પરિપત્ર:

ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટીની સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજોનાં આચાર્યશ્રીઓને સવિનય જણાવવાનું કે સાયન્સ વિદ્યાશાખા હેઠળનો NEP-૨૦૨૦ અંતર્ગત મેથેમેટિક્સ વિષય સેમેસ્ટર-૪નો અભ્યાસક્રમ આ સાથે સામેલ છે.

માનનીય કુલપતિશ્રીની મંજુરી અનુસાર સદર અભ્યાસક્રમ શૈક્ષણિક વર્ષ જુન,૨૦૨૪ થી અમલવારી કરવાની રહે છે. સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજો ધ્વારા તેની અમલવારી કરવા જણાવવામાં આવે છે.

નોંધ: તા ૨૩.૦૧.૨૦૨૫નાં પરિપત્રનં: ૩૧૩/૨૦૨૫માં મેથેમેટિક્સનાં અભ્યાસક્રમમાં ફેરફાર કરવામાં આવેલ છે.

18/6/2025

Bhakta Kavi Narsinh Mehta University Junagadh

ખાસ ફરજ પરના અધિકારી
(એકેડેમિક)

ક્રમાંક/બીકેએનએમયુ/ એકેડેમિક/૨૮૯/૨૦૨૫
ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી,
સરકારી પોલીટેકનિક કેમ્પસ,
ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી રોડ,
ખડીયા, જૂનાગઢ-૩૬૨૨૬૩
તા.૧૮.૦૬.૨૦૨૫

પ્રતિ,

- ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી સંલગ્ન સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમો ચલાવતી તમામ કોલેજોના આચાર્યશ્રીઓ તરફ....

નકલ સાદર રવાના:-

- માન.કુલપતિશ્રી/ કુલસચિવશ્રીનાં અંગત સચિવશ્રી.
- પરીક્ષા નિયામકશ્રી, ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી, જુનાગઢ

નકલ રવાના જાણ તથા યોગ્ય કાર્યવાહી અર્થે:

- સીસ્ટમ મેનેજરશ્રી, આઇ.ટી.સેલ વિભાગ (વેબસાઇટ ઉપર પ્રસિદ્ધ થવા અર્થે.)

પ્રો. ડૉ. નાગ્રેચા
ચેરમેન,
BOS (Mathematics)
જી.કે. જોન. ચેમ. યુ.,
જૂનાગઢ.
તા. 11/07/2025

પ્રતિશ્રી,
એકેડેમીક ઓફિસરશ્રી,
જી.કે. જોન. ચેમ. યુ.,
જૂનાગઢ.

વિષય: રીપીટર્સ વિદ્યાર્થીઓ માટે NEP Syllabus બંધો.

માનનીયશ્રી,

જય ભારત સાથે જણાવવાનું કે BOS (Mathematics) દ્વારા NEP-2020 અન્વયેના Sem-1 થી 4 ના અભ્યાસક્રમો રીવાઈઝડ કરવામાં આવેલ છે. રીપીટર્સ (ATKT) વાળા લાગુ પડતા વિદ્યાર્થીઓએ નવો અભ્યાસ કરેલ NEP-2020 અન્વયેનો જુનો અભ્યાસક્રમ પ્રમાણે પરીક્ષા આપવાની રહેશે.

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

JUNAGADH

BOARD OF STUDIES

FACULTY OF SCIENCE

SYLLABUS FOR MATHEMATICS (HONOURS)

PROGRAMME (SEMESTER- IV)

EFFECTIVE FROM JUNE, 2024

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

Major/Minor/Multidisciplinary

Syllabus of B.Sc. (Honors) as per NEP - 2020

Faculty of SCIENCE

Effective from June 2024

Subject: MATHEMATICS

SEMESTER - IV

Sem No.	Sr. No.	Category of Course	Course Title	Course Level	Credit	Teaching Hrs.	SEE Marks	CCE Marks	Total Marks	Exam Duration
Semester - 4	1	Major - 8	**Linear Algebra - 2**	5.0	4	4	50	50	100	2 Hours
	2	Major - 9	**Advanced Calculus – 2**	5.0	4	4	50	50	100	2 Hours
	3	Major - 10	**Computational Mathematics - 2 (Practical Based Course)**	5.0	4	08 Hours/Batch/Week	50	50	100	3 Hours
	4	Minor - 3	**Numerical Computational Techniques (Practical Based Course)**	5.0	4	08 Hours/Batch/Week	50	50	100	3 Hours
				Total	**16**					

