SYLLABUS DISTRIBUTION
2023/2024 TERM 2

GRADE 12

BIOLOGY

17. Selection and evolution
18. Classification, biodiversity and conservation
19. Genetic technology

CHEMISTRY

33 Carboxylic acids and derivatives
Carboxylic acids
Esters
Acyl chlorides

34 Nitrogen compounds
Primary and secondary amines
Phenylamine and azo compounds
Amides
Amino acids

35 Polymerisation
Condensation polymerisation
Predicting the type of polymerisation
Degradable polymers

36 Organic synthesis

37 Analysis
Analytical techniques
Thin-layer chromatography
Gas /liquid chromatography
Carbon-13 NMR spectroscopy
Proton (1 H) NMR spectroscopy

COMPUTER SCIENCE 9618

16 System Software
    16.1 Purposes of an Operating System (OS)
    16.2 Translation Software
20 Further Programming
    20.1 Programming Paradigms
    20.2 File Processing and Exception Handling
17 Security
    17.1 Encryption, Encryption Protocols and Digital certificates
18 Artificial Intelligence (AI)
    18.1 Artificial Intelligence (AI)

MATHEMATICS

Ref. no.	Topic	Objectives
3.4	**Differentiation**	■ Use the derivatives of e^x, $\ln x$, $\sin x$, $\cos x$, $\tan x$, $\tan^{-1} x$, together with constant multiples, sums, differences and composites ■ Differentiate products and quotients ■ Find and use the first derivative of a function which is defined parametrically or implicitly
3.5	**Integration**	extend the idea of 'reverse differentiation' to include the integration of e^{ax+b}, $\dfrac{1}{ax+b}$, $\sin(ax+b)$, $\cos(ax+b)$, $\sec^2(ax+b)$ and $\dfrac{1}{x^2+a^2}$ ■ Use trigonometrical relationships in carrying out integration ■ Integrate rational functions by means of decomposition into partial fractions recognise an integrand of the form $\dfrac{k\mathrm{f}'(x)}{\mathrm{f}(x)}$, and integrate such functions ■ Recognize when an integrand can usefully be regarded as a product, and use integration by parts ■ Use a given substitution to simplify and evaluate either a definite or an indefinite integral.
3.6	**Numerical solutions of Equations**	■ Locate approximately a root of an equation, by means of graphical considerations and/or searching for a sign change ■ Understand the idea of, and use the notation for, a sequence of approximations which converges to a root of an equation ■ Understand how a given simple iterative formula of the form $x_{n+1} = F(x_n)$ relates to the equation being solved, and use a given iteration, or an iteration based on a given rearrangement of an equation, to determine a root to a prescribed degree of accuracy.
3.7	**Vectors**	use standard notations for vectors, i.e. $\begin{pmatrix} x \\ y \end{pmatrix}$, $x\mathbf{i}+y\mathbf{j}$, $\begin{pmatrix} x \\ y \\ z \end{pmatrix}$, $x\mathbf{i}+y\mathbf{j}+z\mathbf{k}$, $\overrightarrow{AB}$, $\mathbf{a}$ ■ Carry out addition and subtraction of vectors and multiplication of a vector by a scalar, and interpret these operations in geometrical terms ■ Calculate the magnitude of a vector, and use unit vectors, displacement vectors and position vectors ■ Understand the significance of all the symbols used when the equation of a straight line is expressed in the form $r = a + tb$, and find the equation of a line, given sufficient information ■ Determine whether two lines are parallel, intersect or are skew, and find the point of intersection of two lines when it exists ■ Use formulae to calculate the scalar product of two vectors, and use scalar products in problems involving lines and points
3.8	**Differential Equations**	■ Formulate a simple statement involving a rate of change as a differential equation ■ Find by integration a general form of solution for a first order differential equation in which the variables are separable ■ Use an initial condition to find a particular solution ■ Interpret the solution of a differential equation in the context of a problem being modelled by the equation

3.9	**Complex numbers**	- Understand the idea of a complex number, recall the meaning of the terms real part, imaginary part, modulus, argument, conjugate, and use the fact that two complex numbers are equal if and only if both real and imaginary parts are equal - Carry out operations of addition, subtraction, multiplication and division of two complex numbers expressed in Cartesian form x + iy - Use the result that, for a polynomial equation with real coefficients, any non-real roots occur in conjugate pairs - Represent complex numbers geometrically by means of an Argand diagram carry out operations of multiplication and division of two complex numbers expressed in polar form $r(\cos\theta + i\sin\theta) \equiv re^{i\theta}$ - Find the two square roots of a complex number - Understand in simple terms the geometrical effects of conjugating a complex number and of adding, subtracting, multiplying and dividing two complex numbers - Illustrate simple equations and inequalities involving complex numbers by means of loci in an Argand diagram

PHYSICS

TOPIC 22 –MOTION OF CHARGED PARTICLE
IN MAGNETIC FIELD

22.1 Observing The Force
22.2 Orbiting Charged Particle
22.3 Electric And Magnetic Fields
22.4 The Hall Effect
22.5 Discovering The Electron

TOPIC 23 –ELECTROMAGNETIC INDUCTION

23.1 Observing Induction
23.2 Explaining Emi
23.3 Faraday's Law Of Emi
23.4 Lenz's Law
23.5 Everyday Examples

TOPIC 24- ALTERNATING CURRENT

24.1 Sinusodal Current
24.2 Alternating Voltage
24.3 Power And Ac

24.4 Rectification

TOPIC 25-QUANTUM PHYSICS

25.1 Modelling With Particles And Waves
25.2 Particle Nature Of Wave
25.3 The Photo Electric Effect
25.4 Threshold Ffrequency And Wavelength
25.5 Momentum Of Photons
25.6 Line Spectra
25.7 Origin Of Line Spectra
25.8 Photon Energy
25.9 The Nature Of Light
25.10 Electron Waves
25.11 Revisiting Photons

TOPIC 26-QUANTUM PHYSICS

26.1 Balanced Equaton
26.2 Mass And Energy
26.1 The Photo Electric Effect
26.1 Energy Released In Nuclear Decay
26.1 Binging Energy And Stability
26.1 Randomness And Radioactive Decay
26.1 Decay Graph And Equations
26.1 Decay Constant And Half Life

TOPIC 27-MEDICAL IMAGING

27.1 The Nature And Production Of X-Rays
27.2 X-Ray Attenuation
27.3 Improving X-Ray Images
27.4 Computerised Axial Tomography
27.5 Using Ultrasound In Medicine
27.6 Echo Sounding
27.7 Ultrasound Scanning
27.8 Positron Emission Tomography

TOPIC 28-Astronomy and Cosmology

28.1 Standard Candles
28.2 Luminosity And Radiant Flux Intensity
28.3 Steller Radii
28.4 The Expanding Universe