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-૩નો 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 ૦૬.૦૭.૨૦૨૪નાં પરિપત્રનં: ૮૯૫/૨૦૨૪માં મેથેમેટિક્સનાં અભ્યાસક્રમમાં ફેરફાર કરવામાં આવેલ છે.

18/6/2025

Bhakta Kavi Narsinh Mehta University Junagadh

ખાસ ફરજ પરના અધિકારી
(એકેડેમિક)

ક્રમાંક/બીકેએનએમયુ/ એકેડેમિક/૨૮૮/૨૦૨૫
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- III)

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 - III

SUMMARY OF THE SYLLABUS

Sem No.	Sr. No.	Category of Course	Course Title	Course Level	Credit	Teaching Hrs.	SEE Marks	CCE Marks	Total Marks	SEE Exam Duration
Semester - 3	1	Major - 5	LINEAR ALGEBRA - 1	5.0	4	4	50	50	100	2 HOURS
	2	Major - 6	ADVANCED CALCULUS - 1	5.0	4	4	50	50	100	2 HOURS
	3	Major - 7	Computational Mathematics - 1 (Practical Based Course)	5.0	4	8/Batch/Week	50	50	100	3 Hours
	4	MDC - 3	Computational Mathematics (Practical Based Course)	5.0	4	8/Batch/Week	50	50	100	3 Hours
				Total	16					

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SEMESTER - III

Course Level	5.0		**Internal Marks**	50
Programme	B.Sc. (HONORS)		**External Marks**	50
Semester	III		**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 – 5**		**Exam Duration**	2 Hours
Course Title	**LINEAR ALGEBRA - 1**			

Course Objectives:

- Explore axioms that define vector spaces.
- Study linear independence of vectors.
- Investigate the span of a set of vectors, which represents all possible linear combinations of those vectors.
- Understand the concept of a basis for a vector space.
- Learn how to find coordinates of a vector relative to a given basis.
- Explore the existence theorem that guarantees every finite dimensional vector space has a basis.
- Define the dimension of a vector space as the maximum number of linearly independent vectors in any basis.
- Investigate the concepts of sum and direct sum of subspaces.
- Understand the properties of disjoint subspaces and their role in vector space decomposition and explore the existence of a complementary subspace for a finite-dimensional vector space.
- Define linear transformations and their significance in mathematics.
- Understand the Rank-Nullity Theorem, which relates the rank and nullity of a linear transformation.
- Explore properties of inner product, including linearity and positivity.
- State and prove the Cauchy-Schwartz inequality for inner product spaces.
- Define the triangle inequality for inner product spaces.
- Learn the Gram-Schmidt process for constructing an orthogonal basis from a given basis.

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

- Describe vector spaces and provide examples.
- Explore properties of vector spaces.
- Understand linear combinations, spans and subspaces.
- Apply theorems related to subspaces and linear independence.
- Comprehend sum, direct sum, disjoint subspaces.
- Define basis and its significance.
- Calculate coordinates of vectors with respect to a basis.
- Explore the invariance of basis set elements.
- Determine the dimension of a vector space.
- Understand complementary subspaces in finite-dimensional vector spaces.
- Apply theorems related to dimensions.
- Define linear transformations and their properties.
- Explore examples of linear transformations.
- Identify zero and identity linear transformations.
- Understand kernel and range (image) spaces.
- Calculate rank and nullity of linear transformations.
- Apply the rank-nullity theorem.
- Represent transformations using matrices.
- Define inner product spaces.
- Apply the Cauchy-Schwartz inequality.
- Understand the triangle inequality.
- Explore orthogonal vectors and orthonormal vectors.
- Identify orthogonal sets and bases.
- Apply the Gram-Schmidt orthogonalization process.

