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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-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન ગણિતશાસ્ત્ર વિષયની કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ–૨૦૨૨–૨૩, જૂન – ૨૦૨૩ થી અમલમાં આવનાર પેટાસમિતિએ તૈયાર કરેલ ગણિતશાસ્ત્ર વિષયનો F. Y. B.Sc. સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબતે ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિ ની તા.૨૧/૦૪/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ અન્વયે કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૨/૫/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૯ અન્વયે સ્વીકારી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલ તા.૦૫/૦૫/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૬૧ થી સ્વીકારી મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિનીતા.૨૧/૦૪/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૨

:: આથી ઠરાવવામાં આવે છે કે,શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર F.Y.B.Sc. સેમેસ્ટર–૧ અને ૨ ગણિતશાસ્ત્ર વિષયનો અભ્યાસક્રમ જરૂરી સુધારા–વધારા સાથે સર્વાનુમતે મંજૂર કરી જૂન ૨૦૨૩ થી અમલમાં મૂકવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૯

:: આથી ઠરાવવામાં આવે છે કે, ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિનીતા.૨૧/૦૪/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ અન્વયે કરેલ ભલામણ સ્વીકારી શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર એમ.એસસી. મેથેમેટીકસ વિષયનો સેમેસ્ટર–૧ અને ૨ નો અભ્યાસક્રમ મંજૂર કરી એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૫/૦૫/૨૦૨૩ની ઠરાવ ક્રમાંકઃ ૬૧

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૯ અન્વયે કરેલ ભલામણ સ્વીકારી શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર એમ.એસસી. મેથેમેટીકસ વિષયનો સેમેસ્ટર–૧ અને ૨ નો અભ્યાસક્રમ મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./ગણિતશાસ્ત્ર/પરિપત્ર/૧૦૯૯૯/૨૦૨૩
તા.૧૦–૦૫–૨૦૨૩

કુલસચિવ

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન ગણિતશાસ્ત્ર વિષયની કોલેજોનાં આચાર્યશ્રીઓ.
..... 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	Marks
I	100	MH-MJ-101	**Functions of Complex Variables**	3	3	70 (20 Internal + 50 External)
		MH-MJ-102	**Calculus-I**	3	3	
		Practical based on MH-MJ-101 and MH-MJ-102	**MHP-MJ-1**	4	2	70 (20 Internal + 50 External)
II	100	MH-MJ-201	**Matrix Algebra**	3	3	70 (20 Internal + 50 External)
		MH-MJ-202	**Calculus-II**	3	3	
		Practical based on MH-MJ-201 and MH-MJ-202	**MHP-MJ-2**	4	2	70 (20 Internal + 50 External)

Chairman
Details

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

Marks: 70 (20 Internal + 50 External)

(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.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS-MH-MJ-102

Calculus-I

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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 EditionDecember-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.**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MH-MJ-201

Matrix Algebra

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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-MH-MJ-202

Calculus-II

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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 –I

MATHEMATICS-MHP-MJ-1 (PRACTICAL)

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(Practical 4 Hours /Week-Credit:2)

1. Practical-1 based on Unit-I (MH-MJ-101)
2. Practical-2 based on Unit-II (MH-MJ-101)
3. Practical-3 based on Unit-III (MH-MJ-101)
4. Practical-4 based on Unit-IV (MH-MJ-101)
5. Practical-5 based on Unit-I (MH-MJ-102)
6. Practical-6 based on Unit-II (MH-MJ-102)
7. Practical-7 based on Unit-III (MH-MJ-102)
8. Practical-8 based on Unit-IV (MH-MJ-102)

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MHP-MJ-2 (PRACTICAL)

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(Practical 4 Hours /Week-Credit: 2)

1. Practical-1 based on Unit-I (MH-MJ-201)
2. Practical-2 based on Unit-II (MH-MJ-201)
3. Practical-3 based on Unit-III (MH-MJ-201)
4. Practical-4 based on Unit-IV (MH-MJ-201)
5. Practical-5 based on Unit-I (MH-MJ-202)
6. Practical-6 based on Unit-II (MH-MJ-202)
7. Practical-7 based on Unit-III (MH-MJ-202)
8. Practical-8 based on Unit-IV (MH-MJ-202)

