B.Sc. Mathematics

PROPOSED COURSE STRUCTURE

To be in force from June 2009.

F.Y.B.Sc. :

Paper 1 Algebra, Trigonometry and Vector Calculus.

Paper 2 Calculus and Differential Equations.

S.Y.B.Sc. :

Paper 3 Advanced Calculus.

Paper 4 Differential Equations.

Paper 5 Linear Algebra (Theory and Practical).

S.Y.B.Sc. : (For students of **Computer Science** as a special subject)

Paper 3 Calculus and Differential Equations.

Paper 4 Discrete Mathematics.

S.Y.B.Sc. : (For students of **Industrial Chemistry** as a special subject)

Paper 3 Calculus and Differential Equations.

Paper 4 FORTRAN 77 and Statistical Methods.

S.Y.B.Sc. : (IDS)

Mathematical Methods.

Group of Symmetries.

T.Y.B.Sc. :

Paper 6 Real Analysis.

Paper 7 Abstract Algebra.

Paper 8 Numerical Analysis (Theory and Practical).

Paper 9 Discrete Mathematics.

T.Y.B.Sc. : (CAN Courses) [Any one from the following]

Number Theory.

Mechanics.

Mathematics in Finance.

Computer Oriented Numerical Methods.

Operation Research.

Mathematical Modelling.

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F.Y.B.Sc.

Mathematics Paper - I

(TRIGONOMETRY, MATRICES AND VECTOR CALCULUS)

To be in force from June 2009

[L : 4; P : 0]

Unit 1 : De' Moivre's theorem and its applications :

De' Moivre's theorem, Trigonometric functions for multiple arguments, Euler's expressions, Evaluation of Indeterminate forms by using Euler's expressions, Hyperbolic functions for real arguments and their inverses.

Unit 2 : Complex variable functions :

Exponential, Circular and Hyperbolic functions of complex variables and their identities, Euler's Theorem, Relations between circular and Hyperbolic functions, Logarithm of complex quantities, Separations of these functions in to their real and imaginary parts.

Unit 3 : Matrix – Introduction and Elementary Row operations :

Matrices, Different types of matrices, Operations on matrices, Properties of operations of matrices.

Equivalent system of linear equations, Elementary Row operations, Row-reduced echelon form, Linear independence of Rows, Row rank, Rank of a matrix, Inverse of Matrix by Row-Reduced Echelon form.

Unit 4 : Solution of linear system of equations, Eigen values & Eigen vectors of a Matrix :

Application of Matrices for solving a system of linear homogeneous and non-homogeneous equations, Eigen values and Eigen vectors of a matrix, Characteristic equation of a matrix, Cayley-Hamilton theorem and its application to find inverse of a matrix.

Unit 5 : Vector Calculus :

Orientation of Vectors.

Vector differentiation and their properties, Gradient of a scalar functions, Divergence and Curl of a vector functions, their properties, Directional derivatives.

The course is covered by the following reference books :

1. Shantinarayan : Text book of Matrices, S.Chand and Co.
2. Krishnamurthy, Mainra & Arora : An Introduction to Linear Algebra, Affiliated East-West Press Pvt. Ltd., N.Delhi.
3. S.L.Loney : Plane trigonometry, Part I and II, McMillan & Co. London.
4. R.S.Verma & K .S. Shukla : Text book of Trigonometry, Pothishala Pvt. Ltd. Allahabad.
5. Shantinarayan : Text Book of Vector Calculus, S. Chand & Co. New Delhi.
6. N.P.Bhamore & et el: Adhunik Ganitshashtra, Part - I, Popular Prakashan, Surat.

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F.Y.B.Sc.

Mathematics Paper - II

(CALCULUS AND DIFFERENTIAL EQUATIONS)

To be in force from June 2009

[L : 4; P : 0]

Unit 1 : Differential Calculus :
Successive differentiation, Calculation of n^{th} derivatives of some standard functions (rational functions and product of powers of sine & cosine functions), Leibnitz theorem and its applications.

Unit 2 : Mean Value Theorems and Indeterminate forms :
Rolle's and Lagrange's Theorems and their geometrical interpretations, Cauchy theorem, Increasing - Decreasing functions, Maclaurin & Taylor series expansions, Indeterminate forms, L'Hospital Rule.

Unit 3 : Applications of Differential Calculus and Reduction formulae for integration :
Curvature, Test of Concavity & Convexity, Points of Inflexion, Asymptotes.
Reduction formulae for integration of $\sin^n x$, $\cos^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\operatorname{cosec}^n x$, $\sin^p x \cos^q x$, $x^m \cos nx$, $x^m \sin nx$.

Unit 4 : Differential Equations of first order and first degree :
Differential equations of first order and first degree, differential equations having separable variables, Homogenous differential equation, Exact differential equation, Integrating factors, Linear differential equation, Bernoulli's differential equation.

Unit 5 : Differential Equations of first order and higher degree :
Differential equations of first order and higher degree, solvable for x, y, p.
Lagrange's equation, Clairaut's equation.

The course is covered by the following reference books :

1. Shantinarayan : Differential & Integral Calculus, S. Chand & Co. New Delhi.
2. Shantinarayan : Integral Calculus, S. Chand & Co., New Delhi.
3. Gorakhprasad : Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
4. Gorakhprasad : Integral Calculus, Pothishala Pvt. Ltd., Allahabad
5. N.P.Bhamore & et el : Adhunik Ganitshashtra, Part - II, Popular Prakashan, Surat.
6. D.A. Murray : Differential Equations. Tata McGraw Hills.
7. Gorakhprasad : Differential Equations, Pothishala Pvt. Ltd., Allahabad.