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Subject: MATHEMATICS
SEMESTER - IV

Course Level	5.0		**Internal Marks**	50
Programme	B.Sc. (HONORS)		**External Marks**	50
Semester	IV		**Practical Internal**	---
Category of Course	5.0		**Practical External**	---
Course Credit	4		**Prac. External Exam Duration**	---
Teaching Hours	4 Lectures/Week		**Total**	100
Course Code	**Major – 8**		**Exam Duration**	2 Hours
Course Title	**LINEAR ALGEBRA – 2**			

Course Objectives:

- Introduce foundational concepts of linear algebra.
- Develop a strong understanding of vector spaces, linear transformations and their properties.
- Explore eigenvalues, eigenvectors and their applications in diagonalization.
- Examine bilinear forms and their relationship to quadratic forms.
- Investigate the theory and applications of linear groups.
- Cultivate problem-solving and critical thinking skills related to Linear Algebra.
- Enhance mathematical reasoning and abstract thinking abilities.
- Prepare students for further studies in Mathematics, Physics, Engineering and other related fields.
- Provide a solid foundation for understanding advanced mathematical concepts.
- Foster an appreciation for the elegance and power of linear algebra.

Course Learning Outcomes: After completion of the course, a student will be able to do the following:

- Define key terms and concepts in linear algebra such as vector spaces, subspaces, linear transformations, eigenvalues, eigenvectors and bilinear forms.
- Perform basic operations on vectors and matrices including addition, scalar multiplication, matrix multiplication and finding inverses.
- Determine eigenvalues and eigenvectors of matrices and understand their significance.

- Diagonalize diagonalizable matrices and apply diagonalization techniques to solve problems.
- Analyze bilinear forms, classify them as symmetric or skew-symmetric and find their matrix representations.
- Recognize different types of linear groups and understand their properties.
- Solve problems involving systems of linear equations, linear transformations, and matrix operations.
- Apply Linear Algebra concepts to solve problems in other areas of mathematics, science and engineering.
- Communicate mathematical ideas clearly and effectively, both orally and in writing.
- Demonstrate a deep understanding of the fundamental concepts of Linear Algebra and their interconnections.

Course contents

Sem	Unit No.	Syllabus	Teaching Hours
3	1	**Concept of different Linear Transformations** Direct Sum of Subspaces, Complementary Subspaces, Orthogonal Complementary Subspace, Orthogonal Projections of a vector, Symmetric Linear Transformation, Eigen Value of a Symmetric Liner Transformation, Spectra of Linear Transformation, Charcteristic Subspace, Orthogonal Linear Transformation, Orthogonal Complementary Subspace, Spectral Theorem, Second Form of Spectral Theorem, Third Form of Spectral Theorem, Diagonalization of a Symmetric matrix, Equivalent matrices.	**18**
	2	**Bilinear Forms** Bilinear Form, Examples of Bilinear Forms. Properties of Bilinear Forms, Symmetric and Skew-Symmetric Bilinear Forms, Matrix Representation of a Bilinear Form	**12**

	3	**Quadratic Forms** Quadratic Form, Examples of Quadratic Forms, Properties of Quadratic Forms, Congruent Quadratic Forms, Rank and Signature of a Quadratic Form, Reduction of a Quadratic Form, Canonical Form of a Quadratic Form.	**12**
	4	**Full Linear Group and Affine Group** Full Linear Group, Examples of Full Linear Groups, Orthogonal Matrix, Unitary Matrix, Orthogonal Linear Transformation, Orthogonal Group of a Full Linear Group, Shift Function, Affine Transfromation, Affine Groups, Shift function, Affine Linear Transformation.	**18**

Suggested References:

1. Linear Algebra and Its Applications by David C. Lay, Steven R. Lay, Judi J. McDonald, ISBN: 9780321982384
2. Linear Algebra Done Right by Sheldon Axler, ISBN-13: 9783319110790
3. Linear Algebra by Hoffman and Kunze, ISBN-13: 9780135367971
4. Introduction to Linear Algebra by Gilbert Strang, ISBN-13: 9780980232719
5. A Textbook of Linear Algebra by K. Hoffman and R. Kunze, ISBN-13: 9780131508857
6. A Course in Linear Algebra by David C. Lay, ISBN-13: 9780321287137
7. Suggested e-learning Resource: https://nptel.ac.in/courses