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Unit No.	Syllabus Contents	Teaching Hours
1	**Vector Space and Subspaces** Definition of Group, Ring & Field(**Not to be asked**), Definition of Vector space and examples of it, Properties of a vector space, Some standard vector spaces, Linear combination, Span and Subspace & their examples, Theorem related to subspaces and Linear span, Linear independence of vectors -- Theorems & Examples on these, Geometrical representation of Linearly Dependent and Independent vectors. Sum and Direct sum of subspaces and their examples, Disjoint subspace, Complementary subspace, Quotient space.	**[18 Hours]**
2	**Basis & Dimension of a Vector space** Basis of a vector space, Co-ordinates of vectors w.r.t. to a basis, Existence theorem for basis, Invariance of the number of the elements of a basis set, Examples and theorem of basis. Definition of dimension of a Vector space, Existence of Complementary subspace of a finite dimensional vector space, Dimension of sum of subspaces, Theorems & Examples based on dimension.	**[12 Hours]**
3	**Linear Transformation:-** Definition of Linear Transformation, Zero and Identity linear transformation, Properties of linear transformation, Examples of linear transformations, Kernel & Range(Image) spaces of a linear transformation, Rank & Nullity of a linear transformation, Rank-Nullity Theorem and Examples based on it. Representation of Transformation by Matrices & its examples.	**[18 Hours]**
4	**Inner Product Spaces** Inner product spaces, Cauchy-Schwartz inequality, Triangle inequality, Orthogonal vectors, Orthonormal vectors, Orthogonal sets and basis, Orthonormal basis, Gram-Schmidt orthogonalization process.	**[12 Hours]**

Suggested References:

1. ***Linear Algebra*** by J.N. Sharma & A.R. Vasishtha, Krishna Prakashan Mandir, Meerut **ISBN-10**: 9387620689 / **ISBN-13**: 9789387620681
2. ***An Introduction to Linear Algebra*** by **V. Krishnamurthy, V. P. Mainra,** & **J. L. Arora** **ISBN-10**: 8185095159 / **ISBN-13**: 9788185095158
3. ***Matrix and Linear Algebra*** by K.B. Datta, Prentice Hall of India Pvt. Ltd. New Delhi ***ISBN:*** 8120306368
4. ***Linear Algebra*** by K. Hoffman and Ray Kunze **ISBN:9789332550070**

5. ***Linear Algebra - A Geometric Approach by S. Kumaresan,*** **ISBN : 978-8120316287, Prentice Hall India Learning Private Limited,** New title edition (1 January 2000)
6. ***A text book of Modern Abstract Algebra*** by Shanti Narayan, S.Chand & Co., New Delhi **ISBN: 9788121925969**
7. ***Basic Linear Algebra with Matlab*** by S.K. Jain, A. Gunawardena & P.B. Bhattacharya ISBN: **9780387989266**
8. **Suggested e-learning resource:** https://nptel.ac.in/courses

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SEMESTER - III

Course Level	5.0	**Internal Marks**	50
Programme	B.Sc. (HONORS)	**External Marks**	50
Semester	III	**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 – 6**	**Exam Duration**	2 Hours
Course Title	**ADVANCED CALCULUS - 1**		

Course Objectives:

- Students will learn to compute double and triple integrals in various coordinate systems, including Cartesian and polar coordinates.
- Students will also understand how to change the order of integration.
- Students will learn how to apply transformations to simplify integrals.
- Students will explore the properties of beta and gamma functions.
- Students will understand the relation between beta and gamma functions
- Students will learn the applications of beta and gamma functions
- Students will learn evaluating definite integrals using beta & gamma functions.
- Students will understand gradient, divergence and curl operators
- Students will learn to apply integral theorems (Green's theorem, Gauss's divergence theorem and Stokes' theorem) in vector calculus.
- Students will learn how to use gradient, divergence and curl to solve problems related to line, surface, and volume integrals.

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

- Students will comprehend the concept of double and triple integrals.
- Students will learn various methods to evaluate double and triple integrals over different regions, such as rectangular, polar and cylindrical coordinates.

