Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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સંદર્ભ: યુનિવર્સિટી કાર્યાલયના તા.૧૦–૦૫–૨૦૨૩, ક્રમાંક : એસ./ગણિતશાસ્ત્ર/પરિપત્ર/૧૦૯૯૯/૨૦૨૩

–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને તથા વિભાગીય વડાશ્રીને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર શિક્ષણ વિભાગના રાજયની તમામ ઉચ્ચ શૈક્ષણિક સંસ્થાઓ માટે રાષ્ટ્રીય શિક્ષણ નીતિ ૨૦૨૦ અંતર્ગત કોમન કરીકયુલમ એન્ડ ક્રેડિટ ફ્રેમવર્ક હેઠળ ક્રેડિટ માળખું અમલીકરણ માટે નિયત કરવા બાબત અંગેના તા.૧૧/૦૭/૨૦૨૩, ઠરાવ ક્રમાંક: KCG/admin/2023-24/0607/kh.1 અનુસાર ગણિતશાસ્ત્ર વિષયના F.Y.B.Sc. Sem.- 1 & 2 ના Major, Minor, Practical, Multidisciplinary, SECના અભ્યાસક્રમ અંગે ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૨૮/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૨ અન્વયે નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક:૧૪ અન્વયે કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૪ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૨૮/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૨

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર F.Y.B.Sc. Sem.- 1 & 2 નો ગણિતશાસ્ત્ર વિષયનો Major, Minor, Practical, Multidisciplinary અને SEC નો અભ્યાસક્રમ સુધારા વધારા સાથે સર્વાનુમતે મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૧૪

:: આથી ઠરાવવામાં આવે છે કે, ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૨૮/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૨ અન્વયે કરેલ ભલામણ સ્વીકારી શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર F.Y.B.Sc. Sem.- 1 & 2 નો ગણિતશાસ્ત્ર વિષયનો Major, Minor, Practical, Multidisciplinary અને SEC નો અભ્યાસક્રમ સુધારા વધારા સાથે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલ ની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક: ૪

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખા તા.૨/૦૮/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંક:૧૪ અન્વયે કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

(બિડાણ: ઉપર મુજબ)

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૨૧૪૬૩/૨૦૨૩
તા.૧૮–૦૮–૨૦૨૩

કુલસચિવશ્રી

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ વડાશ્રીઓ.
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

Semester: I, II

Effective from June-2023

Semester	Level of courses	Paper	Title of the Paper	Hours	Credit
I	100	MH-MJ-101	**Functions of Complex Variables**	3	3
		Practical based on MH-MJ-101	**MHP-MJ-101**	2	1
		MH-MJ-102	**Calculus-I**	3	3
		Practical based on MH-MJ-102	**MHP-MJ-102**	2	1
II	100	MH-MJ-201	**Matrix Algebra**	3	3
		Practical based on MH-MJ-201	**MHP-MJ-201**	2	1
		MH-MJ-202	**Calculus-II**	3	3
		Practical based on MH-MJ-202	**MHP-MJ-202**	2	1

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS–MH-MJ-101

Functions of Complex Variables

Effective from June-2023

(Theory 3 Hours /Week-Credit: 3)

Unit–I

De' Moivre's theorem and its applications, Trigonometric functions for multiple arguments.

Unit-II

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

Unit-III

Exponential, Circular and Hyperbolic functions for complex variables and their identities, Euler's Theorem, Relations between circular and Hyperbolic functions, Separation of circular and hyperbolic functions into real and imaginary parts.

Unit-IV

Logarithm of complex quantities, Separation of logarithmic, Inverse circular and Inverse hyperbolic functions into real and imaginary parts.

The course is covered by the following reference books :

1. S. L. Loney: Plane Trigonometry, Part I and II, Mc Millan and Co. London.

2. R. S. Verma, K. S. Shukla: Text book of Trigonometry, Pothishala Pvt. Ltd. Allahabad.

3. E. Kreyszig: Advanced Engineering Mathematics, Wiley India Pvt. Ltd.

4. N. P. Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.

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SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS-MHP-MJ-101 (PRACTICAL)

Effective from June-2023

(Practical 2 Hours /Week-Credit:1)

Practical-1	Verify De' Moivres theorem, Applications of De' Moivre's theorem.
Practical-2	Expansion of Trigonometric functions, Finding the last term of Trigonometric functions.
Practical-3	Evaluation of Indeterminate forms by Euler's expression.
Practical-4	Examples related Hyperbolic functions and Inverse Hyperbolic functions.
Practical-5	Relation between Circular and Hyperbolic functions.
Practical-6	Application of Euler's theorem.
Practical-7	Separation into the Real and Imaginary parts of Circular functions and Hyperbolic functions.
Practical-8	Separation into the Real and Imaginary parts of Logarithm functions and Inverse Trigonometric functions.