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SEMESTER - IV

Course Level	5.0		**Internal Marks**	50
Programme	B.Sc. (HONORS)		**External Marks**	50
Semester	IV		**Practical Internal**	---
Category of Course	5.0		**Practical External**	---
Course Credit	4		**Prac. External Exam Duration**	---
Teaching Hours	4 Lectures/Week		**Total**	100
Course Code	**Major - 9**		**Exam Duration**	2 Hours
Course Title	**ADVANCED CALCULUS – 2**			

Course Objectives:

- Understand the fundamental concepts of partial differentiation.
- Formulate PDEs from given physical or mathematical models.
- Classify different types of PDEs (e.g., hyperbolic, parabolic, elliptic).
- Develop proficiency in solving first-order PDEs using various methods.
- Solve second-order and higher-order PDEs, including those with constant coefficients.
- Understand and apply techniques for reducing PDEs to simpler forms.
- Define and understand the Laplace transform and its properties.
- Determine Laplace transform of various functions.
- Apply shifting theorems, change of scale property and the convolution theorem.
- Find inverse Laplace transform of given functions.
- Solve ordinary and partial differential equations using Laplace transform techniques.
- Develop problem-solving and analytical skills in applying mathematical concepts to real-world problems.

Course Learning Outcomes: After completion of the course, a student will be able to do the following:

- Demonstrate a solid understanding of partial derivatives and their applications.
- Formulate PDEs that accurately model given physical or mathematical situation.
- Classify PDEs correctly based on their characteristics.
- Solve first-order PDEs using Lagrange's method and Charpit's method.
- Solve second-order and higher-order PDEs, including those with constant coefficients using appropriate techniques.
- Apply techniques such as transformation to simplify complex PDEs.
- Define and explain the Laplace transform and its key properties.
- Calculate Laplace transform of various functions, including those involving derivatives and integrals.
- Apply shifting theorems, change of scale property and the convolution theorem effectively.
- Find inverse Laplace transforms using appropriate methods.
- Solve ODEs and PDEs using Laplace transform techniques and hence a student will be able to interpret the results.
- Apply mathematical knowledge and problem-solving skills to analyze and solve real-world problems involving PDEs and Laplace transforms.

Course Contents

Sem	Unit No.	Syllabus	Teaching Hours
3	1	Formation of Partial differential equations by the elimination of arbitrary constants and arbitrary functions. Partial differential equations of the first order, the complete and particular integrals, Lagrange's solution of the linear equation. Some special types of equations which can be solved easily by the methods other than the general method, Charpit's method.	18
	2	Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogenous and non-homogenous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients (Monge's method) Note: Heat equation, wave equation and Laplace equation are NOT included.	18
	3	Laplace Transformation, Linearity of Laplace transform, Laplace transforms of standard functions, Shifting theorems, Change of scale property, Laplace transform of derivatives and integrals.	12
	4	Inverse Laplace transforms, Multiplication by t^n and division by t, Convolution theorem. Applications to differential equations.	12

Suggested References:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi. ISBN: 81-89050-71-0
2. Erwrin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc., New York, 1999, ISBN: 0-471-50729-2
3. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967
4. I.N. Sneddon, Elements of Partial differential equations, McGraw Hill Book Company 1988, ISBN: 0-07-058562-2
5. K.R. Kachot, Higher Engineering Mathematics, Vol-II, Mahajan Publishing House, Ahmedabad.
6. Suggested e-learning resource: https://nptel.ac.in/courses

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Subject: MATHEMATICS
SEMESTER - IV

Course Level	5.0		**Internal Marks**	
Programme	B.Sc. (HONORS)		**External Marks**	
Semester	IV		**Practical Internal**	50
Category of Course	5.0		**Practical External**	50
Course Credit	4		**Prac. External Exam Duration**	3 hours
Teaching Hours	8 Hours/Batch/Week		**Total**	100
Course Code	**Major - 10**		**Exam Duration**	3 Hours
Course Title	**Computational Mathematics – 2 (Practical Based Course)**			

Course Objectives:

- Introduce finite differences for equi-spaced data points and their applications.
- Understand relationships among various difference operators (Δ, ∇, E, δ, μ, D) and their applications.
- Implement forward and backward interpolation techniques using Gregory Newton's formulae.
- Apply Newton's divided difference interpolation formula for unequally spaced data.
- Implement Lagrange's interpolation and inverse interpolation formulae.
- Apply Gauss forward and backward interpolation techniques.
- Utilize central difference interpolation techniques which includes Sterling, Bessel and Laplace-Everette formulae.
- Perform numerical differentiation using various interpolation methods.
- Apply various Newton Cote's numerical integration techniques like Trapezoidal rule, Simpson's rules, Weddle's rule.
- Apply Gauss quadrature 2- and 3-point formula for numerical integration.
- Conduct curve fitting and regression analysis for linear, hyperbolic, exponential, geometric and quadratic models.
- Solve initial value problems using Euler's method, Taylor's series method, Picard's method and Runge-Kutta methods.
- Apply predictor-corrector methods such as Milne's and Adam Bashforth methods.

