

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Syllabus for M.Sc. (Mathematics)

Scheme of Teaching and Examination

Semester – II

Effective from June 2017

Subject Code	Subject	Scheme Of Teaching			Scheme Of Examination					
		L	P	Total	Th.		Pr.		Total	
					Int	ext	Int	Ext	Int	Ext
201	Real Analysis – II	4	--	4	30	70	--	--	30	70
202	Complex Analysis – II	4	--	4	30	70	--	--	30	70
203	Topology – II	4	--	4	30	70	--	--	30	70
204	Abstract Algebra – II	4	--	4	30	70	--	--	30	70
205	ODE – II	4	--	4	30	70	--	--	30	70
206	Numerical Analysis – II	4	--	4	30	70	--	--	30	70
	Total	24	--	24	180	420	--	--	180	420

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-201
(Real Analysis – II)

Effective from June 2017

Lebesgue Integral:

The Riemann integral, The Lebesgue integral of a bounded function over a set of finite measure, The integral of a non negative function, The general Lebesgue integral, Lebesgue convergence theorem, monotone convergence theorem, Fatau's lemma, generalized Lebesgue convergence theorem.

Differentiation and integration:

Differentiation of monotone functions, Functions of a bounded variation, Differentiation of an Integral, Absolute continuity, Convex functions.

Inequalities in L^p Spaces:

L^p Spaces, The Minkowski and Holder inequalities.

Reference Books:

1. H. L. Royden: "Real Analysis", Macmillan publication, 1993.
2. G. de Barra: "Measure theory and Integration", Wiley Eastern limited 1981.
3. Walter Rudin: "Principles of Mathematical Analysis", McGraw Hill, 1976.
4. T. M. Apostol: "Mathematical Analysis", Narosa Publishing House, 1985.
5. I. P. Natanson: "Theory of Functions of real variable", Fredrick Unger pub.1961.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-202
(Complex Analysis – II)
Effective from June 2017

Prerequisite:

Sequence of Functions, Series of Functions.

Series Expansions:

Power Series, Uniform convergence of power series, Taylor series, Zeros of Analytic functions, Laurent Series, Integration and Differentiation of power series, Multiplication and Division of power series.

Singularities and Residues:

Classification of Singularities, Residues, Poles and Zeros, Behaviour of functions and infinity, Meromorphic functions, Open mapping theorem, Partial fraction expansions, Regular points and singularities.

Sums and Definite Integrals:

Estimation of sums, Definite Integrals involving Sines and Cosines, Improper integrals, Integration along indented Contours, Other types of Contours.

Conformal Mappings:

Conformality Theorem, Bilinear Transformation, Special Bilinear Transformations, Exponential Transformation, Trigonometric Transformation.

Reference Books:

1. H. S. Kasana: "Complex Variables – Theory and Applications", 2nd Edition (2006), PHI, N. Delhi.
2. J. N. Sharma: "Functions of a Complex Variable", Krishna Prakashan, 2000.
3. S. Ponnuswamy: "Foundation of Complex Analysis", Narosa Publishing House, 1997.
4. S. Lang: "Complex Analysis", Addison Wesley, 1997.
5. H. A. Priestly: "Introduction to Complex Analysis", Clarendon Press, 1990.
6. J. B. Conway: "Functions of one Complex Variable", Springer-Verlag, 1980.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-203
(Topology – II)

Effective from June 2017

Separation Axioms:

T_1 and T_2 Spaces, Regular, Completely regular and Normal spaces, Uryshon's lemma and Tietz's extension theorem.

Connected Spaces:

Connected Space, Continuity and connectedness, Disconnected spaces, Product of connected spaces, Connectedness of R^n and C^n .

Component of Space:

Component of space, Theorems and examples on connected spaces.

Totally Disconnected Space:

Definition and examples, Theorems and examples on totally disconnected spaces

Locally Connected Space:

Definition and examples, Theorems related to locally connected spaces.

