Syllabus Prescribed for B.Sc. First Year Examination
w.e.f. 2015- 16

Semester I
1S Mathematics Paper- I (Algebra and Trigonometry)

Unit- I: De Moivre's theorem, roots of complex number, circular functions, hyperbolic function, inverse hyperbolic function. Relation between circular functions and hyperbolic functions. Separation of real and imaginary parts of the circular and hyperbolic functions of complex variable.

Unit- II: Trigonometric series: Gregory series, Euler's series, Machin's series, Rutherford's series, summation of series, series based up on $\sin x, \cos x, \sinh x, \cosh x$, exponential series, logarithmic series and series based upon Gregory series.

Unit- III: Elements of quaternion: Definition. Equality and addition, multiplication, complex conjugate of a quaternion, norm, inverse, quaternion as a rotation operator, geometric interpretation, a special quaternion product, operator algorithm, quaternion to matrices.

Unit- IV: Theory of equations: Relations between the roots and coefficients, transformation of equations, cubic equations (Cardon method), Descarte's rule of signs, biquadratic equations.

Unit- V: Matrices: Rank of a matrix, row rank, column rank, eigenvalues, eigenvectors and the characteristic equation of a matrix. Cayley- Hamilton theorem and its application.

References Books:

1. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi,2000.

2. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.

3. Chandrika Prasad, Text Book on Algebra & Theory of Equations, Pothishala Private Ltd., Allahabad.

4. S.L. Loney, Plane Trigonometry Part- II , MacMillan & Co., London.

5. R.S. Verma & K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd. Allahabad.

6. Ayres Jr Frank : Matrices : Schaum's outline series, McGraw Hill Book Company,Singapore, 1983.

7. T M Karade, Maya S.Bendre, Lectures on Algebra and Trigonometry.

8. Hohn Franz E : Elementary Matrix Algebra, Amerind Publishing Co., Pvt. Ltd. 1964.

9. Spiegel M.R. :Comples Variables, Schaum's outline series, McGraw Hill, 1981.

10. Shanti Narayan : A Test Book of Matrices, S. Chand & Co. Delhi.

11. Jack B Kuipers: quaternion algebra of Quaternions and rotation sequences,Princeton University Press, Fifth printing, 2002.

Unit- I: Definition of the limit of a function, basic properties of limits, continuous functions and classification of discontinuities.

Unit- II : Differentiability, successive differentiation, Leibnitz theorem, indeterminate forms and L'Hospital rule.

Unit- III: Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Maclaurin and Taylor series expansions.

Unit- IV: Partial derivatives and differentiation of real valued function of two variables, homogeneous functions, Euler's theorem on homogeneous functions.

Unit- V: Integration of the form $\int \dfrac{P_n(x)}{\sqrt{Q}}\,dx$, reduction formulae for $\int \sin^n x\,dx$ $\int \cos^n x\,dx$

and Walli's formula $\int \tan^n x\,dx$, $\int \cot^n x\,dx$, $\int \sec^n x\,dx$, $\int \cos ec^n x\,dx$, $\int \sin^n x.\cos^m x\,dx$

Quadrature, rectification.

References :

1. Ayres F Jr. : Differential equations, Schaum's outline series, McGraw Hill, 1981.

2. Ayres F.Jr. : Calculus, Schaum's Outline series, McGRaw Hill, 1981.

3. Karade T.M., J .N. Salunke, M.S. Bendre : Graduate level Calculus, Sonu- Nilu,5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.

4. Karade T.M., Maya S. Bendre : Integration and Differential equations, Sonu-Nilu, 5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.

5. Edwards J: Differential Calculus for Beginners, MacMillan and Co.Ltd.,1963.

6. Edwards J: Integral Calculus for Beginners, AITBS, Publishers and Distributors,1994.

7. Forsynth A.R.: A Treatise on Differential Equations, (Sixth Edition) MacMillan and Co.1956.

8. Greenspan D. : Introduction to Calculus, Harper and Row, 1968.

9. Gorakh Prassad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.

10. Gorakh Prasad : Integral Calculus, Pothishala Pvt. Ltd., Allahabad.

11. Erwin, Kreyszig :Advanced Engineering Mathematics, J ohn Wiley & Sons, 1999

12. N. Piskunov : Differential and Integral Calculus, Peace Publishers, Moscow.