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SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS-MH-MJ-102

Calculus-I

Effective from June-2023

(Theory 3 Hours /Week-Credit: 3)

Unit –I

Successive differentiation, Calculation of n^{th} derivatives of some standard functions (rational functions and powers of sine, cosine functions), Leibnitz theorem and its applications

Unit-II

Rolle's Theorems and its geometrical interpretation, Lagrange's Theorem and its Geometrical interpretation, Cauchy theorem, Taylor's and Maclaurin series expansions

Unit-III

Curvature and Radius of Curvature (except Polar form), Increasing and Decreasing functions, Asymptotes, Concavity and Convexity

Unit-IV

Reduction formulae for integration of
$sin^n x, cos^n x, tan^n x, cot^n x, sec^n x, cosec^n x, sin^p x cos^q x, x^m cosnx, x^m sinnx.$

The course is covered by the following reference books:

1. Shantinarayan: Differential Calculus, Revised Edition December-2004, S. Chand and Co. New Delhi.

2. Shantinarayan: Integral Calculus, S. Chand and Co. New Delhi.

3. Gorakhprasad: Differential Calculus, Pothishala Pvt. Ltd. Allahabad.

5. M. R. Spigel: Theory and Problems of Advanced Calculus, Schaum's Publishing Co., New York.

6. N. P. Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.

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SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS-MHP-MJ-102 (PRACTICAL)

Effective from June-2023

(Practical 2 Hours /Week-Credit:1)

Practical-1	Examples of Successive Differentiation
Practical-2	Application of Leibnitz theorem
Practical-3	Applications of Rolle's theorem, Lagrange's mean value theorem and Cauchy theorem
Practical-4	Examples of Increasing and decreasing functions
Practical-5	Examples of Curvature of the curve and Radius of Curvature of the curve
Practical-6	Examples of Concave upward and Concave downward curves, Point of Inflexion of the curve
Practical-7	Integration of the Trigonometric function
Practical-8	Examples of Reduction formulae for some standard functions

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MH-MJ-201

Matrix Algebra

Effective from June-2023

(Theory: 3 Hours /Week-Credit:3)

Unit-I

Various types of Matrices, Operations on Matrices, Properties of operations of Matrices, Elementary row operations,

Unit-II

Row-reduced Echelon form, Inverse of matrix by Row–reduced Echelon form. Row rank of a matrix, Quadratic form.

Unit-III

Trace of matrix and its properties, Solution of homogeneous and non-homogeneous system of linear equations using Row–reduced Echelon form.

Unit-IV

Characteristic equation of a matrix, Method to find Characteristic equation using determinant and minors of a matrix, Eigen values and Eigen vectors of a matrix, Cayley-Hamilton theorem and its application to find an inverse of a matrix, Method of diagonalization.

The course is covered by the following reference books:

1. Krishnamurthy, Mainra and Arora: An Introduction to linear Algebra, Affiliated West Press Pvt. Ltd., New Delhi.
2. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India (P) Ltd., 2009.
3. B.S.Vasta and Suchi Vasta: Theory of Matrices; 4rd Edition -2014, New Age International (P) Ltd. Publishers, New Delhi.
4. Shantinarayan: Text book of Matrices, S. Chand and Co., New Delhi.
5. H. K. Dass, H. C. Saxena, M. D. Raisinghania: Simplified course in Matrices, S. Chand and Co., New Delhi.
6. N. P. Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MHP-MJ-201 (PRACTICAL)

Effective from June-2023

(Practical 2 Hours /Week-Credit:1)

