

Swami Ramanand Teerth Marathwada
University, Nanded.

B.A. /B.Sc. Second Year
Syllabus (Mathematics)
(Semester System)

Effective from June -2010

B.A/B.Sc. S.Y. Semester- III

Paper VI :(MT 201): Real Analysis

No. of periods: 60

Max.Marks:50

Unit I:

Sequences of Real numbers: Limit of sequence; uniqueness of the limits, bounded sequences, monotonic sequences, sequences of functional values, limits superior and inferior limit points in terms of sequences.

Unit II:

Infinite series of constants, Cauchy's convergence criterion for series, series of nonnegative terms, the ratio test, absolute and conditional convergence.

Unit III:

Sequences and series of functions, uniform convergence, infinite series of functions, tests of uniform convergence of series continuity, differentiability and integrability of series, power series, properties of functions defined by power series, Taylor's series, arithmetic operations with power series, Abel's theorem.

Text Book: Introduction of Real Analysis –

William F. Trench,

Pearson Education Publications.

Scope:

Unit I : 4.1, 4.1.1 to 4.1.13, 4.2, 4.2.1 to 4.2.7

Unit II : 4.3, 4.3.1 to 4.3.25

Unit III : 4.4, 4.4.1 to 4.4.12, 4.4.13 to 4.4.20 4.5.3 to 4.5.12

B.A./B.Sc. S.Y. Semester III

Paper VII: (MT 202): Modern Algebra

No. of periods: 60

Max.Marks:50

Unit I:

Mapping, Examples of Mappings, The Integers, Group Theory, Definition of a Group, Some Examples of Groups, Cyclic Group, Some Preliminary Lemmas.

Unit II:

Subgroups, Properties of subgroups, Lagrange's Theorem, Normal subgroup and quotient groups, Properties and Examples.

Unit III:

Homomorphisms, Examples and Properties, Applications, Cauchy's theorem for Abelian groups, isomorphism (definitions and basic examples)

Recommended Text Book:

Topic in Algebra

By I.N. Herstein (Second Edition)

Scope:

Chapter 1: 1.2, 1.2.1, 1.2.2 (Lemma), 1.2.3, 1.2.1 (Theorem),

Chapter 2: 2, 2.1, 2.2, 2.3, 2.4, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.4.5, 2.6, 2.7 (Excluding Sylow's Theorem)(Delete art. 2.7.5,2.7.2), 2.8

Reference Books:

- 1) A first course in abstract algebra by J.B. Fraleigh,
Narosa Publications.
- 2) Contemporary Abstract Algebra by Joseph Gallion,
Narosa Publications.
- 3) Modern Algebra by A.R. Vasishtha,
Krishna Prakashan Media.

- 4) Modern Algebra by R.P. Rohtatgi,
Dominant Publishers and Distributors, New Delhi.
- 5) Modern Algebra, By Goyal and Gupta, Pragato Prakashan Meerut
- 6) College Mathematics by N.R. Jayaram and R.V. Prabhakara,
Himalaya Publishing House.
- 7) Elements of Logic and Modern Algebra by M.V. Bhat and M.L.
Bhave, S. Chand and Company Ltd. Ramnagar, New Delhi 110055
- 8) Abstract Algebra by Vijay K. Khanna, Vikas Publication Company

B.Sc. S.Y. SEMESTER –III

PAPER-VIII: (MT203): NUMBER THEORY.

No. of periods: 60

Max.Marks:50

UNIT I: Preliminaries: Mathematical Induction .The Binomial theorem
Divisibility Theory in the integers: Division algorithm GCD Euclidean
algorithm Diophantine equation

UNIT II: Primes and their distribution: The fundamental theorem of
Arithmetic the Sieve of Eratosthenes the Goldbach conjecture

UNIT III: The theory of Congruences: Basic properties of congruence.
Binary and Decimal representations of integers Linear congruences and the
Chinese remainder theorem.
Fermat's Theorem: Theorems and pseudo primes Wilson's theorem The
Fermat-Kraitchik factorization method

Text Book:- Elementary Number theory
-David M Burton
Tata McGraw-Hill Co. New Delhi.

Scope: - Chap 2: Complete
Chap 3: 3.1 to 3.3.
Chap 4: 4.2 to 4.4.
Chap.5: 5.1 to 5.4.

Note: - Paper is only for B.Sc. students.

B.Sc. S.Y. Semester: IV

Paper-IX: (MT 204): Ordinary Differential Equations

No. of periods: 60

Max.Marks:50

Unit I:

Preliminaries: Polynomials, Determinants, Introduction – Linear Equations of the First Order: Differential Equation, Linear Equations of the First Order, The Equation $y'+ay = 0$, the equation $y'+ay = b(x)$, The General Linear Equations of the First Order.

