

K.T.S.P.Mandal's  
**Hutatma Rajguru Mahavidyalaya, Rajgurunagar**  
**Department Of Mathematics**  
**Teaching Plan**  
**Academic Year-2023-24**  
**Sem-I**

Sr. No.	Class	Subject	Name of Teacher
1	F.Y.B.Sc.	Algebra	Prof. Toke R.N.
		Calculus-I	Prof. Wayal R.M.
2	S.Y.B.Sc.	Calculus of Several Variable	Prof. Wayal R.M.
		Numerical Analysis & its application	Prof. Wayal R.M.
3	F.Y.B.Com	Business Mathematics & Statistics	Prof. Toke R.N.

**Class: F.Y.B.Sc**  
**Name: Prof. R. M. Wayal**

**Subject : Algebra**  
**No. of Lectures:36**

Month	Topic
August	Sets, relation, equivalence relation, equivalence classes, Function.
September	Types of function, inverse of function, composition of function, Mathematical induction, division algorithm, greatest common divisor,

	Euclid's lemma.
October	The Euclidean algorithm, fundamental theorem of arithmetic, prime numbers, theory of congruence, properties of congruence.
November	Fermat's theorem, sums and products, basic algebraic properties, moduli, complex conjugates. Polar and exponential form of complex number, De-Moivers theorem
December	$N^{\text{th}}$ root of unity

**Class: S.Y.B.Sc**

**Subject : Calculus of Several Variables**

**Name: Prof. R. M. Wayal**

**No. of Lectures:36**

<b>Month</b>	<b>Topic</b>
<b>Sept</b>	Functions of two variables, Domain and Range, Graphs, Level Curves.
<b>Oct</b>	Functions of Three or More Variables, Limits by using definition, different paths, polar coordinates. Continuity, Definition and examples of partial derivative. Higher Derivatives, Clairaut's Theorem , higher order partial derivative,
<b>Nov</b>	Differential, Equations, Wave equation. Differentiable function, Differentials, Chain Rule, homogeneous Functions, Euler's theorem, Extreme values of functions of two variables. Necessary conditions for extreme values.Second Derivative Test, Lagrange Multipliers.
<b>Dec</b>	Iterated Integrals, Fubini's Theorem. Double integral over general regions
<b>Jan</b>	Change of order of integration for two variables. Double integral in Polar coordinates. Triple integrals, Evaluation of triple integrals. Triple integrals in spherical coordinates. Jacobians, Change of variables in multiple integrals

**Class - S.Y.B.Sc.**

**Subject:- Numerical Analysis &It's Application**

**Name:- Prof. R. M. Wayal**

**Total No. of lectures - 36**

<b>Month</b>	<b>Topic</b>
September	Errors and their computations, Bisection method.
October	The method of False position,Newton- Raphson method, Finite Difference Operators and their relations (Forward, Backward difference and Shift operator). Differences of a polynomial, Newton's forward Interpolation Formula
November	Newton's Backward Interpolation Formulae, Lagrange's Interpolation Formula, Numerical Differentiation, A General Quadrature formula, The rapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule. . Taylor's series method, Picard's Method successive approximations.
December	Euler's & Modified Euler's Methods.

	Runge Kutta Method (Second and fourth order).
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**Class - F.Y.B.Cs.(Comp. Sci)**

**Subject:- Discrete Mathematics**

**Name:-Prof. Rakshe A.R.**

**Total No. of lectures per week - 36**

Month	Topic
July 2022	Propositional Logic, Predicates and Quantifiers Rules of Inference, Poset, Hasse diagram. Lattices, Complemented lattice , Bounded lattice and Distributive lattice . Boolean Functions Boolean Function of degree n.
August 2022	Boolean identities, Definition of Boolean Algebra .Representation of Minterm, Maxterm Disjunctive normal form, Conjunctive normal Form. Counting Principles Cardinality of a finite set.
September 2022	The Product Rule, The Sum Rule, The Inclusion-Exclusion Principle. The Pigeonhole Principle: Statement, The Generalized Pigeonhole Principle, Its applications.
October 2022	Permutation and Combination with Repetitions, Permutations with Indistinguishable Objects, Distributing objects into box.
November (2022)	Recurrence Relations : Introduction, Formation. Linear Recurrence Relations with constant coefficients. Homogeneous Solutions. Particular Solutions. Total Solutions

**Class - S.Y.B.Cs.(Comp Sci.)**

**Subject:- Numerical Techniques**

**Name:-Prof. Rakshe A.R.**

**Total No. of lectures - 36**

Month	Topic
Sep 2022	Solution of Algebraic and Transcendental, Introduction, Error and their computation, Bisection method - without derivation and convergence, The method of false position,, Newton - Raphson Method - without derivation & convergence. Interpolation, Introduction, Finite difference operators and their relation,
Oct 2022	Difference Operators - Forward , Backward , Shift (E), Relations between them.Forward & Backward Difference tables. Factorial notation Newton's Forward Difference & Backward Difference
Nov 2022	interpolation Formula, Lagrange's formula for interpolation with unequally, Divided Difference, Newton's Divided Difference formula. Numerical Integration, Introduction. Numerical Differentiation. Numerical Integration - A General Quadrature formula, The Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule. Method (First, Second, third and fourth order).