Practical-1	Examples of operation on Matrix
Practical-2	Examples of the Row Echelon form and Row Reduced Echelon form of the matrix
Practical-3	Examples of finding Rank of matrix using Row Reduced Echelon form
Practical-4	Examples of finding Inverse of Matrix by using Row Reduced Echelon form
Practical-5	System of Homogeneous linear equations
Practical-6	System of Non-Homogeneous linear equations
Practical-7	Eigen vector of the Matrix
Practical-8	Verification of Cayley -Hamilton theorem and Inverse of Matrix by using Cayley - Hamilton theorem

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MH-MJ-202

Calculus-II

Effective from June-2023

(Theory 3 Hours /Week-Credit: 3)

Unit-I

Curve Tracing : Equation of the form $y = f(x)$, Equation of the form $y^2 = f(x)$, Parametric equations.

Unit-II

Application of Integral Calculus: Length of a Curve, Intrinsic equation (except polar coordinates).

Unit-III

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

Unit-IV

Linear Differential Equations with constant coefficients: Complimentary functions, Particular Integral, General Solution, Method for finding Particular Integral specially for $e^{ax}, sinax, cosax,$ polynomial in terms of $x, e^{ax}V$ and $xV,$ where V is a function of x.

The course is covered by the following reference books:

1.Shantinarayan : Differential calculus, 4th edition -2001,Shyamlal Charitable Trust, Ram nagar, New Delhi, S. Chand and Company LTD.

2. Shantinarayan: Integral Calculus, Revised Edition-2009, S.Chand and Co., New Delhi.

3. Gorakhprasad: Integral Calculus, Pothishala Pvt.Ltd., Allahabad.

4. D.A.Murray: Differential Equations, Tata Mc Graw Hills.

5. Frank Ayres: Theory and problems on Differential Equations, Mc Graw Hill Book Co., New York.

6. N.P.Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MHP-MJ-202 (PRACTICAL)

Effective from June-2023

(Practical 2 Hours /Week-Credit:1)

Practical-1	Traced the Cartesian Curves
Practical-2	Traced the Parametric Curves
Practical-3	Length of the Cartesian Curves and Parametric Curves
Practical-4	Intrinsic equation of the Cartesian Curves and Parametric Curves
Practical-5	Solution of the various types of differential equations; e.g solvable for x, y, p
Practical-6	Solution of Lagrange's equation and Clairaut's equation
Practical-7	Finding General solution of the Differential equation: e^{ax} ,$Sinax, Cosax$ and polynomial in terms of x
Practical-8	Finding General solution of the Differential equation: $x.V$ and $e^{ax}V$

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR ELECTIVE

Semester: I, II

Effective from June-2023

Semester	Level of courses	Paper	Title of the Paper	Hours	Credit
I	100	MH-ME-101	**Differential Calculus and Complex Variables**	2	2
		Practical based on MH-ME-101	**MHP-ME-101**	4	2
II	100	MH-ME-201	**Integral Calculus and Matrices**	2	2
		Practical based on MH-ME-201	**MHP-ME-201**	4	2

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –I

MATHEMATICS–MH-ME-101

Differential Calculus and Complex Variables

Effective from June-2023

(Theory 2 Hours /Week-Credit: 2)

Unit–I

Successive differentiation, Calculation of n^{th} derivatives of some standard functions (Rational functions, Logarithm functions, Exponential function and powers of sine, cosine functions), Leibnitz theorem and its applications.

Unit-II

De' Moivre's theorem and its applications, Trigonometric functions for multiple arguments, Euler's expressions, Hyperbolic functions for real arguments and their inverses.

The course is covered by the following reference books:

1. Shantinarayan: Differential Calculus, Revised Edition December-2004, S.Chand and Co. New Delhi.
2. S. L. Loney: Plane Trigonometry, Part I and II, McMillan and Co. London.
3. N. P. Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.
4. R. S. Verma, K. S. Shukla: Text book of Trigonometry, Pothishala Pvt. Ltd., Allahabad.
5. E. Kreyszig: Advanced Engineering Mathematics, Wiley India Pvt. Ltd.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –I

MATHEMATICS-MHP-ME-101 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	Examples of Successive Differentiation.
Practical-2	Examples of Successive Differentiation of some standard functions.
Practical-3	Examples based on Leibnitz theorem.
Practical-4	Application of Leibnitz theorem.
Practical-5	Verify De' Moivre's theorem, Applications of De' Moivre's theorem.
Practical-6	Expansion of Trigonometric functions, Finding the last term of Trigonometric functions.
Practical-7	Evaluation of Indeterminate forms by Euler's expression.
Practical-8	Examples related Hyperbolic functions and Inverse Hyperbolic functions.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –II

MATHEMATICS–MH-ME-201

Integral Calculus and Matrices

Effective from June-2023

(Theory 2 Hours /Week-Credit:2)

Unit-I

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-II

Various types of Matrices, Operations on Matrices, Properties of operations of Matrices, Elementary row operations, Row-reduced Echelon form, Inverse of matrix by Row–reduced Echelon form.

