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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 ગણિતશાસ્ત્ર વિષય ચલાવતી સંલગ્ન સ્નાતક આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ : ૨૦૨૧–૨૨ થી અમલમાં આવનાર S.Y.B.Sc. Sem-III & IV, Mathematics વિષયનો અભ્યાસક્રમ અંગે ગણિતશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૧૪/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંકઃ૨ અન્વયે નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૧૭/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૫ અન્વયે મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલે તેની તા.૨૫–૨૬/૦૬/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંકઃ ૨૫ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્ઉપરાંત તેનો અમલ કરવો.

ગણિતશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૧૪/૦૬/૨૦૨૧ની સભાનાં ભલામણ ક્રમાંકઃ૨

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ : ૨૦૨૧–૨૨ થી અમલમાં આવનાર S.Y.B.Sc. Sem-III & IV ગણિતશાસ્ત્ર વિષયનો અભ્યાસક્રમ જે પેટાસમિતિએ બનાવ્યો હતો તે સર્વાનુમતે મંજૂર કરવામાં આવ્યો, જે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૧૭/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૯

:: આથી ઠરાવવામાં આવે છે કે, ગણિતશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૧૪/૦૬/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંકઃ૨અન્વયે મંજૂર કરેલ શૈક્ષણિક વર્ષ : ૨૦૨૧–૨૨ થી અમલમાં આવનાર S.Y.B.Sc. Sem-III, &IV, Mathematics વિષયનો અભ્યાસક્રમ મંજુર કરી એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૨૫–૨૬/૦૬/૨૦૨૧ ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૫

:: આથી ઠરાવવામાં આવે છે કે, ગણિતશાસ્ત્ર વિષયની અભ્યાસસમિતિએ તેની તા.૧૪/૦૬/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંક : ૨ અન્વયે ભલામણ કરેલ અને વિજ્ઞાન વિદ્યાશાખાએ તેની તા. ૧૭/૦૬/૨૦૨૧ ની સભાનાં ઠરાવ ક્રમાંક : ૧૯ અન્વયે સ્વીકારેલ શૈક્ષણિક વર્ષ : ૨૦૨૧–૨૨ થી અમલમાં આવનાર S.Y.B.Sc. Sem-III & IV Mathematics વિષયનો અભ્યાસક્રમ મંજુર કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૯૨૨૬/૨૧
તા.૦૧–૦૭–૨૦૨૧

ઈ.ચા. કુલસચિવ

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની ગણિતશાસ્ત્ર વિષય ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓ.
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)
Semester: III, IV
Effective from June 2021

B. Sc.	Paper	Name of the Paper	Hours	Credit	Marks
Semester III	**MTH-301**	Mathematics-V	3	3	**70** (20 Internal + 50 External)
	MTH-302	Mathematics-VI	3	3	
	MTH-303	Mathematics-VII	3	3	
	EG-3001	Mathematical Methods	2	2	
	EG-3002	Group of Symmetries – I	2	2	
Semester IV	**MTH-401**	Mathematics-VIII	3	3	
	MTH-402	Mathematics-IX	3	3	
	MTH-403	Mathematics-X	3	3	
	EG-4001	Mathematical Modeling	2	2	
	EG-4002	Group of Symmetries – II	2	2	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER - III
MTH-301
(Mathematics-V)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week – Credits: 3)

Unit I:
Limits and Continuity of a function of two variables, Partial Differentiation, Total Differential, Composite function, Homogeneous functions.

Unit II:
Euler's theorem for Homogeneous functions, Taylor's theorem for functions of two variables, Maclaurian's expansions in power series, Jacobian.

Unit III:
Maxima-Minima for functions of two variables: Necessary and sufficient conditions for extreme points.

Unit IV:
Vector point function, Differentiation of a Vector point function, Gradient, Divergence and Curl and their properties, Line Integral.