- Students will be able to interchange the order of integration in double and triple integrals, understanding how this affects the result.
- Students will explore coordinate transformations (such as polar, cylindrical and spherical) and apply them to simplify integrals.
- Students will understand the definitions of beta and gamma functions, including their properties (such as symmetry, duplication formula etc.).
- Students will apply beta and gamma functions to evaluate definite integrals.
- Students will explore the connection between beta and gamma functions, including the integral representation of the beta function.
- Students will learn numerical techniques to approximate beta & gamma functions
- Students will differentiate vector point functions (such as position vectors) and scalar point functions (such as temperature distributions).
- Students will compute gradient, divergence and curl operators for vector fields.
- Students will understand the Laplace operator and its significance in various physical contexts.
- Students will explore the properties of gradient, divergence and curl.
- Students will compute line integrals along curves and apply Green's theorem.
- Students will understand surface integrals over parametric surfaces.
- Students will state and verify Gauss's divergence theorem.
- Students will apply Stokes' theorem to relate circulation around a closed curve to the curl of a vector field.

Unit No.	Syllabus Contents	Teaching Hours
1	**Vector differentiation** Vector point and scalar point functions, vector differentiation, Laplace operator, definition of gradient, divergence and curl, examples and properties of these operators.	**[12 Hours]**
2	**Multiple Integrals** Revision of indefinite & definite integrals. Introduction to double integral, repeated or iterated integral, double integral over a closed region, evaluation of double integral, changing the order of double & triple integrals, iterated triple integrals, transformation of double & triple integrals.	**[18 Hours]**

3	**Line, surface and volume integrals** Definition of line integral, Green's theorem and its application to simple problems, surface and volume integral, statement of Gauss's divergence and Stokes' theorem, verification these three theorems and problems based on the theorems.	**[18 Hours]**
4	**Beta and Gamma functions** Definition of beta and gamma functions, properties of beta and gamma functions, relation between beta and gamma functions, duplication formula, evaluation of definite integrals using beta-gamma functions.	**[12 Hours]**

Suggested References:

1. **Mathematical Analysis** – S.C. Malik and Savita Arora, 2nd edition New Age International (P) Ltd., **ISBN 1781831041 / 9781781831045**
2. **Integral Calculus** - Shantinarayan and Dr. P.K. Mittal, 2016, S.Chand Publishing House, New Delhi., **ISBN**: 9788121906814
3. **Advanced Calculus, Volume - II** - T.M. Apostol, **ISBN**: 9780471000075
4. **A Course in Multivariable Calculus & Analysis** - S.B. Ghorpade & B.V. Limaye, Springer India., **ISBN**: 9781441916211
5. **Principles of Mathematical Analysis** - Walter Rudin, Mc Graw Hill Book & Compony, 2nd edition., **ISBN 9781259064784**
6. **Calulus** - G.B. Thomas & R.I. Finney, Maurice D. Weir, and Frank R. Giordano Pearson Education 14th edition, ISBN **9789353060411**

Suggested e-learning resource: https://nptel.ac.in/courses

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Course Level	5.0		**Internal Marks**	50
Programme	B.Sc. (HONORS)		**External Marks**	50
Semester	III		**Practical Internal**	---
Category of Course	5.0		**Practical External**	---
Course Credit	4		**Prac. External Exam Duration**	3 Hours
Teaching Hours	8 Hours/Batch/Week		**Total (SEE+CCE)**	100
Course Code	**Major – 7**		**Exam Duration**	3 Hours
Course Title	**Computational Mathematics - 1**			

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).

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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

Suggested e-learning resource: https://nptel.ac.in/courses

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Subject: MATHEMATICS
SEMESTER - III

Course Level	5.0		**Internal Marks**	50
Programme	B.Sc. (HONORS)		**External Marks**	50
Semester	III		**Practical Internal**	---
Category of Course	5.0		**Practical External**	---
Course Credit	4		**Prac. External Exam Duration**	3 Hours
Teaching Hours	8 Hours/Batch/Week		**Total (SEE+CCE)**	100
Course Code	**MDC – 3**		**Exam Duration**	3 Hours
Course Title	**Computational Mathematics**			

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).

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

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

Suggested e-learning resource: https://nptel.ac.in/courses

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 - III

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-5 & 6:

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 - 7 and Multidisciplinary 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**