Course Learning Outcomes: After completion of the course, a student will be able to do the following:

- Compute finite differences and apply them to find missing values in data tables.
- Understand and utilize relationships among different operators such as Δ, ∇, E, δ, μ, D.

- Implement forward and backward interpolation using Gregory Newton's formulae accurately.
- Apply Newton's divided difference formula for interpolating unequally spaced data.
- Use Lagrange's interpolation and inverse interpolation formulae effectively.
- Implement Gauss forward and backward interpolation techniques with precision.
- Apply central difference interpolation techniques including Sterling, Bessel and Laplace-Everette formulae.
- Perform numerical differentiation up to the second order using various interpolation methods.
- Carry out numerical integration using methods such as Trapezoidal rule, Simpson's rules, Weddle's rule and Gauss quadrature formulae.
- Conduct curve fitting and regression analysis for different types of functions and models.
- Solve initial value problems using Euler's methods, Taylor's series method, Picard's method and various Runge-Kutta methods.
- Apply multi step predictor-corrector methods such as Milne's and Adam Bashforth methods for solving differential equations.

Practical No.	**Title / Aim of Practical**
1.	Introduction to finite differences for a set of equi-spaced collection of points : (A) Finite differences based missing values (up to three) in data table of two variables (B) Relation among various operators like $\Delta,\ \nabla,\ E,\ \delta,\ \mu,\ D$. (C) Factorial polynomials, reciprocal factorial function and their applications
2.	Implementation of forward and backward Interpolation techniques : (A) Gregory Newton's forward interpolation formula (B) Gregory Newton's backward interpolation formula
3.	Implementation of unequally spaced interpolation technique (I) : Newton's divided difference interpolation formula
4.	Implementation of unequally spaced interpolation technique (II) : (A) Lagrange's interpolation formula (B) Lagrange's inverse interpolation formula *Note:* Restrict the number of points in the given data to atmost 6 points.
5.	Implementation of Gauss forward and backward interpolation techniques : (A) Gauss forward interpolation formula (B) Gauss backward interpolation formula
6.	Implementation of other central difference interpolation techniques : (A) Sterling interpolation formula

	(B) Bessel's interpolation formula (C) Laplace Everette's interpolation formula
7.	Numerical differentiation using Gregory Newton's forward / backward interpolation method (upto 2nd order)
8.	Numerical differentiation using Newton's divided difference interpolation method (upto 2nd order)
9.	Numerical differentiation using Lagrange's interpolation method (upto 2nd order) *Note:* Restrict the number of points in the given data to at most 6 points.
10.	Numerical differentiation using Gauss forward / backward difference interpolation methods.(upto 2nd order)
11.	Numerical integration (I) : (A) Obtaining integral as lower sum and upper sum (B) Obtaining integral by using Trapezoidal rule
12.	Numerical integration (II) : (A) Simpson's 1/3rd rule (B) Simpson's 3/8th rule (C) Weddle's rule
13.	Numerical integration (III) : Gauss quadrature formula with 2 evaluation points and 3 evaluation points only.
14.	Curve fitting or Regression analysis (I) : (A) Linear regression of type $y = ax + b$ (B) Hyperbolic regression of type $y = \frac{1}{ax+b}$
15.	Curve fitting or Regression analysis (II) : (A) Exponential regression of type $y = a\, e^{bx}$ (B) Geometric regression of type $y = a\, x^{b}$
16.	Curve fitting (III) : Quadratic curve fitting of type $y = ax^2 + bx + c$
17.	Numerical solution of initial value problem (I) : (A) Euler's method (B) Modified Euler's method (C) Improved Euler's method
18.	Numerical solution of initial value problem (II) : (A) Taylor's series method (B) Picard's method
19.	Numerical solution of initial value problem (III) : (A) 2nd order Runge Kutta's method (B) 3rd order Runge Kutta's method (C) 4th order Runge Kutta's method
20.	Numerical solution of initial value problem (IV) :

	(A) Milne's predictor corrector methods (B) Adam Bashforth predictor corrector methods

Note:

1. Theoretical and geometry explanation, as and when needed, must be provided before beginning any practical from the list above.
2. For practical number 1, at least 4 examples in each subpractical (i.e. A, B and C) must be written in Journal.
3. For the practicals numbered 3, 8, 9, 13, 16 and 20 at least 2 examples must be written in Journal.
4. For remaining practicals, at least 4 examples must be written in Journal.

