



# Virtual Live GAMSAT Preparation Course Topic Outline

## Introduction to GAMSAT Module

- What is GAMSAT?
  - What is the Structure of GAMSAT?
  - What is Examined on GAMSAT?
  - How is GAMSAT Scored?
  - What is an Acceptable GAMSAT Score?
- Why GAMSAT?
- Test-Taking Strategy
  - Humanities & Social Sciences Reasoning
  - Written Communication
  - Physical & Biological Sciences Reasoning
- How to Approach GAMSAT?
- How does MedPrep work?
- Study Schedules
- Sit Diagnostic Simulated GAMSAT Exam
- Diagnostic GAMSAT Evaluation

## Biological & Physical Sciences Reasoning Module

### INTRODUCTION

#### *Physics Topics & Units*

#### **Vectors & Scalars**

- Scalars & Vectors -- A Definition
- Graphical Vector Addition
- Vector Trigonometry
- Vector Components

#### **Units & Kinematics**

- Kinematics – A Definition
- Translational Motion
- Distance & Displacement
- Speed & Velocity
- Acceleration
- Graphical Analysis of Translational Motion
- Horizontal Motion
- Vertical Motion
- Air Resistance
- Projectile Motion
- Kinematic Equations of Translational Motion
- Rotational Motion
- Angular vs. Linear Measurements
- Graphical Analysis of Rotational Motion
- Kinematic Equations of Rotational Motion
- Translational vs Rotational Quantities

#### **Newtonian Mechanics**

- Newtons Laws
- The First Law
- The Second Law
- The Third Law
- Contact Forces
- The Normal Force
- Friction
- Static & Kinetic Friction
- Inclined Planes
- Uniform Circular Motion
- Horizontal Circular Motion
- Vertical Circular Motion
- Newton's Law of Universal Gravitation

#### **Work & Energy**

- Work & Energy – A Definition
- Power
- Potential Energy
- Gravitational Potential Energy
- Elastic Potential Energy
- Kinetic Energy
- Conservation of Mechanical Energy
- Momentum
- Impulse
- Conservation of Momentum
- Collisions
- Explosions

#### **Fluids**

- Fluids – A Definition
- Hydrostatics – Fluids at Rest
- Total vs. Gauge Pressure
- Buoyancy & Archimedes' Principle
- Surface Tension
- Hydrodynamics – Fluids in Motion
- Viscosity & Liquid Flow
- Liquid Flow Through a Pipe of Varying Diameter
- Bernoulli's Equation: Energy of Moving Fluids
- Bernoulli's Equation: Pressure & Velocity

#### **Thermodynamics**

- Heat & Temperature – A Definition
- Temperature Scales
- Specific Heat Capacity
- Heat Transfer
- Conduction
- Convection
- Radiation
- System & Surroundings
- First Law of Thermodynamics
- Second Law of Thermodynamics

#### **Electrostatics**

- Charge – A Definition
- Coulomb's Law of Electric Force
- Electric Field
- Electric Potential

#### **DC & AC Circuits**

- Electric Current
- Voltage
- Resistance
- Ohm's Law
- Series & Parallel Circuits
- Energy & Power
- Current Forms
- Direct Current (DC)
- Alternating Current (AC)
- Effective Current or Voltage (RMS)
- AC Power

#### **Magnetism**

- Permanent Magnets
- Coulomb's Law of Magnetic Force
- Permanent Magnetic Fields
- Electromagnetism
- Force on a Moving Charge

Force on a Current Carrying Wire  
Magnetic Fields Created by Current Carrying Wire

### **Oscillation & Waves**

Periodic Motion – A Definition  
Simple Harmonic Motion  
Spring Block Oscillator:  
Spring Mechanics  
Spring Energetics  
Spring Kinematics  
Pendulum:  
Pendulum Mechanics  
Pendulum Energetics  
Pendulum Kinematics  
Concept of a Wave  
Wave Types  
Wave Characteristics  
Superposition (Interference) of Waves  
Sound Waves  
Speed of Sound  
Reflection & Refraction  
Timbre  
Beats  
The Doppler Effect

### **Nuclear Reactions**

Nuclear Structure  
Concept of Radiation  
Types of Radioactive Decay  
Half-Life  
Nuclear Energy  
Nuclear Fission  
Fission Chain Reaction  
Nuclear Power  
Nuclear Fusion