The course is covered by the following reference books:

1. Shantinarayan: Integral Calculus, Revised Edition-2009, S. Chand and Co., New Delhi.
2. Krishnamurthy, Mainra and Arora: An Introduction to linear Algebra, Affiliated West Press Pvt. Ltd., New Delhi.
3. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India (P)Ltd., 2009.
4. B. S. Vasta and Suchi Vasta: Theory of Matrices; 4th Edition -2014, New Age International (P) Ltd. Publishers, New Delhi.
5. N. P. Bhamore and et al: College Aadhunik Ganitshastra, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –I

MATHEMATICS-MHP-ME-201 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	Examples of Reduction formulae for $\sin^n x$, $\cos^n x$.
Practical-2	Examples of Reduction formulae for $\tan^n x$, $\cot^n x$.
Practical-3	Examples of Reduction formulae for $\sec^n x$, $\mathrm{cosec}^n x$.
Practical-4	Examples of Reduction formulae for $\sin^p x \cos^q x$, $x^m \cos nx$, $x^m \sin nx$.
Practical-5	Examples of operations on Matrix
Practical-6	Examples of the Row Echelon form and Row Reduced Echelon form of the matrix
Practical-7	Examples of finding Rank of matrix using Row Reduced Echelon form
Practical-8	Examples of finding Inverse of Matrix by using Row Reduced Echelon form

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

SYLLABUS FOR B.Sc. (MATHEMATICS) Multidisciplinary

Semester I

Fundamentals of Mathematics (MH-MLD-101)

Effective from June-2023

(Theory: 4 Hours/Week - Credit: 4)

Unit-I:

Whole numbers, Integers, Fractions, Exponents and radicals, Complex Numbers, Arithmetic operations on complex numbers, Absolute Value, Interval notation and linear inequalities.

Unit-II:

Sets, Intervals, Boundedness of sets, Supremum and Infimum, and Countable and uncountable sets, Process of the proof by mathematical induction, application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction (weak and strong) and simple applications.

Unit-III:

Linear equation in two variables, Solution of simultaneous linear equations in two variables – Method of substitution, Cramer's Rule, Elimination method, Cross multiplication. Quadratic equations, methods to solve quadratic equations.

Unit-IV:

Coordinate plane, points, distance, midpoint, lines, graphical method to solve system of linear equation and linear inequalities, Introduction to functions, Polynomial functions, Graphs of functions, Exponential function, Logarithms.

The course is covered by the following reference books :

1. Serge Lang: Basic Mathematics, Addison -Wesley Publishing Company, 1971.
2. S.C. Malik and Savita Arora, Mathematical Analysis, 2nd Edition, New Age International (P) Limited, New Delhi, India, 1994.
3. Colin McGregor, Jonathan Nimmo, Wilson Stothers: Fundamentals of University Mathematics, Woodhead Publishing, 1994.
4. Sanjay Mishra: Fundamentals of Mathematics: Functions and Graphs, Pearson, 2016.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. (MATHEMATICS) Multidisciplinary
Semester I
Elementary Calculus (MH-MLD-102)
Effective from June-2023
(Theory: 4 Hours/Week - Credit: 4)

Unit-I

Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto $R \times R \times R$). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, trigonometry. Sum, difference, product and quotients of functions.

Unit-II

Basic concept of a limit of a function, Rules of limits, Infinite limits and limits at infinity, Continuity and types of discontinuities, Differentiability of a function, differentiable functions.

Unit-III

Derivative of composite functions, Chain rule, Derivatives of trigonometric functions, Derivative of implicit function, Concepts of exponential, Logarithmic functions, Derivatives of $\log_e x$ and e^x.

