Syllabus for Bio-Informatics (for females only) PGQP08 (x)

A. MATHEMATICS

- **Calculus:** The concept of limit of a Functions, continuity, differentiability, successive differentiation, Liebnitz theorem, asymptotes, definite integrals, reduction formulae, order and degree of ordinary differential equations, linear differential equations with constant coefficient and Laplace transformations

- **Algebra:** Mappings, groups, subgroups, matrices, elementary operations of matrices, inverse of matrices, application of matrices to system of linear equations, vector spaces, linear transformation and their matrix representations.

- **Analysis** Open set, closed set, limit, continuity, Taylor's theorem, Lagrange's mean theorem, Rolle's Theorem, sequences and series, convergence of series.

- **Geometry** Plane, straight line, sphere, cone, cylinder, conicoids.

B. CHEMISTRY

- Structure and bonding: Bohr's theory and Schrodinger wave equation; Ionic and covalent bonding, VSEPR theory and shape of molecules; hybridization, resonance, dipole moments; structure parameters, bond length, bond angle, bond energy, hydrogen. bonding, van der Waals interaction, ionic solids, lattice energy.
- Periodicity of elements: s, p, d and f Block elements; Periodic properties — Atomic and ionic radii, ionization energy, electrode potential, electron affinity and electronegativity, definition, significance, trends in periodic table.
- Coordination compounds: Nomenclature, stereochemistry, isomerism in coordination complexes' important applications.
- Chemical Equilibria: Colligative properties of solutions, ionic equilibria in solution, solubility product, common ion effect, hydrolysis of salts, concept of pH, pK, buffer and their application in chemical analysis, equilibrium constants, structure of water, chemical forces, hydrophobic and hydrophilic forces.
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- Chemical kinetics: Rate constant, order of reaction, molecularity, activation energy, effect of pl 1 and temperature on kinetics of reactions, catalysis.
- Chemistry of Organic compounds: Acids and bases, electronic and steric effects; optical and geometrical isomerism, tautomerism, conformers, concept of aromaticity; chemistry of functional groups. alkyl halides, alcohols, carbonyl compounds, carboxylic acids and their derivatives, phenols, sulphonic acids, organo phosphorus compounds; synthesis of small molecules using standard reactions.
- Instrumental techniques: Concept of chromatography, electrophoresis; spectrophotometry, UV-VIS, IR, NMR',-and spectroscopy.