The course is covered by the following reference books:

1. Shantinarayan, P. K. Mittal : A course of Mathematical Analysis, S. Chand and Co., New Delhi.
2. Hari Kishan : Vector Algebra and Calculus, Atlantic Pub. & Distributors(P) Ltd., New Delhi.
3. T. M. Apostol : Mathematical Analysis, Narosa Publishing House, New Delhi.
4. S. C. Malik : Mathematical Analysis, Wiley-Eastern Ltd, New Delhi.
5. N. P. Bhamore & et el : Mathematics Paper III–IV, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -III
MTH-302
(Mathematics-VI)*
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week - Credits: 3)

Unit I:
Error estimation: Errors and their computations, A general error formula.

Unit II:
Numerical Solutions of Algebraic and Transcendental Equations: Bisection Method, Method of False position, Iteration Method, Newton-Raphson's Method.

Unit III:
Forward Differences, Backward Differences, Central Differences, Symbolic relation and separation of symbols, Differences of Polynomials.

Unit IV:
Newton's Forward and Backward Formulae, Gauss' Interpolation formulae.

The course is covered by the following reference books :

1. S. S. Sastry : Introductory methods of Numerical Analysis, Prentice-Hall of India Pvt. Ltd.; 5th Edition.
2. M. K. Jain, Iyenger, Jain : Numerical Methods for Scientific and Engineering Computations, New Age International Ltd.
3. Goel, Mittal : Numerical Analysis, Pragati Prakashan, Meerut.
4. Kaiser A. Kunz : Numerical Analysis, Mc Graw Hill Book Co., London.
5. James I. Buchanan, Peter R. Turner : Numerical Methods and Analysis, Mc Graw Hill Book Co., London.
6. P. C. Biswal:NumericalAnalysis,Prentice-HallofIndia, 2008.
7. H. C. Saxena: Finite Differences and Numerical Analysis, S. Chandand Co., 2005.

* Use of Scientific non – programmable calculator is allowed.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -III
MTH-303
(Mathematics-VII)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week - Credits: 3)

Unit I:
Linear Differential Equations with variable coefficients, Homogeneous Differential Equations, Legendre's Differential Equation.

Unit II:
Second order Differential Equations: Solution in terms of known Integral, Solution by method of removal of first order derivatives, Method of Changing Independent Variable.

Unit III:
Formation of Partial Differential Equation, Solution of Partial Differential Equations, Equations solvable by direct integral.

Unit IV:
Partial Differential Equations of first order, Nonlinear Partial Differential Equations of first order, Some special methods.

The course is covered by the following reference books :

1. D. A. Murray: An Introductory Course in Differential Equations, Orient Longmans, Bombay.
2. I. N. Sneddon: Elements of Partial Differential Equations, McGraw Hill Book Company.
3. B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi.
4. Gorakh prasad : Differential Equations, Pothishala Pvt. Ltd., Allahabad.
5. M. D. Rai Singhania : Differential Equations, S. Chand & Co., New Delhi.
6. Nita H. Shah : Ordinary and Partial Differential Equations : Theory and Applications, PHI Learning Pvt. Ltd, New Delhi.
7. N. P. Bhamore & et el. : Mathematics Paper III–IV, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -III
Elective Generic
EG-3001
(Mathematical Methods)*
Effective from June 2021
Marks:70 (20 internal + 50 external)
(2 Hours / Week - Credits: 2)

Unit I:
Notations of finite difference calculus, Operators E, Δ, ∇, δ, Relations between different operators and their prosperities, Relation between difference and differential operators, Method of constructing difference tables, Finding the missing terms.

Unit II:
Factorial notation, Expression of polynomials in factorial notation by using finite differences, Method of unknown coefficients.

Unit III:
Difference equations: Order and degree of a difference equation, Solution of difference equations, Homogeneous difference equations with constant coefficients.