### **Appendix: Measurement, Calculation, & Graphs**

## ***Biology Topics & Units***

### **Enzymes**

Enzyme – A Definition  
Mechanism of Action  
Enzyme Kinetics  
Inhibition of Enzyme Activity:  
Competitive Inhibition  
Non-Competitive Inhibition  
Cooperative Enzyme Kinetics  
Optimal Conditions for Enzymatic Activity

### **Cellular Metabolism**

Energy Flow  
Energy Generation in Cells  
Metabolic Pathways:  
Glycolysis  
Fate of Pyruvate  
Tricarboxylic Acid (TCA) Cycle  
Electron Transport Chain & Oxidative Phosphorylation

### **Molecular Genetics**

“Central Dogma” of Molecular Genetics  
The Cell Cycle & Nucleic Acids  
Nucleotide Structure  
Nucleic Acid Structure:  
DNA  
RNA  
DNA Replication  
Prokaryotic vs. Eukaryotic DNA Replication  
Flow of Genetic Information  
DNA Transcription: RNA Synthesis  
Basic Terms & Concepts  
Mechanisms of RNA Synthesis:

Prokaryotes  
Eukaryotes  
Translation: Protein Synthesis  
Amino Acid Activation  
Protein Synthetic Mechanism  
The Genetic Code  
Mutations

### **Musculoskeletal System**

Structure of Skeletal Muscle  
Muscle Contraction  
Electrical vs. Mechanical Events  
Length-Tension Relationship  
Preload & Afterload  
Structure of Bone  
Function of Bone  
Endocrinology of Bone

### **Gastrointestinal System**

Gastrointestinal Structure:  
Anatomy  
Innervation  
Histology  
Appetite  
Gastrointestinal Secretions:  
Oral Secretion  
Gastric Secretion  
Pancreatic Secretion  
Hepatic-Biliary Secretion  
Nutrient Digestion & Absorption:  
Carbohydrates  
Proteins  
Lipids

### **Respiratory System**

Pulmonary Structure  
Pulmonary Mechanics  
Breathing Cycle  
Pulmonary Ventilation:  
Minute Ventilation  
Alveolar Ventilation  
Distribution of Tidal Volume  
Pulmonary Circulation  
Distribution of Blood Flow  
Distribution of Ventilation & Perfusion  
Normal Gas exchange  
Diffusion of Oxygen & Carbon Dioxide  
Transport of Oxygen & Carbon Dioxide  
Oxygen-Haemoglobin Dissociation Curve  
Carbon Dioxide Transport  
Control of Respiration:  
Chemical Control  
Neural Control

### **Cardiovascular System**

Heart Anatomy  
Vascular Histology  
Haemodynamics  
Systemic & Pulmonary Circuits  
Blood Flow  
Local Blood Flow Regulation  
Trans-Capillary Exchange  
Blood Pressure & Gravity  
Cardiac Cycle  
Blood Pressure Regulation:  
Neural Component  
Endocrine Component

### **Renal System**

Urinary System Structure  
Anatomy  
Histology  
Body Water Distribution  
Fluid Disturbances  
Renal Clearance  
Glomerular Filtration  
Regulation of Urine Concentration & Volume/Renal Endocrinology

## **Physical Chemistry Topics & Units**

### **Atomic Structure & Periodicity**

- Atoms – A Definition
- The Bohr Model of an Atom
- The Wave-Mechanical Atom
- Elemental Electronic Structure
- Orbital Shape
- Rules of Electron Configuration
- Examples of Electron Configuration
- Periodic Trends:
  - Atomic Radius
  - Ionic Radius
  - Ionisation Energy
- Summary of Periodic Trends
- Constitution of Periodic Table

### **Chemical Bonding**

- Bonding – A Definition
- Ions:
  - Cations
  - Anions
- Intramolecular Bonding:
  - Ionic Bonds
  - Covalent & Multiple Covalent Bonds
- Types of Covalency
- Bonding as a Continuum
- Metallic Bonds
- Lewis Structures
- Molecular Geometry
- Intermolecular Bonding
- Hydrogen Bonding
- Permanent Dipole-Dipole Attractions
- Temporary Dipole-Dipole Attraction

### **Kinetics & Equilibrium**

- Kinetics – A Definition
- Collision Theory
- Transition State Theory
- Factors Affecting Reaction Rate
- Concentration of Reactants
- Surface Area of Reactants
- Reaction Temperature
- Quantifying Reaction Rates
- Rate Laws
- Overall Rate
- Equilibrium – A Definition
- Reaction Quotient & Equilibrium Constant
- Le Chatelier's Principle
- Concentration & Equilibrium
- Pressure & Equilibrium
- Temperature & Equilibrium
- Heterogeneous Equilibria