Reference Books:

1. George F. Simmons: "Introduction to Topology and Modern Analysis", McGraw-Hill Book Co., 1963.
2. James R. Munkres: "Topology : A First Course", Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
3. J. Dugundji: "Topology", Allyn and Bacon, 1966 (Reprinted in India by Prentice Hall of India Pvt. Ltd.).
4. K. D. Joshi: "Introduction to General Topology", Wiley Eastern Ltd., 1983.
5. J. Hocking and G. Young: "Topology", Addison-Wesley, Reading, 1961.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-204
(Abstract Algebra – II)
Effective from June 2017

Field Theory:

Extension fields, Finite extension field, Algebraic extension, Algebraic number, Roots of polynomials, splitting fields, Uniqueness of Splitting fields, Construction with Straightedge and compass, More about roots, Simple extension.

Galois Theory:

Fixed fields, Elementary symmetric functions, normal extension, Galois group, The fundamental theorem of Galois theory.

Solvability by Radicals & Finite Fields:

Solvable Groups, Abel's Theorem, Finite Fields.

Reference Books:

1. I.N. Herstein : Topics in Algebra 4thEd., John Wiley Sons.
2. P.B. Bhattacharya : Basic Abstract Algebra 2ndEd., Cambridge University Press.
3. Artin M. Algebra, Prentice Hall, Englewood, Cliffs NJ.
4. J. A. Gallian: Contemporary Abstract Algebra, Narosa Publishing House.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-205
(Ordinary Differential Equations – II)
Effective from June 2017

Systems of Linear Differential Equations

Introduction, Systems of First Order Equations , Model for Arms Competition between Two Nations Exercise, Existence and Uniqueness Theorem, Fundamental Matrix, Nonhomogeneous Linear Systems, Linear Systems with Constant Coefficients, Linear Systems with Periodic Coefficients.

Existence and Uniqueness of Solutions

Introduction, Preliminaries, Successive Approximations, Picard's Theorem.

References:

1. S. G. Deo, V. Lakshmikantham and V. Raghvendra :Text Book of Ordinary Differential Equations
V. Raghvendra : Tata Mc Graw Hill Pub. Co. Ltd, New Delhi,1997.
2. Coddington E.A. and Levinson N. : Theory of Ordinary Differential Equations,
Mc Graw Hill, 1955.
3. Hartmann P. : Ordinary Differential Equations, John Wiley
International, 1964.
4. Somasundaram D. : Ordinary Differential Equations, Narosa, 2001
5. Mandal C.R. : Ordinary Differential Equations, P.H.I., 2003.
6. Rai B., Freedmanm H.I., and Chaudhary D.P., : A Course in Ordinary Differential Equations,
Narosa, 2002.
7. King A.C., Otto R. : Differential Equations, Cambridge, 2005
and Billingham J.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.
SYLLABUS FOR M.Sc.(MATHEMATICS)
SEMESTER -II
PGMTH-206
(Numerical Analysis – II)
Effective from June 2017

Numerical Differentiations:

Numerical differentiations, Optimum choice of step-length, Extrapolation methods, Partial differentiations.

Numerical Integrations:

Numerical Integrations, Methods based on interpolations, Methods based on Undetermined coefficients, Composite integration methods, Romberg Integration.

Ordinary Differential Equations (Initial Value Problem):

Difference equations, Single step methods, Stability analysis of single step methods, Multistep methods, Stability analysis of Multistep methods.

Ordinary Differential Equations (Boundary Value Problem):

Shooting method, Finite difference methods.

Reference Books:

1. M.K. Jain, S.R.K. Iyenger, R.K. Jain: "Numerical Methods for scientific and engineering computations", VI – edition, New Age International Publishers
2. Philips and Taylor: "Theory and Applications of Numerical Analysis Academic Press", 1996
3. Gourdin and Boumhart: "Applied Numerical Analysis", P.H.I., 1996
4. A.S. Householder: "Theory of Matrices in Numerical Analysis", Blarsedell - New York.
5. Jacques and Colin: "Numerical Analysis", Chapman & Hall, New-York, 1987.