Unit II:

Linear equations with constant coefficients: The second order homogeneous equations, IVPs for second order homogeneous equations, Linear dependence and independence, A formula for the Wronskain, The non homogeneous equations of order two, The homogeneous equation of order n, IVPs of order n, Special methods for solving the non- homogeneous equation

Unit III:

Linear equations with variable coefficients: IVPs for homogeneous equation, Solution of the homogeneous equation, The Wronskain and linear independence, reduction of order, homogeneous equations with analytic coefficients.

Existence and uniqueness of solutions to first order: equations with variables separated, exact equations, the method of successive approximations.

Text Book:

Introduction to Ordinary Differential Equations,

By E.A. Coddington

Prentice Hall of India.

Scope:

Unit 1: Chap 0: Art 4, 6

Chap 1: Complete, **Unit 2:** Chap 2: Art 1 to 8, 10, 11

Unit 3: Chap 3: Art 1 to 5, 7, Chap 5: Art 1 to 4

Note: - Paper is only for B.Sc. students.

B.A./B.Sc. S.Y. Semester IV
Paper X :(MT 205): Ring Theory

No. of periods: 60

Max.Marks:50

Unit I:

Definition and examples of rings, Some special classes of rings, Homomorphisms, Isomorphism

Unit II:

Ideals and quotients rings, More ideals and quotients rings, The field of quotients of an integral domains

Unit III:

Euclidean rings, A particular Euclidean ring, Polynomial rings, Polynomial over the national fields.

Scope:

Unit 1: 3.1, 3.2, 3.3

Unit 2: 3.4, 3.5, 3.6

Unit 3: 3.7, 3.8, 3.9, 3.10

Text Book:

Topics in Algebra,

I.N. Herstein , John Wiley and Sons (New York)

Reference Books:

- 1) A first course in abstract algebra by J.B. Fraleigh,
Narosa Publications.
- 2) Contemporary Abstract Algebra by Joseph Gallion,
Narosa Publications.
- 3) Modern Algebra by A.R. Vasishtha, Krishna Prakashan Media.
- 4) Modern Algebra by R.P. Rohtatgi,
Dominant Publishers and Distributors, New Delhi.
- 5) Modern Algebra, By Goyal and Gupta, Pragato Prakashan Meerut

- 6) College Mathematics by N.R. Jayaram and R.V. Prabhakara,
Himalaya Publishing House.
- 7) Elements of Logic and Modern Algebra by M.V. Bhat and M.L.
Bhave,
S. Chand and Company Ltd. Ramnagar, New Delhi 110055

B.A./B.Sc. S.Y. Semester- IV

Paper XI :(MT 206): Calculus of Several Variables

No. of periods: 60

Max.Marks:50

Unit I:

Real valued functions of several variables: structure of \mathbb{R}^n , length, distance and inner product, line segments in \mathbb{R}^n , neighborhood and open sets in \mathbb{R}^n , Heine–Borel theorem, connected sets and regions.

Unit II:

Continuous Real-valued functions of n variables: vector valued functions and composite functions, intermediate value theorem, uniform continuity.

Partial derivatives and the differential: Differentiable functions of several variables, the differential, Geometric interpretation of differentiability, maxima and minima.

Unit III:

The Chain rule and Taylor's theorem: The chain rule, higher derivatives of composite functions, higher differentials and Taylor's theorem,

Text Book: Introduction of Real Analysis –

William F. Trench,

Pearson Education Publications.

Scope:

Unit I: Art 5.1, 5.1.1 to 5.1.21

Unit II: Art 5.2, 5.2.1 to 5.2.54, 5.3, 5.3.1 to 5.3.11

Unit III: Art 5.4, 5.4.1 to 5.4.11

B.Sc. S.Y. SEMESTER –III & IV

PAPER-XII (MP207): PRACTICAL PAPER.

No. of periods: 90

Max.Marks:100

PRACTICALS USING MATHEMATICAL SOFTWARES.

SECTION A: Plotting of Graphs.

SECTION B: Solving of Ordinary differential equations.

SECTION C: Solving problems in Calculus.

SECTION D: Introduction to symbolic methods and solving problems.

NOTE:- 1) No. of periods per week :**03**.

2) Examination pattern: **Yearly**

3) Practical paper is only for **B.Sc.** students.

4) Softwares: **Freeware, MATLAB**.etc.

5) Minimum **Five** practicals from each section should be covered in Record book.

Jogdand S.M.
Chairman,
B.O.S. in Mathematics,
S.R.T.M.University,Nanded.
Dt.-26/04/2010.

To,
The Director,
B.C.U.D.,
S.R.T.M. University,
Nanded.

Subject: - *Submission of syllabus of B.A./B.Sc. (Second Year), III & IVth Semester.*

R/Sir,

With reference to subject cited above, the Board of Studies in Mathematics prepared the New Syllabus for of B.A. /B.Sc. (second Year), III & IVth Semester, which to be effective from June-2010. The same is submitting for the information and necessary action. Kindly do the needful in this regard.

The question paper pattern of theory examination and practical examination will be provided afterward.

Thanking You,

Yours faithfully,

(Jogdand S.M.)