Unit-IV

Integration as an inverse process of differentiation, Finite integral, integration of some functions by substitution, integration by partial fractions, integration by parts, Definite integrals.

The course is covered by the following reference books:

1. B. S. Grewal: Elementary Engineering Mathematics, S. Chand & Co.
2. Tom M. Apostol: Calculus, Volume I and II, Second edition, John Wiley & Sons Inc., New York.
3. Serge Lang: Basic Mathematics, Addison -Wesley Publishing Company, 1971.
4. Jain and Iyengar, Advanced Engineering Mathematics, Narosa Publishing House.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. (MATHEMATICS) Multidisciplinary
Semester II
Matrices and Determinants (MH-MLD-201)
Effective from June-2023
(Theory: 4 Hours/Week - Credit: 4)

Unit-I:

Matrix, Types of Matrices, Operation on matrices, Transpose of a matrix, Conjugate of a matrix.

Unit-II:

Determinants, Properties of determinant, Minors, Cofactors, Adjoint of a matrix, Inverse of a square matrix, Singular and Non-singular Matrices.

Unit-III:

Special types of Matrices: Symmetric and Skew Symmetric, Hermitian and skew Hermitian, Orthogonal, Unitary, Methods to solve system of linear equations in three variables: Martin's Rule, Cramer's rule.

Unit-IV:

Characteristics equation of a matrix, Eigen values, Eigen vectors, Cayley-Hemilton theorem and its application to find an inverse of a matrix.

The course is covered by the following reference books:

1. Vasistha and Vasistha: Matrices, Krishna Prakashan, 2008.
2. Shantinarayan: Text book of Matrices, S. Chand and Co., New Delhi.
3. Shantinarayan and P. K. Mittal: A textbook of Matrices, S. Chand, 1953.
4. Serge Lang: Basic Mathematics, Addison -Wesley Publishing Company, 1971.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B.Sc. (MATHEMATICS) Multidisciplinary
Semester II
Ordinary Differential Equations (MH-MLD-202)
Effective from June-2023
(Theory: 4 Hours/Week - Credit: 4)

Unit-I

Introduction of Differential Equation, Order and Degree of a differential equation, Solution and constants of integration, Derivation (Formation) of a differential equation, General solution, Particular solution.

Unit-II

Differential equations of first order and first degree, Separable variable, Homogeneous differential equations, Differential equations reducible to Homogeneous form.

Unit-III

Exact differential equations, Necessary and sufficient condition for exact differential equations, Integrating factor, Linear differential equations, Differential equations reducible to Linear form (Bernoulli's equation).

Unit-IV

Application: Linear decay models, Models for growth of Science and Scientists.

The Course is covered by the following reference books:

1. D.A. Murray: Introductory Course in Differential Equations, Orient Longmans, Bombay, April 1960.
2. J. N. Kapoor: Mathematical Modelling, New Age International Publishers, New Delhi.
3. B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi, 42nd Edition, 2012.
4. Zafar Ahasan: Differential Equations and their Applications, PHI, New Delhi, Second Edition, 2009.
5. Harikishan: Differential Equations, Atlantic Publishers and Distributors, New Delhi, 2006.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS)

SEMESTER –I

MATHEMATICS–MH-SEC-101

FUNDAMENTALS OF VEDIC MATHEMATICS-I

Effective from June-2023

(Theory 2 Hours /Week- Credit : 2)

Unit-I

Left to Right calculation: Addition, Multiplication, Writing Left to Right Sums, Subtraction, Digit Sums, Checking Devices, Subtraction from a Base, Bar numbers, General Subtraction. Advantages of Left to Right Calculation Advantages of Bar numbers.

Unit-II

Special methods: Multiplication Near a Base-Number just Below the Base,Above the Base, Above and Below, Proportionality and different Bases. Mental calculation, Special numbers- Repeating numbers, Proportionality, Disguises. Division by Nine etc.

