br>pH scale<br>Neutralization<br>Common acids and bases in daily life |
| Grade 9 Term 3 | **Critical Studies and Modernist Poetry**<br><br>*Modernist Poetry*<br>- "The Love Song of J. Alfred Prufrock" - T.S. Eliot<br>- "This Is Just To Say" - William Carlos Williams<br>- "The Red Wheelbarrow" - William Carlos Williams<br>- "Dreams" - Langston Hughes<br><br>*Prose*<br>- Novel Study: "Of Mice and Men" by John Steinbeck | **Logarithmic and Exponential Functions, Series**<br><br>1. Indices and Logarithms<br>  - Laws of logarithms and change of base formula<br>  - Solving exponential and logarithmic equations<br>  - Applications in growth and decay problems<br>2. Further Logarithmic Applications<br>  - Real-world applications: pH, Richter scale, population growth<br>  - Transformations and graphing | **Earth and Space Sciences**<br><br>*1. The Universe*<br>Solar system structure<br>Stars and galaxies<br>Light years and astronomical distances<br>Life cycle of stars<br>Origin of the universe<br>Space exploration<br><br>*2. Earth Sciences*<br>Earth's structure<br>Plate tectonics<br>Earthquakes and volcanoes |

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| | - Short Stories:<br>  - "The Cask of Amontillado" by Edgar Allan Poe<br>  - "The Story of an Hour" by Kate Chopin<br><br>*Writing Skills*<br>1. Discursive Writing<br>  - Balanced arguments<br>  - Objective analysis<br>  - Research methods<br>  - Citation techniques<br><br>2. Critical Analysis<br>  - Literary criticism<br>  - Historical context<br>  - Author's purpose<br>  - Stylistic analysis | of exponential and logarithmic functions<br>3. Graphs - Applications of Logarithms and Exponents<br>  - Exponential growth and decay graphs<br>  - Logarithmic graphs and their interpretations<br>4. Arithmetic and Geometric Series<br>  - Sum of finite arithmetic and geometric series<br>  - Infinite geometric series and convergence<br>5. Application of Series<br>  - Real-life applications of series (finance, sequences in nature)<br>  - Using series in problem-solving contexts | Rock cycle<br>Minerals and their properties<br><br>*3. Human Impact on the Biosphere*<br>Climate change and global warming<br>Pollution types and effects<br>Conservation of resources<br>Biodiversity and extinction<br>Sustainable development |
| Grade 9 Term 4 | **Close Reading, Visual Analysis, and Advanced Writing Skills**<br><br>*Poetry*<br>- "Ozymandias" - Percy Bysshe Shelley<br>- "The Tiger" - William Blake<br>- "Mother to Son" - Langston Hughes<br>- "Fire and Ice" - Robert Frost | **Functions, Advanced Problem Solving, and Preparation for Further Studies**<br>1. Functions<br>  - Definition and types of functions (linear, quadratic, absolute, exponential)<br>  - Domain, range, and function notation<br>2. Inverse Functions & Further Graphs | **Physics**<br><br>*1. Wave Motion*<br>Types of waves<br>Wave properties<br>  Amplitude<br>  Frequency<br>  Wavelength<br>  Speed<br>Sound waves<br>Light waves |

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| | *Prose*<br>- Novel Study: "The Pearl" by John Steinbeck<br>- Short Stories:<br>  - "The Necklace" by Guy de Maupassant<br>  - "The Open Window" by Saki<br><br>*Writing Skills*<br>1. Close Reading<br>  - Detailed textual analysis<br>  - Interpretation skills<br>  - Evidence-based arguments<br>  - Literary devices identification<br><br>2. Visual Analysis<br>  - Media literacy<br>  - Visual rhetoric<br>  - Advertisement analysis<br>  - Film analysis techniques |   - Finding the inverse of a function and graphing inverses<br>  - Transformation of graphs (translations, reflections, stretches)<br>3. Regions and Graphical Solutions<br>  - Introduction to inequalities in two variables<br>  - Shading regions to represent solutions of inequalities<br>4. The Discriminant<br>  - Understanding the discriminant in quadratic equations and its significance<br>  - Real-life applications and interpretation of roots<br>5. Simultaneous Equations<br>  - Solving simultaneous linear and quadratic equations algebraically and graphically<br>6. Problem Solving on the Coordinate Plane<br>  - Complex problem-solving involving multiple concepts (geometry, algebra, trigonometry) | Electromagnetic spectrum<br><br>*2. Forces and Motion*<br>Newton's laws of motion<br>Types of forces<br>Momentum and impulse<br>Work, energy, and power<br>Simple machines<br><br>*3. Electricity and Magnetism*<br>Electric charges and fields<br>Current and voltage<br>Circuits<br>Magnets and magnetic fields<br>Electromagnetic effects |