### **Thermochemistry**

- Enthalpy
- Exothermic & Endothermic Reactions:
  - Exothermic
  - Endothermic
- Entropy
- Standard State
- Free Energy

### **Gases**

- Gases – A Definition
- Gas Laws:
  - Boyle's Law
  - Charles' Law
  - Gay-Lussac's Law
  - Avogadro's Law
  - Graham's Law of Effusion
  - Dalton's Law of Partial Pressures
  - Maxwell-Boltzmann Distribution
- Ideal Gas
- Real Gas

### **Phase Equilibria**

- Phase – A Definition
- Heat vs. Temperature Diagram
- Temperature vs. Pressure Diagram
- Evaporation
- Vapour Pressure

### **Solutions & Solubility**

- Solution – A Definition
- Units of Concentration
- Energetics of Solvation
- Solvents
- Rates of Dissolution
- Solubility
- Solubility Product
- Precipitation & Ionic Product
- Common Ion Effect
- Raoult's Law
- Colligative Properties:
  - Boiling Point Elevation
  - Freezing Point Depression

### **Acids & Bases**

- Concept of Acid & base
- The pH Scale
- Acid & Base – A Definition
- Conjugate Acid/Base Pairs
- Strong & Weak Acids
- Strong & Weak Acids of Equal Concentration
- Single Acid of Different Concentrations
- Concentrations of Different Acids & pH
- Acid Strength
- Binary Acids
- Oxoacids
- Strong & Weak Bases
- Base Strengths:
  - Monoatomic Anion & Binary Bases
  - Metal Hydroxides
- Acidity Constant
- Basicity Constant
- Buffers
- Titration
- Titration Curves

## **Organic Chemistry Topics & Units**

### **Isomerism**

- Structural Isomers
- Conformational Isomers
- Geometric Isomers
- Fischer & Standard Notation
- Stereochemistry
- Enantiomers
- Optical Activity
- Racemic Mixture
- Diastereomers
- Meso Compounds

### **Hydrocarbons**

- Hydrocarbons
- Cycloalkanes
- Physical Properties
- Free-Radical Halogenation
- Alkenes & Alkynes
- Covalent Organic Chemical Bonding
- Electrophilic Addition
- Aromatic Compounds
- Nucleophilic Substitutions
- Elimination

### **Oxygen-Containing Compounds**

- Alcohols – A Definition
- Physical & Chemical Properties

Important Reactions  
Ethers – A Definition  
Physical & Chemical Properties  
Important Reactions  
Aldehydes & Ketones – A Definition  
Physical & Chemical Properties  
Important Reactions  
Carboxylic Acids – A Definition  
Physical & Chemical Properties  
Important Reactions

### **Biological Molecules**

Carbohydrates – A Definition  
Stereochemistry  
Cyclisation  
Polysaccharides  
Lipids – A Definition  
Fatty Acids  
Triacylglycerols  
Protein – A Definition  
Amino Acid Structure  
20 Amino Acids  
Titration of Amino Acids  
Protein Structure

### **Appendix 1: Nomenclature**

### **Appendix 2: Laboratory Techniques**

Quote B Deconstruction  
Online Sample Response B  
Online Practice Essay A  
Online Practice Response A  
Online Practice Essay B  
Online Practice Response B  
Written Communication Simulated GAMSAT Questions  
Written Communication Marked Assignments

## Testbank Module

Prognostic Simulated GAMSAT 1  
Analysis of Solutions  
Prognostic Simulated GAMSAT 2  
Analysis of Solutions

## Humanities & Social Sciences

### Reasoning Module

#### INTRODUCTION

Suggested Reading  
What is being Tested?  
Analysing Prose  
Answering Multiple-Choice Questions  
Textual Paraphrasing & Annotation  
Question Analysis  
Prose Simulated GAMSAT Questions  
Analysing Poems  
Poetry Simulated GAMSAT Questions  
Analysing Social Science  
Bar Charts  
Scattergrams  
Histograms  
Pie charts  
Social Science Simulated GAMSAT Questions

## Written Communication Module

#### INTRODUCTION

What is Being Tested?  
Written Communication  
Examination Instructions  
Criteria of Assessment  
Typical Mistakes Made by Candidates  
Planning Your Essay  
Online Writing Test A  
Sample Quotation A  
Quote A Deconstruction  
Online Sample Response A  
Online Writing Test B  
Sample Quotation B