DEPARTMENT OF COMPUTER SCIENCE

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SYLLABUS FOR M.Sc. (Bioinformatics) ENTRANCE TEST

FORMAT: Multiple-Choice Questions

Category	Distribution of Questions (approx.)
1. Mathematics (CBSE Secondary/10th Level)	50%
2. Computer Awareness	15%
3. Molecular Biology	15%
4. Reasoning	10%
5. General English	10%

DETAILED SYLLABUS

1. **MATHEMATICS: Number Systems-**Real Numbers and their Representations, Representation of terminating/ non-terminating recurring decimals; Rational numbers as recurring/ terminating decimals; nonrecurring/ non-terminating decimals, Existence of non-rational numbers, *n*th root of a real number. Laws of exponents with integral powers. Rational exponents with positive real bases. Rationalization of real numbers. Euclid's division lemma, Fundamental theorem of arithmetic, Irrationality of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, decimal expansions of rational numbers. **Algebra-**Polynomials, Degree of a polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros/roots of a polynomial/ equation. Remainder Theorem, Factorization of polynomials, Algebraic expressions and identities, Simple expressions, Linear Equations in Two Variables, Ratio and Proportion. **Coordinate Geometry-**The Cartesian plane, coordinates and coordinate plane, notations and linear equations in two variables. **Euclid's Geometry-**Euclid's method, common/obvious notions, axioms/postulates and theorems; The five postulates of Euclid. Equivalent the fifth postulate. Relationship between axiom and theorem. Two distinct points and one point in common. **Lines and Angles-**Sum of two adjacent angles, Intersection and vertically opposite angles, Results on corresponding angles, alternate angles, interior angles. Lines and parallels. Exterior, interior and opposite angles. **LINES (in two-dimensions):** Concepts of coordinate geometry including graphs of linear equations; Geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). **Triangles-**Definitions, examples, counter examples of similar triangles. the corresponding angles and their corresponding sides; Corresponding sides of two triangles and their corresponding angles; Similarity of Triangles – different cases, Area of a triangle, Congruence of Triangles, SAS Congruence, ASA Congruence, SSS Congruence; Two right triangles congruence, Triangle inequalities and relation between 'angle and facing side' inequalities in triangles. **Quadrilaterals-**Parallelogram into two congruent triangles, Parallelogram with opposite equal sides and opposite angles and conversely, etc. **Areas & Volumes:** Concept of area, area of a rectangle. Parallelograms on the same base and between the same parallels have the same area. Triangles on the same base and between the same parallels are equal in area and its converse; Hero's formula and its application, area of a quadrilateral. Surface areas and volumes of cubes, cuboids, spheres and right circular cylinders/ cones. **Surface Areas and Volumes-**surface areas and volumes of combinations of cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Fructum of a cone, mixed problems. **Circles-**Basic concepts, equal chords and equal angles at the center and its converse; The perpendicular, chord and bisector of a chord and converse; one circle passing through three given non-collinear points, Equal chords of a circle. The angle subtended by an arc, Angles and a line segment joining two points. The sum of the either pair of the opposite angles; Tangents and their properties, length of tangents; Area of a circle; sector and segment; Problems based on areas and perimeter/ circumference of the above said plane figures. **Constructions-**Construction of bisectors of line segments & angles, 60^{o}, 90^{o}, 45^{o} angles etc., equilateral triangles; Construction of a triangle given its base, sum/difference of the other two sides and one base angle; Construction of a triangle of given perimeter and base angles; Internal division of a line; Tangent to a circle from an outside point, Construction of a triangle similar to a given triangle. **Statistics-**Data collection & presentation, graphs, analysis of data; Mean, median, mode; Cumulative frequency graph. **Probability-**Terminology, Repeated experiments and observed frequency, Classical definition of probability. **Pair of Linear Equations in Two variables-**Geometric representation of different possibilities of solutions/ inconsistency. Algebraic conditions for number of solutions. Solution by substitution, elimination and by cross multiplication. **Quadratic Equations-**Standard form, Solution by factorization and by completing the square, Relationship between discriminant and nature of roots. **Arithmetic Progression:** AP, Derivation of standard results of finding the n^{th} term and sum of first n terms. **Trigonometry-**Trigonometric ratios, Proof of their existence, common trigonometric ratios. Relationships between the ratios. **Trigonometric Identities-** applications of the identities, and Trigonometric ratios of complementary angles. **Height and Distances-**Simple

problems, Angles of elevation/depression.
2. COMPUTER AWARENESS: Computer Organization and Architecture, Components, I/O Devices, Storage Devices, Types of Computer Systems, Types of Software, Programming Languages, Number Systems, Internet vs. Intranet, Popular Computer Brands, Popular Computer Software Companies, Recent Developments, Common Computer Terminologies, Windows and Current Trends/News.
3. MOLECULAR BIOLOGY: Concepts in Biology, Characteristics of living Organisms, Structure of Cells, Energy flow, Nutrition & Metabolism; Information storage and gene expression, Reproduction and Inheritance. Biomolecules, Carbohydrates, Amino Acids, Proteins, Lipids, Nucleic Acids. Enzymes, Properties, Activation energy, Reaction Kinetics, Intercellular Communication, DNA Expression and replication, Genes, Cloning, Mutation X-ray Crystallography, NMR Genome Organization.
4. REASONING: Logical, Symbolic, Verbal & Mathematical Reasoning, Finding Odd-Man Out, Matching, Differences, Similarities, Prediction, Interpolation and Extrapolation in Number Series, Number Series and Alphabet Series, Test of Direction Sense, Coding-Decoding, Number Ranking, Arithmetical Reasoning, Blood Relations, Analogy, Decision Making, Non-verbal Series, Mirror Images, Grouping Identical Figures & Common Reasoning Fallacies.
5. GENERAL ENGLISH: Vocabulary, Punctuation, Syntax, Verb, Forms, Spelling, Synonyms, Antonyms, Homonyms, Tense, Use of Preposition, Conjunctions, Active and Passive voice, Simple, Complex and Compound Sentences, Degree of Comparison, Direct and Indirect Speech.