Suggested References:

1. Numerical Methods by V.N. Vedamurthy and N. Ch. S. N. Iyengar, Vikas Publishing House Pvt. Ltd., 1st edition, ISBN: 978-8125906308

2. Numerical Methods for Scientists and Engineers by M.K. Jain and Rajendra K. Jain, New age internationals publishers, 8th edition, ISBN: 978-9393159151

Course Level	5.0		**Internal Marks**	

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SEMESTER - IV

Programme	B.Sc. (HONORS)		**External Marks**	
Semester	IV		**Practical Internal**	50
Category of Course	5.0		**Practical External**	50
Course Credit	4		**Prac. External Exam Duration**	3 hours
Teaching Hours	8 Hours/Batch/Week		**Total**	100
Course Code	**Minor - 3**		**Exam Duration**	3 Hours
Course Title	**Numerical Computational Techniques (Practical Based Course)**			

Course objectives:

- Understand and apply various methods (graphical, bisection, false position, secant, fixed point iteration and Newton-Raphson) to find roots of transcendental equations.
- Explore practical applications of the Newton-Raphson method.
- Calculate derivatives of polynomials using synthetic division.
- Use Horner's method to find roots of algebraic equations.
- Predict positive or negative roots using Descartes' rule of sign.
- Understand the relationship between coefficients and roots.
- Solve equations with roots diminished or increased by a constant 'k'.
- Find equations with roots as 'm' times the roots of other equation.
- Find equations with roots which are reciprocal roots of other equation.
- Solve equations with roots in arithmetic, geometric or harmonic progressions.
- Obtain all roots (including radical roots) of cubic equations using Cardon's method.
- Find all roots (including radical roots) of biquadratic equations using Ferrari's method.
- Solve system of simultaneous linear equations using Cramer's method (up to four variables).
- Understand LU decomposition and solve systems involving three variables.
- Solve system of simultaneous linear equations using Crout's method (three variables).
- Apply Gauss-Jacobi & Gauss-Seidel iterative methods to solve systems (up to four variables).

Course Learning Outcomes: After completion of the course, learner will be able to do the following:

- Understand the procedure to find roots of transcendental equations using graphical methods.
- Apply the bisection method to obtain roots of transcendental equations.
- Utilize the false position method to find roots of transcendental equations.
- Solve transcendental equations using the secant method.
- Apply fixed point iteration to find roots of transcendental equations.
- Master the Newton-Raphson method to find roots of transcendental equations.
- Explore practical applications, such as finding p^{th} roots of positive numbers.
- Calculate derivatives of polynomials using synthetic division.
- Use Horner's method to find roots of algebraic equations.
- Predict positive or negative roots using Descartes' rule of sign.
- Understand the relationship between coefficients and roots.
- Find equations with roots diminished or increased by a constant 'k' , directly and using synthetic division.
- Find equations with roots as 'm' times the roots of other equation.
- Find equations with roots which are reciprocal roots of other equation.
- Solve equations with roots in arithmetic, geometric or harmonic progression.
- Obtain roots (including radical roots) of cubic equations using Cardon's method and biquadratic equations using Ferrari's method.
- Solve system of simultaneous linear equations using Cramer's method (up to four variables).
- Understand LU decomposition and solve systems involving three variables.
- Solve system of simultaneous linear equations using Crout's method (three variables).
- Learn to apply Gauss-Jacobi & Gauss-Seidel iterative methods.

Practical No.	Title / Aim of Practical
1.	To obtain roots of transcendental equation by Graphical method.
2.	To obtain roots of transcendental equation by Bisection method.