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

Semester: I, II

Effective from June-2023

Semester	Level of courses	Paper	Title of the Paper	Hours	Credit	Marks
I	100	MH-MN-101	**Functions of Complex Variables**	3	3	70 (20 Internal + 50 External)
		MH-MN-102	**Calculus-I**	3	3	
		Practical based on MH-MN-101 and MH-MN-102	**MHP-MN-1**	4	2	70 (20 Internal + 50 External)
II	100	MH-MN-201	**Matrix Algebra**	3	3	70 (20 Internal + 50 External)
		MH-MN-202	**Calculus-II**	3	3	
		Practical based on MH-MN-201 and MH-MN-202	**MHP-MN-2**	4	2	70 (20 Internal + 50 External)

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –I

MATHEMATICS–MH-MN-101

Functions of Complex Variables

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –I

MATHEMATICS-MH-MN-102

Calculus-I

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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:

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

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –II

MATHEMATICS-MH-MN-201

Matrix Algebra

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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.

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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) MINOR

SEMESTER –II

MATHEMATICS-MH-MN-202

Calculus-II

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(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.

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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) MINOR

SEMESTER –I

MATHEMATICS-MHP-MN-1 (PRACTICAL)

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(Practical 4 Hours /Week-Credit:2)

1. Practical-1 based on Unit-I (MH-MN-101)
2. Practical-2 based on Unit-II (MH-MN-101)
3. Practical-3 based on Unit-III (MH-MN-101)
4. Practical-4 based on Unit-IV (MH-MN-101)
5. Practical-5 based on Unit-I (MH-MN-102)
6. Practical-6 based on Unit-II (MH-MN-102)
7. Practical-7 based on Unit-III (MH-MN-102)
8. Practical-8 based on Unit-IV (MH-MN-102)

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –II

MATHEMATICS-MHP-MN-2 (PRACTICAL)

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

(Practical 4 Hours /Week-Credit: 2)

1. Practical-1 based on Unit-I (MH-MN-201)
2. Practical-2 based on Unit-II (MH-MN-201)
3. Practical-3 based on Unit-III (MH-MN-201)
4. Practical-4 based on Unit-IV (MH-MN-201)
5. Practical-5 based on Unit-I (MH-MN-202)
6. Practical-6 based on Unit-II (MH-MN-202)
7. Practical-7 based on Unit-III (MH-MN-202)
8. Practical-8 based on Unit-IV (MH-MN-202)

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

SYLLABUS FOR B.Sc. (MATHEMATICS) Multidisciplinary

Semester I

Fundamentals of Mathematics (MH-MLD-101)

Effective from June-2023

Marks: 70 (20 Internal + 50 External)

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

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:

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

Unit-III:

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. **Colin McGregor, Jonathan Nimmo, Wilson Stothers: Fundamentals of University Mathematics, Woodhead Publishing, 1994.**
3. **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

Marks: 70 (20 Internal + 50 External)

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

Unit-I

Functions:

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

Limit and Differentiation:

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, 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-III

Integration:

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
Marks: 70 (20 Internal + 50 External)
(Theory: 3 Hours/Week - Credit: 3)

Unit-1:

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

Unit-2:

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

Unit-3:

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

The course is covered by the following reference books:

(1) Vasistha and Vasistha: Matrices, Krishna Prakashan, 2008.
(2) Shantinarayan and P. K. Mittal: A textbook of Matrices, S. Chand, 1953.
(3) 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
Marks: 70 (20 Internal + 50 External)
(Theory: 3 Hours/Week - Credit: 3)

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).

The Course is covered by the following reference books:

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

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –I

MATHEMATICS-MHP-MJ-1 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	
1	Verify De'moivres theorem, Applications of De' Moivre's theorem
2	Expansion of Trigonometric functions, Finding the last term of Trigonometric functions
Practical-2	
1	Evaluation of Indeterminate forms by Euler's expression
2	Examples related Hyperbolic functions and Inverse Hyperbolic functions
Practical-3	
1	Relation between Circular and Hyperbolic functions
2	Application of Euler's theorem
Practical-4	
1	Separation into the Real and Imaginary parts of Circular functions and Hyperbolic functions
2	Separation into the Real and Imaginary parts of Logarithm functions and Inverse Trigonometric functions
Practical-5	
1	Examples of Successive Differentiation
2	Application of Leibnitz theorem
Practical-6	
1	Applications of Rolle's theorem, Lagrange's mean value theorem and Cauchy theorem
2	Examples of Increasing and decreasing functions
Practical-7	
1	Examples of Curvature of the curve and Radius of Curvature of the curve
2	Examples of Concave upward and Concave downward curves, Point of Inflexion of the curve
Practical-8	
1	Integration of the Trigonometric function
2	Examples of Reduction formulae for some standard functions