The course is covered by the following reference books :

1. S.S. Sastry : Introductory methods of Numerical Analysis, Prentice-Hall of India Pvt. Ltd.; 4^{th} Edition.
2. M. K. Jain, Iyenger, Jain: Numerical Methods for Scientific and Engineering Computations, New Age International Ltd.
3. Goel, Mittal : Numerical Analysis, Pragati Prakashan, Meerut.
4. Kaiser A. Kunz : Numerical Analysis, McGraw Hill Book Co., London.
5. James I. Buchanan, Peter R. Turner : Numerical Methods & Analysis, McGraw Hill Book Co., London.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER – III
Elective Generic
EG-3002
(Group of Symmetries-I)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(2 Hours / Week - Credits: 2)

Unit I:
Definition of a group and its elementary properties, Order of a group, Order of an element of a group, Group multiplication tables, Examples of groups including finite groups and infinite groups, Abelian groups, Cyclic groups.

Unit II:
Subgroup, Condition that a subset is a subgroup, Examples of subgroups, Basic concept of symmetry, Symmetry elements and symmetry operations in a space, Identity symmetry operation.

Unit III:
Symmetry planes and reflection symmetry, Inversion centre and inversion symmetry, Rotation axes and rotation symmetry, Improper axes and improper rotation symmetry, Product of symmetry operations.

The course is covered by the following reference books:

1. F. A. Cotton: Chemical application of group theory, Wiley Inter Science, Wiley Eastern Ltd., New Delhi.
2. G. Davidson: Intro. Group Theory for Chemists, Applied Science Publisher.
3. I. N. Herstein: Topics in Algebra, Wiley Eastern Ltd., New Delhi.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -IV
MTH-401
(Mathematics-VIII)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week - Credits: 3)

Unit I:
Beta-Gamma functions: Relation between Beta and Gamma functions, Properties, Applications of Beta-Gamma function.

Unit II:
Double and Triple Integrals: Change of order of Double integrals, Area.

Unit III:
Laplace Transforms: Laplace Transform of elementary functions, Properties of Laplace Transform, Differentiation and Integration of Laplace Transform, Laplace Transform of derivatives and integrals.

Unit IV:
Inverse of Laplace Transform: Method of Partial fractions, Properties of inverse Laplace Transform.

The course is covered by the following reference books:

1. David V. Widder : Advanced Calculus, PHI Learning Pvt. Ltd, New Delhi
2. Kreysig: Advanced Engineering Mathematics, John Wiley, New York, 1999.
3. Shantinarayan, P. K. Mittal : A course of Mathematical Analysis, S. Chand and Co., New Delhi.
4. N. P. Bhamore & et al : Mathematics Paper III-IV, Popular Prakashan, Surat.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -IV
MTH-402
(Mathematics-IX)*
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week - Credits: 3)

Unit I:
Finite difference with unequal interval, Lagrange's Interpolation Formula, Divided Differences, Newton's General Interpolation Formula.

Unit II:
Numerical Differentiation: 1^{st} and 2^{nd} order derivatives based on Newton's forward and backward difference interpolation formulae.

Unit III:
Numerical Integration: General Integration formula, Trapezoidal Rule, Simpson's 1/3-Rule, Simpson's 3/8-Rule.

Unit IV:
Solution of Ordinary Differential Equations by Taylor's series method, Picard's approximation method, Euler's method.

The course is covered by the following reference books:

1. S. S. Sastry : Introductory methods of Numerical Analysis, Prentice-Hall of India Pvt. Ltd.; 4^{th} Edition.
2. M. K. Jain, Iyenger, Jain: Numerical Methods for Scientific and Engineering Computations, New Age International Ltd.
3. Goel, Mittal : Numerical Analysis, Pragati Prakashan, Meerut.
4. Kaiser A. Kunz : Numerical Analysis, McGraw Hill Book Co., London.
5. James I. Buchanan, Peter R. Turner: Numerical Methods and Analysis, McGraw Hill Book Co., London.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -IV
MTH-403
(Mathematics-X)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(3 Hours / Week - Credits: 3)

Unit I:
Sets and elements, Operations on sets, Functions, Real-valued functions.