3.	To obtain roots of transcendental equation by False position method.
4.	To obtain roots of transcendental equation by Secant method.
5.	To obtain roots of transcendental equation by Fixed point iteration method.
6.	To obtain roots of transcendental equation by *Newton Raphson* method.
7.	Applications of NR method (To obtain p^{th} root of a positive number using *NR* method)
8.	To obtain derivatives of a polynomial by Synthetic division.
9.	To obtain roots of algebraic equation by *Horner*'s method.
10.	(A) *Descarte*'s rule of sign for predicting positive or negative roots of a polynomial equation. (B) Relation between coefficients of a polynomial equation and its roots. Problems based on this principle. (C) Removing the second term of an n^{th} degree polynomial equation by diminishing roots by $\frac{-a_1}{n\,a_0}$.
11.	(A) Find the equation whose roots are diminished by a constant 'k' w.r.t. the given polynomial equation. (B) Find the equation whose roots are increased by a constant 'k' w.r.t. the given polynomial equation. *Note:* Solving directly as well as with the use of synthetic division, wherever applicable.
12	(A) Find the equations with roots as 'm' times the roots of other equation. (B) Find the equation whose roots are reciprocal of the given polynomial equation.
13.	(A) To solve a polynomial equation whose roots are in *arithmetic* progression. (B) To solve a polynomial equation whose roots are in *geometric* progression. (C) To solve a polynomial equation whose roots are in *harmonic* progression.
14.	To obtain all roots (including radical roots) of a cubic equation by *Cardon*'s method.
15.	To obtain all roots (including radical roots) of a biquadratic equation by *Ferrari*'s method.

16.	To solve a system of simultaneous linear equations using *Cramer*'s method. (System of equations involving up to four variables).
17.	To solve a system of simultaneous linear equations using *LU decomposition* method. (System of equations involving three variables only).
18.	To solve a system of simultaneous linear equations using *Crout*'s method. (System of equations involving three variables only).
19.	To solve a system of simultaneous linear equations using *Gauss Jacobi* iterative method. (System of equations involving up to four variables).
20.	To solve a system of simultaneous linear equations using *Gauss Seidel* iterative method. (System of equations involving up to four variables).

Suggested References:

1. **Numerical Method** by V.N. Vedamurthy and N. Ch. S. N. Iyengar, 1st Edition**,** Vikas Publishing House Pvt. Ltd., ISBN: 978-8125906308
2. **Theory of Equations** by Hari Kishan, 1st Edition, Atlantic Publishers and Distributors (P) Ltd., ISBN: 978-8126918263
3. **Algebra** by Michael Artin, 2nd Edition, Pearson Education, ISBN: 978-1292051741
4. **Higher Algebra** by Hall & Knight, 7th Edition, Arihant Publications India Limited, ISBN: 978-9388127318
5. **Elementary Theory of Equations** by Leonard Eugene Dickson, 1st Edition, John Wiley & Sons, ISBN: 978-1292051741
6. **Suggested e-learning resource: https://nptel.ac.in/courses**

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Faculty of SCIENCE
Effective from June 2024
Subject: MATHEMATICS
SEMESTER - IV

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**25**
2	Class Test	05
3	Open book exam/test	05
4	Open note exam/test	05
5	Self-test/ Online test	05
6	Essay/Article writing	05
7	Quizzes/Objective test	05
8	Class assignment	05
9	Home assignment	05
10	Reports Writing	05
11	Research/Dissertation	05
12	Case Studies	05
13	Viva/Oral exam	05
14	Group Discussion	05
15	Role Play	05
16	Paper presentation/Seminar	05
17	Language Lab work	05
18	Interview	05
19	Craft work	05
20	Co-curricular work	05
21	Field Assignment	05
22	Poster Presentation	05
23	Attendance	05
24	Project Work	05
	Total	**50**

Note: Sr. No.1 is mandatory. Select any five from Sr. No.2 to 24. Each contains five marks. Student should secure 18 Marks out of 50 Marks (for 4 Credit course).

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Paper Style for SEE of Major Courses - 8 & 9:

Que. No.	Particulars	From which Unit	Marks
1	Answer any TWO out of THREE	1	**10**
2	Answer any TWO out of THREE	2	**10**
3	Answer any TWO out of THREE	3	**10**
4	Answer any TWO out of THREE	4	**10**
5	Answer any TWO out of THREE	From all four Units	**10**
		Total Marks	**50**

Paper Style for SEE of Major Course - 10 and Minor Course - 3:

(Practical Based Courses of 4 Credits)

Que. No.	Particulars	Marks
1	Answer any FOUR out of SIX (Each of 9 Marks)	**36**
2	VIVA	**08**
3	JOURNAL	**06**
	Total Marks	**50**