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

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| | Farm" by George Orwell<br><br>Key Skills Development<br>- Character analysis<br>- Understanding dramatic irony<br>- Shakespearean language and devices<br>- Historical context analysis<br>- Comparative analysis of texts | Polynomials:<br>Polynomial expressions and operations (addition, subtraction, multiplication, division)<br>Factoring polynomials<br>Solving polynomial equations<br>Remainder and Factor Theorems<br>Graphing polynomial functions | Natural selection and adaptation<br>Speciation and extinction |
| Grade 10 Term 2 | **Mock HSC Critical Study**<br><br>*Core Focus: Poetry Analysis*<br>1. Romantic Poetry Collection<br>  - "The Tyger" by William Blake<br>  - "Ode on a Grecian Urn" by John Keats<br>  - "I Wandered Lonely as a Cloud" by William Wordsworth<br>  - "She Walks in Beauty" by Lord Byron<br><br>2. Modern Poetry<br>  - "The Road Not Taken" by Robert Frost<br>  - "Do Not Go Gentle Into That Good Night" by Dylan Thomas<br>  - "Still I Rise" by Maya Angelou<br><br>Novel Study | **Calculus and Logarithmic Concepts**<br><br>Applications of Coordinate Geometry:<br>Distance formula<br>Midpoint formula<br>Slope of a line<br>Equations of lines (slope-intercept, point-slope, standard form)<br>Parallel and perpendicular lines<br>Circles and their equations<br><br>Limits and First Principles:<br>Concept of a limit<br>Evaluating limits graphically and algebraically<br>One-sided limits<br>Limits at infinity<br>Definition of the derivative using | **Physical Sciences and Cosmology**<br><br>*1: Structure of Matter*<br>Atomic structure (protons, neutrons, electrons)<br>Periodic table trends<br>Isotopes and radioactivity<br><br>*2: Chemical Reactions*<br>Types of chemical bonds (ionic, covalent, metallic)<br>Chemical equations and balancing<br>Reaction rates and factors affecting them<br>Acids, bases, and pH<br><br>*3: The Big Bang and the Universe* |

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

| | Mock HSC Reading to Write | Probability, Combinatorics, and Advanced Graphing | Physics and Environmental Science |
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| Grade 10 Term 3 | Creative Writing Focus<br>1. Short Story Writing<br>  - Study of "The Lottery" by Shirley Jackson<br>  - "The Gift of the Magi" by O. Henry<br>  - "The Last Leaf" by O. Henry<br><br>2. Poetry Writing<br>  - Study of Contemporary Poets<br>  - "Morning Song" by Sylvia Plath<br>  - "The Colonel" by Carolyn Forché<br><br>Novel Study<br>"Lord of the Flies" by William Golding<br><br>Writing Techniques<br>- Narrative perspective<br>- Character development<br>- Setting and atmosphere<br>- Symbolism and metaphor<br>- Voice and style | Probability and Set Notation:<br>Basic probability concepts<br>Set notation (union, intersection, complement)<br>Venn diagrams<br>Conditional probability<br>Independent and dependent events<br><br>Counting Methods and Permutations:<br>Fundamental Counting Principle<br>Permutations<br>Permutations with repetition<br>Circular permutations<br>Further Permutations and Combinations:<br>Combinations<br>Applications of permutations and combinations<br><br>Graphing Absolutes:<br>Graphs of absolute value functions<br>Solving absolute value equations and inequalities<br><br>Further Non-linear Graphs: | *1: Motion and Forces*<br>Describing motion (speed, velocity, acceleration)<br>Newton's laws of motion<br>Types of forces (gravity, friction, etc.)<br><br>*2: Energy*<br>Forms of energy (kinetic, potential, thermal, etc.)<br>Energy transformations and conservation<br>Work and power<br><br>*3: Energy in Ecosystems*<br>Food chains and food webs<br>Energy flow and pyramids<br>Biogeochemical cycles (carbon, nitrogen, water)<br><br>*4: Global Issues*<br>Climate change<br>Pollution<br>Resource depletion<br>Sustainability |

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

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