Unit II:
Countable & Uncountable sets, Greatest lower bound and least upper bound.

Unit III:
Sequences of real numbers, Sub-sequences, limit of a sequence, Convergent sequences, Divergent sequences.

Unit IV:
Divisors, Greatest common divisor, Least Common multiple, Prime numbers, Fundamental theorem of Arithmetic, Congruence relation, Equivalence classes.

The course is covered by the following reference books :

1. R. R. Goldberg : Methods of Real Analysis, Oxford & TBH Pub. Co.
2. I. N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 2006.
3. I. H. Sheth : Abstract Algebra, Nirav Prakashan, Ahmedabad.
4. T. M. Apostol : Mathematical Analysis, Narosa Publishing House, New Delhi.
5. S. C. Malik : Mathematical Analysis, Wiley-Eastern Ltd, New Delhi.
6. Shantinarayan : Modern Algebra, S. Chand and Co., New Delhi.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER -IV
Elective Generic
EG-4001
(Mathematical Modeling)*
Effective from June 2021
Marks:70 (20 internal + 50 external)
(2 Hours / Week - Credits: 2)

Unit I:
Mathematical modelling through ordinary differential equation of first order, Linear growth models; Linear decay models, Models for growth of Science and scientists.

Unit II:
Non-linear growth and decay models, Model of Logistic law of population, Spread of technological innovation, Spread of infectious diseases.

Unit III:
Mathematical models of geometrical problems through ordinary differential equation of first order, Simple geometrical problems, Orthogonal trajectories.

The course is covered by the following reference books :

1. J. N. Kapoor: Mathematical Modelling, New Age International Publishers, New Delhi.
2. Kreysig: Advanced Engineering Mathematics, John Wiley, New York, 1999.
3. J. K. Sharma: OR Theory & Applications, Mac Milian India Ltd., 1998.
4. G. Hadley: Linear Programming, Narosa Publishing House, New Delhi,1995.
5. G. Paria : Linear Programming, Transportation, Assignment, Game, Books & Allied Pvt. Ltd. Calcutta.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
SYLLABUS FOR B. Sc. (MATHEMATICS)
SEMESTER – IV
Elective Generic
EG-4002
(Group of Symmetries-II)
Effective from June 2021
Marks:70 (20 internal + 50 external)
(2 Hours / Week - Credits : 2)

Unit I:
Formation of groups of symmetries (in space) of the following Plane figures (regarded as rigid objects):
1. An isosceles triangle (cyclic group C_2 of order 2)
2. An equilateral triangle (the group S_3 of order 6)
3. A rectangle (the group V_4)
4. A square (the group D_4)

Unit II:
Formation of groups of symmetries of the following Chemical Molecules (Configuration of atoms).
1. H_2O (the group V_4)
2. H_2O_2
3. Trans- $N_2 - F_2$ (the group V_4)
4. NH_3, PCl_3, $CHCl_3$(the group S_3)

Unit III:
Concept of isomorphism of groups, Isomorphism of multiplicative group with the group C_2 of the symmetries of an isosceles triangle, Isomorphism of multiplicative group with the group $V_4$of the symmetries of a rectangle, Isomorphism of group V_4 of the symmetries of a rectangle with the group of symmetries of H_2O, Isomorphism of group S_3 of the symmetries of an equilateral triangle with the group of symmetries of NH_3, PCl_3, $CHCl_3$.

The course is covered by the following reference books:

1. F. A. Cotton: Chemical application of group theory, Wiley Inter Science Wiley Eastern Ltd., New Delhi.
2. G. Davidson: Intro. Group Theory for Chemists, Applied Science Publisher.
3. I. N. Herstein: Topics in Algebra, Wiley Eastern Ltd., New Delhi, 2006.

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