**Class - F.Y.B.Sc**

**Name:-Prof. Rakshe A. R.**

**Subject:- Calculus I**

**Total No. of lectures - 36**

<b>Month</b>	<b>Topic</b>
August	Algebraic properties of R, Order properties of R, Well-Ordering Property of N, Arithmetic mean-Geometric mean inequality, Bernoulli's inequality, Absolute value function and its properties, triangle inequality and its consequences.
September	Definitions of Upper bound, Lower bound, supremum, infimum of subsets of R, completeness property of R, Archimedean property and its consequences, The density theorem, sequences of real numbers
October	Definition of limit of sequence and uniqueness of limit, bounded sequence, Monotone sequences, Monotone convergence theorem, Definition of subsequence, Divergence criteria, Monotone Subsequence theorem, Bolzano -Weierstrass theorem, The Completeness Property of R.
November	Functions, domain and range, graphs of functions, Piecewise defined functions, increasing and decreasing functions, symmetry, common functions, limit of a function, divergence criteria, Squeeze theorem, one-sided limits, infinite limits, Definition of continuous function at a point , sequential criterion for continuity, Divergence criterion, combination of continuous functions. Properties of continuous functions on an interval, Boundedness theorem, The minimum -maximum theorem,
December	Location of root theorem, Bolzano's intermediate value theorem. Continuous function maps closed bounded interval to closed bounded interval.

**Class - F.Y.B.B.A.(C.A)**

**Name:- Prof. Bhambure P. D.**

**Subject:- Business Statistics**

**Total No. of lectures - 48**

<b>Month</b>	<b>Topic</b>
August	Role of statistics. In informatics business science ,Tabulation
September	Data condensations and tabulation, Data Condensation and graphical Methods :Raw data , attributes and variables , classification , frequency distribution ,cumulative frequency distributions. Graphs - Histogram, Frequency polygon. Diagrams - Multiple bar , Pie ,Subdivided bar.

October	Criteria for good measures of central tendency, Arithmetic mean, Median and Mode for grouped and ungrouped data, combined mean.
November	Concept of dispersion , Absolute and relative measure of dispersion, Range, Variance, Standard deviation, Coefficient of variation, Quartile Deviation , Coefficient of Quartile deviation
December	Concept of correlation, positive & negative correlation Karl Pearson's Coefficient of correlation, Meaning of regression, Two regression equations, regression coefficients and properties

**Class - F.Y.B.Com.**

**Subject:- Business Mathematics & Statistics**

**Name:- Prof. Bhambure P. D.**

**Total No. of lectures - 48**

<b>Month</b>	<b>Topic</b>
August	<b>Interest &amp; Annuity</b> Interest:-Concept of Present value and future value
September	simple interest ,compound interest, nominal and effective rate of interest, example and problems. Annuity:- Ordinary Annuity, Sinking Fund, Annuity due, present value and future value, equated monthly installment by interest of reducing balance and flat interest method, examples and problem
October	<b>Shares and Mutual Funds</b> Share :-Concept of share, face value, market value, dividend, brokerage, equity shares, preferential shares, examples and problem. Mutual Funds:- Concept of mutual funds, problems on calculation of net income ,Change in net asset value.
November	<b>Population and Sample</b> Definition of Statistics, Scope of statistics in economics , Management Science and Industry. Concept population and sample, method of data collection: Census and sampling with illustration . method of random sampling -( SRSWR, SRSWOR, Stratified, Systematic )
December	<b>Measures of Central Tendency and Measures of Dispersion</b> Frequency distribution : Row data, attributes and variables, classification of data, frequency distribution, cumulative frequency distribution, Histogram and ogive curves. Requisites of ideal, Arithmetic mean, Median, Mode, Geometric mean, Harmonic mean
August	Standard Deviation (S.D), Coefficient of variation(C.V)

**Class - F.Y.B.Sc.(Comp.Sci)**

**Name:- Prof. Arude J. B.**

**Subject:- Matrix Algebra**

**Total No. of lectures - 36**

<b>Month</b>	<b>Topic</b>
August	Introduction, Matrix Operations
September	The Inverse of a Matrix, Characterization of invertible matrices System of Linear equations, Row reduction and echelon forms Vector equations
October	The matrix equation $Ax=b$ , Solution sets of linear systems, Partitioned Matrices, Matrix factorization [Lu decomposition] Linear Independence, Introduction to linear transformation
November	The matrix of linear transformation, Subspaces of $R^n$ , Dimension and Ranks, Introduction to determinants
December	Properties of determinants

**Class - S.Y.B.Sc. (Comp.Sci)**

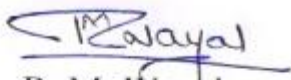
**theory Name:- Prof. Arude J. B.**

**subject:- Group and coding**

**Total No. of lectures - 36**

<b>Month</b>	<b>Topic</b>
September	Division Algorithm, G.C.D. using division algorithm and expressing it as linear combination, Euclid's lemma, Equivalence relation, Congruence relation on set of integers, Equivalence class partition
October	Binary Operation, Group: Definition and Examples, Elementary Properties of Groups
November	Order of a group, order of an element, Examples $(Z_n, +)$ and $(U(n), *)$

	Subgroup definition, Finite subgroup test, subgroups of $Z_n$ , Generator, cyclic group, finding generators of $Z_n$ ( Corollary 3,4), Permutation group, definition, composition of two permutations, representation as product of disjoint cycles, inverse and order of a permutation, even/ odd permutation 3.6 Cosets: Definition, Examples and Properties, Lagrange theorem
December	Coding of Binary Information and Error detection , Decoding and Error Correction , Public Key Cryptography I, Public Key Cryptography II

  
 R. M. Wayal  
 Head  
 Department of Mathematics  
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