Chairman

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MAJOR

SEMESTER –II

MATHEMATICS-MHP-MJ-2 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	
1	Examples of operation on Matrix
2	Examples of the Row Echelon form and Row Reduced Echelon form of the matrix
Practical-2	
1	Examples of finding Rank of matrix using Row Reduced Echelon form
2	Examples of finding Inverse of Matrix by using Row Reduced Echelon form
Practical-3	
1	System of Homogeneous linear equations
2	System of Non-Homogeneous linear equations
Practical-4	
1	Eigen vector of the Matrix
2	Verification of Cayley -Hamilton theorem and Inverse of Matrix by using Cayley -Hamilton theorem
Practical-5	
1	Traced the Cartesian Curves
2	Traced the Parametric Curves
Practical-6	
1	Length of the Cartesian Curves and Parametric Curves
2	Intrinsic equation of the Cartesian Curves and Parametric Curves
Practical-7	
1	Solution of the various types of differential equations; e.g solvable for x, y, p
2	Solution of Lagrange's equation and Clairaut's equation
Practical-8	
1	Finding General solution of the Differential equation: e^{ax} ,$Sinax, Cosax$ and polynomial in terms of x
2	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

SEMESTER –I

MATHEMATICS-MHP-MN-1 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	
1	Verify De'moivres theorem, Applications of De' Moivre's theorem
2	Expansion of Trigonometric functions, Finding the last term of Trigonometric functions
Practical-2	
1	Evaluation of Indeterminate forms by Euler's expression
2	Examples related Hyperbolic functions and Inverse Hyperbolic functions
Practical-3	
1	Relation between Circular and Hyperbolic functions
2	Application of Euler's theorem
Practical-4	
1	Separation into the Real and Imaginary parts of Circular functions and Hyperbolic functions
2	Separation into the Real and Imaginary parts of Logarithm functions and Inverse Trigonometric functions
Practical-5	
1	Examples of Successive Differentiation
2	Application of Leibnitz theorem
Practical-6	
1	Applications of Rolle's theorem, Lagrange's mean value theorem and Cauchy theorem
2	Examples of Increasing and decreasing functions
Practical-7	
1	Examples of Curvature of the curve and Radius of Curvature of the curve
2	Examples of Concave upward and Concave downward curves, Point of Inflexion of the curve
Practical-8	
1	Integration of the Trigonometric function
2	Examples of Reduction formulae for some standard functions

chairman
Dr. M. R. Tailor

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR B.Sc. (MATHEMATICS) MINOR

SEMESTER –II

MATHEMATICS-MHP-MN-2 (PRACTICAL)

Effective from June-2023

(Practical 4 Hours /Week-Credit:2)

Practical-1	
1	Examples of operation on Matrix
2	Examples of the Row Echelon form and Row Reduced Echelon form of the matrix
Practical-2	
1	Examples of finding Rank of matrix using Row Reduced Echelon form
2	Examples of finding Inverse of Matrix by using Row Reduced Echelon form
Practical-3	
1	System of Homogeneous linear equations
2	System of Non-Homogeneous linear equations
Practical-4	
1	Eigen vector of the Matrix
2	Verification of Cayley -Hamilton theorem and Inverse of Matrix by using Cayley -Hamilton theorem
Practical-5	
1	Traced the Cartesian Curves
2	Traced the Parametric Curves
Practical-6	
1	Length of the Cartesian Curves and Parametric Curves
2	Intrinsic equation of the Cartesian Curves and Parametric Curves
Practical-7	
1	Solution of the various types of differential equations; e.g solvable for x, y, p
2	Solution of Lagrange's equation and Clairaut's equation
Practical-8	
1	Finding General solution of the Differential equation: e^{ax} ,$Sinax, Cosax$ and polynomial in terms of x
2	Finding General solution of the Differential equation: $x.V$ and $e^{ax}V$