

Shri Shivaji Education Society Amravati's

SHRI SHIVAJI SCIENCE AND ARTS COLLEGE , CHIKHALI , DIST
BULDANA

NAAC Reaccredited with ' B++' Grade (CGPA-2.82)

DEPARTMENT OF MATHEMATICS

SYLLABUS

(Prescribed by Sant Gadge Baba Amravati University ,Amravati)

B.Sc.Part-I(Semester-I)

MATHEMATICS :_ Algebra And Calculus

UNIT I	Rank of a Matrix, Row Rank, Column Rank, Eigen Values, Eigen Vectors and the Characteristic Equation of a Matrix, Cayley -Hamilton theorem, Inverse by Cayley-Hamilton theorem.
UNIT II	De Moivre's theorem, Roots of Complex Number, Circular Functions, Hyperbolic Function, Inverse Hyperbolic Function, Relation between Circular Functions and Hyperbolic Functions.
UNIT III	Limit of a function, ϵ - δ definition, basic properties of limits, some standard limits, Continuous and Discontinuous functions, Types of Discontinuity.
UNIT IV	Rolle's theorem, Lagrange's Mean Value theorem, Cauchy's Mean Value theorem, Maclaurin's and Taylor's series expansions.

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Practical :- The Distribution of marks for practical examination will be as

follows :

Practical Assessment (50 Marks)	Internal Practical Assessment (25 Marks)	1. Practical Record-15 Marks 2. Viva voce-10Marks
	External Practical Assessment (25 Marks)	1. Practical Perform-20Marks (Perform any four,each carry 05 Marks) 2. Viva voce-05Marks

List Of Practicals :

- 1 To compute Rank, Row Rank and Column Rank of a Matrix.
- 2 To find Eigen values and Eigen vectors of a given matrix.
- 3 To verify Cayley-Hamilton theorem for the given matrix.
- 4 To apply De Moivre's theorem for solution of given polynomial equation.
- 5 To discuss the relation between Circular Functions and Hyperbolic Functions.
- 6 To separate real and imaginary parts of a Circular and Hyperbolic functions.
- 7 To explain basic properties of limit of function(Uniqueness, Addition, subtraction, multiplication and division of two functions).
- 8 To find δ , by using ϵ - δ definition of limit for various functions.
- 9 To explain the types of discontinuity with various examples
- 10 To discuss applicability of Rolle's mean value theorem for various functions.
- 11 To discuss applicability of Lagrange's and Cauchy's mean value Theorem for various functions.
- 12 To discuss applicability of Taylors and Maclaurin's series of expansions for various functions.

REFERENCE BOOKS :

- 1] V.A.Sharma,V.R.Patil,S.R.Bhoyar,G.U.Khapekar,A.N.Rangari:A Textbook of Algebra and Trigonometry, Dnyanpath Publication, Amravati, First Edition, 2022.
 - 2] V.A.Sharma,V.R.Patil,S.R.Bhoyar,G.U.Khapekar,A.N.Rangari: A Text book of Differential and Integral Calculus, Dnyanpath Publication, Amravati, First Edition, 2022.
 - 3] T. M. Karade, Maya S. Bendre, V. G. Mete, V. P. Kadam, S. N. Bayaskar, P. P. Khade, Priyanka B.Gaikwad: Elements of Algebra and Calculus. Sonu-Nilu, Nagpur, 2024.
 - 4] K.B.Datta,MatrixandLinearAlgebra,Prentice Hall of India Pvt. Ltd.New Delhi,2000. 5] H. S. Hall and S. R. Knight, Higher Algebra, H. M. Publications, 1994.
 - 6] Hohn FranzE: Elementary Matrix Algebra,Amerind Publishing Co.,Pvt.Ltd.1964.
 - 7] Ayres Jr Frank:Matrices: Schaum'soutline series,Mc Graw Hill Book Company, Singapore,1983. 8] Shanti Narayan:ATest Book of Matrices, S. Chand & Co. Delhi.
 - 9] Shanti Narayan and Dr.P.K.Mittal:Differential Calculus by, S.Chandand Co.Ltd.Revised Edition 2012 (Reprint 2014).
 - 10] Gorakh Prasad:Textbook on Differential Calculus by, Pothishala Private limited Allahabad.
 - 11]Ayres F : Calculus, Schaum's outline series, Mc Graw Hill, 1981.
 - 12] Mac Millan: Differential calculus by Edwards,and Co. Ltd.
 - 13] N.Bali:Golden Differential Calculus,Laxmi Publication Pvt Ltd.
 - 14] Murray and R Spiegel:Theory and Problems on Advance Calculus by, Schaum Pub. Co .New York.
 - 15] Edwards J : Differential Calculus for Beginners, MacMillan and Co.Ltd.,1963.
 - 16] Green spanD.:Introduction to Calculus,Harper and Row,1968.
 - 17] Gorakh Prasad:Differential Calculus,Pothishala Pvt. Ltd.,Allahabad,1963
- Dnyanpath Publication, Amravati, (M. S.) India, First Edition, 2024.

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DEPARTMENT OF MATHEMATICS

SYLLABUS

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B.Sc.Part-I(Semester-II)

MATHEMATICS :_ Vector Analysis and Geometry

Unit	Content
UnitI	Scalar and Vector Product of three vectors, Product of four vectors, Vector Differentiation and Vector Integration. (08 Hrs.)
UnitII	Space Curve, t, n, b Vectors, Fundamental Planes, Curvature, Torsion, Frenet-Serret Formula. (07 Hrs.)
UnitIII	Gradient , Divergence and Curl, Directional Derivative. (08Hrs.)
UnitIV	Sphere: Different forms of Sphere, Section of a Sphere by a Plane, Sphere through a given Circle, Orthogonal Sphere and Condition of Orthogonality. (07 Hrs.)

Practical :- The Distribution of marks for practical examination will be as

follows :

Practical Assessment (50 Marks)	Internal Practical Assessment (25 Marks)	1. Practical Record-15 Marks 2. Vivavoce-10Marks
	External Practical Assessment (25 Marks)	1. Practical Perform-20Marks (Perform any two from group A and B, each carry 05 Marks) 2. Vivavoce-05Marks

List Of Practicals :

- 1 To solve the examples on Scalar and Vector triple product of three vectors.
- 2 To calculate product of four vectors.
- 3 To solve the problems on Vector Differentiation.
- 4 To solve the problems on Vector Integration.
- 5 To obtain the expression for n, b vectors.
- 6 To determine the equations of Fundamental Planes.
- 7 To obtain the formulae for Curvature and Torsion of curve.
- 8 To prove Frenet-Serret formulae.
- 9 To demonstrate the concept of Gradient, Divergence and Curl of a vector function.
- 10 To solve the problems on Directional Derivative.
- 11 To obtain different forms of Sphere.
- 12 To solve examples on Orthogonality of Sphere.

REFERENCE BOOKS :

- 1] V.A.Sharma, V.R.Patil, S.R.Bhoyar, G.U.Khapekar, A.N.Rangari: A Textbook of Vector Analysis and Geometry, Dnyanpath Publication, Amravati, First Edition, 2022.
- 2] Murray R.Spiegel, Vector Analysis, Schaum Publishing Company, New York, 1981.
- 3] N.Saranand S.N.Nigam, Introduction to vector Analysis Pothishala Pvt.Ltd. Allahabad.
- 4] Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co. New Delhi.
- 5] R.J.T.Bell, Elementary Treatise on Co-ordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994.
- 6] P.K.Jain and Khalil Ahmad, A Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd., 1999.
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