DETAILS OF ENTRANCE TEST – 2021-2022

B-54

Name of the Faculty:	**Faculty of Natural Sciences**
Department/Centre:	**Mathematics**
Name of the Program:	**B.Sc. (Hons.) Mathematics**

About Program's Prospects: To prepare students for higher studies in Mathematics and allied areas including number of professional programs such as Industrial Mathematics, Computer Applications etc. by laying strong theoretical foundation in the subject.

Summary of Entrance Test

S.No	Test-Component	Test Duration (minutes)	Max. Marks	Passing Marks	Negative Marking (Yes/No)
1.	Multiple Choice Questions on Mathematics	90 min.	75	15 %	Yes -0.25 marks/ wrong answer
2.	General Awareness/Reasoning/ General English		25		

Permissible Material/equipment for Entrance Test (as required):
- Black/Blue Ball Pen.
- Pencil

Detailed Entrance Test Syllabus is attached:

B.Sc. (Hons.) Mathematics
Entrance Test Syllabus

Mathematics:

Set Theory and Higher Algebra -Algebra of sets, relation, One. Many one. Onto and Into Mappings, Inverse mapping, Composite mapping. Bounded and unbounded sets Neighborhood of a point, domain, Codomain, Range. Square roots of polynomial quadratic surds. unity, A.P., H.P., G.P. and other related miscellaneous series, A.G.P., Method of differences, Sum of the squares and cubes of first n natural numbers, Simple geometrical problems of permutations and combinations, General terms in the expansions of Logarithmic, Exponential series, binomial and multinomial theorems, remainder theorem, Factor theorem, rationalizing factor of binomial surd of different orders, Conversion of a fraction and a quadratic surds into a continued fraction, Inequalities. Periodic function. hyperbolic function, Inverse hyperbolic functions, Greatest integer functions, Absolute function, Signum function. Even and Odd functions, Transcendental functions, Rational and Irrational algebraic functions etc.

Vector Algebra - Linear combination of vectors, linear dependence and independence of vectors, Geometrical applications of dot (scalar) and cross (vector) product of two, three and four vectors.

Plane and Solid Geometry - Classification of curves represented by general polynomial equations (homogeneous and non- homogeneous) of second degree in x and y, Homogeneous equations of nth degree, Detailed study of families of Straight lines and Circles. Parabola, Ellipse and Hyperbola. Condition of tangency of a line to a curve of any positive integral degree in x and, simple problems on plane, straight line in space and sphere.

Trigonometry - Trigonometrical conditional identities and equations, Relations between sides, angles and radii of incircle, circum circle and excribed circle associated with triangle, Inverse circular functions, Polar form of complex number, Euler's formula, Values of $(a + ib)p/q$, Applications of De-Moivre's theorem.

Determinants and matrices - Multiplications of determinants and matrices, adjoint and inverse of matrices, rank 'of matrix, Cramer's rule, Applications of determinants and matrices, Geometrical transformations (i.e. reflection, rotation, translation, enlargement), their composition and representation by matrices. Limit, Continuity, Monotonicity. Differentiability, Differentiation of composite function, Implicit relation, Parametric forms, logarithmic differentiation, differentiation by transformations, increasing and decreasing functions, Tangent, Normal, Maxima and Minima of a function of one variable, velocity, Acceleration, Rolle's theorem, Lagrange's mean value theorem, standard results on successive (ordinary and partial) differentiation. L'Hopital's rule, Seven indeterminate forms, Euler's theorem on homogenous function for partial differentiation, Simple problems on Leibnitz's theorem. Equations of tangent plane and normal line at any point of 3 D figures.

Integral Calculus - Integration by well known standard results, by substitutions, by parts, by partial fractions, some well known definite integrals, properties of definite integrals, Reduction formulae, Applications of definite integral in finding the area of bounded region in x-y plane, Volume and lateral (curved) surface area of some well

known 3-D solids obtained by revolution, Mean value. Mean square value. root mean square value of a function for a given interval, Calculation of a interval in which the value of a given definite integral exists.

Differential Equations - Formation of ordinary and paltial differential equations. General and particular solution of O.D.E. of I order and I degree (i.e. variable separable for. homogeneous form. linear form, exact form and their reducible form obtained by some transformations and integrating factors), O.D.E. of I order but not of I degree. General solution of $d^ny/dx^n = G(x)$, $d^2y/dx^2 = H(y)$.

Mathematical Statistics - Karl Pearson's simple correlation coefficient for a tabulated function between two variable Coefficients of covariance and variation. Lines of Regression. regression coefficients Properties of binomial. normal and poission distributions. Measures of skewness and Kurtosis. Dynamics and Statics: Standard formulas and elementary problems.

General Awareness/Reasoning/General English

Reasoning: Logical, Symbolic, Verbal & Mathematical Reasoning, Finding Odd-One Out, Matching, Differences, Similarities, Prediction, Finding missing values in Number Series, 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.

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, and Direct and Indirect Speech.

General Awareness: Students are expected to answer questions on current affairs, historical persons, events, places etc.