The course is covered by the following reference books:

1. Kenneth R. Williams: Foreword by L. M. Singhvi, Formerly High Commissioner for India in the U. K. Motilal Banarsidass Publishers Private Limited. Delhi-2005
2. Vandana Singhal: Vedic Mathematics for all ages-A beginner's guide, Motilal Banarsidass Publishers, 2014.
3. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja: Vedic Mathematics, Motilal Banarsidass Publishers, 2015.
4. S. K. Kapoor: Vedic Mathematics Course @2006.Lotus Press, Darya Ganj, NewDelhi-110002. ISBN 81-8382-047-6.
5. S. K. Kapoor: The Teaching of Vedic Mathematics @ 2006. .Lotus Press, Darya Ganj, New Delhi-110002.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS)

SEMESTER –II

MATHEMATICS–MH-SEC-201

FUNDAMENTALS OF VEDIC MATHEMATICS-II

Effective from June-2023

(Theory 2 Hours /Week-Credit: 2)

Unit-I

Recurring Decimals: Denominator Ending in 9, A short cut, Proportionality, Longer numbers, Denominators ending in 1, 2, 3, 4, 8, 7, 6. Definition of Triples. Triples for $45^{\circ}, 30^{\circ}, 60^{\circ}$. Triple addition.

Unit-II

Double Angle, Variation of 3, 4, 5. Quadrant Angles. Rotations. General Multiplication: Two, Three and Four figure numbers. Moving multiplier, Algebraic products, Writing Left to Right and from Right to Left.

The course is covered by the following reference books:

1. Kenneth R. Williams: Foreword by L. M. Singhvi, Formerly High Commissioner for India in the U. K. Motilal Banarsidass Publishers Private Limited. Delhi-2005
2. Vandana Singhal: Vedic Mathematics for all ages-A beginner's guide, Motilal Banarsidass Publishers, 2014.
3. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja: Vedic Mathematics, Motilal Banarsidass Publishers, 2015.
4. S. K. Kapoor: Vedic Mathematics Course @2006.Lotus Press, Darya Ganj, NewDelhi-110002. ISBN 81-8382-047-6.
5. S. K. Kapoor: The Teaching of Vedic Mathematics @ 2006. .Lotus Press, Darya Ganj, New Delhi-110002.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS)

SEMESTER –I

MATHEMATICS–MH-SEC-102

Descriptive Statistics

Effective from June-2023

(Theory 2 Hours /Week- Credit: 2)

Unit-I

Measures of Central Tendency: Mean, median, and mode as measures of the "typical" value in a dataset.

Measures of Dispersion: Range, variance, and standard deviation as measures of the spread or variability of data, coefficient of variation.

Unit-II

Percentiles and Quartiles: Understanding percentiles and quartiles to identify data points in a dataset.

Skewness and Kurtosis: Measures that describe the shape of a distribution.

The course is covered by the following reference books:

1. S. C. Gupta and V. K. Kapoor: Fundamentals of Mathematical Statistics Sultan Chand & Sons, 2014.
2. S. P. Gupta: Statistical Methods, Sultan Chand & Sons, 2011.
3. Daren S. Starnes, Dan Yates, and David S. Moore: The Practice of Statistics, W. H. Freeman, 2010.
4. Dennis Wackerly, William Mendenhall III, and Richard L. Scheaffer: Mathematical Statistics with Applications, Elsevier, 2009.
5. David S. Moore, George P. McCabe, and Bruce A. Craig: Introduction to the Practice of Statistics, W. H. Freeman, 2009.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS)

SEMESTER –II

MATHEMATICS–MH-SEC-202

Mathematical Statistics

Effective from June-2023

(Theory 2 Hours /Week- Credit: 2)

Unit-I

Expectation, Variance, Karl Pearson Coefficient of Correlation, Spearman Rank Correlation, Curve fitting of some standard curves

Unit-II

Marginal Distribution, Cumulative distribution, Binomial, Poisson, Exponential and Normal distributions.

The course is covered by the following reference books:

1. S. C. Gupta and V. K. Kapoor: Fundamentals of Mathematical Statistics Sultan Chand & Sons, 2014.
2. S. P. Gupta: Statistical Methods, Sultan Chand & Sons, 2011.
3. Daren S. Starnes, Dan Yates, and David S. Moore: The Practice of Statistics, W. H. Freeman, 2010.
4. Dennis Wackerly, William Mendenhall III, and Richard L. Scheaffer: Mathematical Statistics with Applications, Elsevier, 2009.
5. David S. Moore, George P. McCabe, and Bruce A. Craig: Introduction to the Practice of Statistics, W. H. Freeman, 2009.