



**VIJAYANAGARA
SRI KRISHNADEVARAYA UNIVERSITY,
BALLARI**

Scheme And Syllabus

**For B.A/B.Sc MATHEMATICS COURSE
(Semester System)**

2016-17

Open Electives offered by Department of Mathematics for U.G from 2016-17 onwards								
SEM	COURSE NUMBER* IN SEMESTER I/II/III/IV	SUBJECT, PAPER No AND TITLE IN A SEMESTER I/II/III/IV	TYPE OF INSTRUCTION & HOURS PER WEEK/COURSE	CREDITS	HOURS OF EXAM (SSE) PER COURSE /SEM	MAX. MARKS FOR IA/COURSE/SEM	MAX.MARKS FOR SEE/COURSE/SEMESTER	MAX. MARKS /COURSE/SEMESTER
II	OEC MAT-II	Fundamentals of Mathematics	T 4	4	3	30	70	100
III	OEC MAT-III	Matrix theory & its application	T 4	4	3	30	70	100
IV	OEC MAT-IV	Mathematics for everyone	T 4	4	3	30	70	100
V	OEC MAT-V	Calculus	T 4	4	3	30	70	100

Second semester

Fundamentals of Mathematics

Total Hours: 52

Theory: 70 I.A: 30

Code: OEC MAT-II

Unit 1:

Brief History of Mathematics:

Number Theory: Numbers, Integers, Real Numbers, GCD, LCM, Prime Numbers, Surds, Indices, Logarithms, Progressions, Arithmetic Progressions, Harmonic Progression. **13 hrs**

Unit 2:

Approximation Wrong Number, Decimal Fractions, Square root and Cube root, simplifications: Partnerships, Percentage, Average, Ratio and Proportions, Average & Ages Ratio & Proportion, Profit and Loss, Simple Interest and Compound interest. **13 hrs**

Unit 3:

Set theory: Operations of Union, Intersection, Complementation, Inclusion- exclusion principle.

Functions: one to one, onto, into functions, many one functions.

Relations: Equivalence relationships.

13 hrs

Unit 4:

Time and work, Time and distance, Mensuration, Permutation and combinations, Data tables, Probability, Pie Charts, Bar Graphs, Line Graphs, Mixed Graphs, Case study. Volume surface and area, Stocks and Shares, Bankers Discount, Basic differentiation and Integration. **13 hrs**

Recommended Books:

1. R. S. Agarwal, Quantitative Aptitude for competitive examinations, S. Chand Company, New Delhi.
2. Dinesh Khattar, The Pearson Guide to Quantitative aptitude for competitive examinations, The Pearson Pvt. Ltd.
3. Kolman and Busby: Discrete Mathematics, OHI

Third semester

Matrix Theory and their applications

Total Hours: 52

Theory: 70 I.A: 30

Code: OEC MAT-III

Unit 1:

Introduction to Matrices: Basic Operations: Matrix addition, Multiplication, Algebraic Properties of Matrix Operations. Invertible Matrices, Special Matrices: Triangular, Symmetric, Diagonal.

Elementary Operation for Matrices: Matrix Exponential, Application: Application of invertible Matrices: Coding Complex numbers as Matrices. Determinants and its properties. **13 hrs**

Unit 2:

Systems of linear equations:

System of Equations: An introduction, System of Linear Equations: Gaussian Elimination, System of linear equations in Two variables, System of linear equations in three variables. Application of Determinant to systems: Cramer's Rule, Problems on Linear System and Matrices. **13 hrs**

Unit 3:

Graphs and its Matrices.

Graph – Finite and Infinite Graph, Multigraph, Complete Graph, Bipartite Graph, connected and disconnected Graph, complimentary Graph, Degree of a Graph, minimum and maximum degree, Addition of Graphs, isomorphism of Graphs. Digraph, Matrix representation of Graph- incidence matrix, Circuit matrix, Application of graph theory- travelling salesman problem and Konigsberg bridge problem.

13 hrs

Unit 4:

Linear Programming: Formulation, Linear Programming in Matrix Operations. Graphical Solutions, some basic properties of convex sets.

13 hrs

References:

1. V. Balakrishna, Graph Theory(Schumus Outline Series)
2. S. D. Sharma Operation Research.
3. Kanti Swarup, gupta P K and Manmohan Operation Research (S Chand & Co)
4. Linear Algebra in Twenty Five Lectures, Tom denton and Andrew Waldron
5. <http://www.sosmath.com/matrix/matrix.html>

Open Elective
Fourth semester
Mathematics for everyone

Total Hours: 52

Theory: 70 I.A: 30

Code: OEC MAT-IV

Unit 1:

Basic Concepts in Mathematics:

The number system: Natural numbers, Integers, rational and Irrational numbers, Real Numbers, Complex Numbers, Prime Numbers. The Concept of Sets: Subsets and Equality of Sets, Set Operations (Union, Intersection and difference). **13 hrs**

Unit 2:

Equivalence relations and types of Functions (one-one, onto, many-one functions with examples)
Mathematical Logic, methods of Proof, Mathematical Induction. **13 hrs**

Unit 3:

Divisibility, Some theorems on divisibility, Primes, the Binomial Theorem.
Congruences: Congruences, Solution of Congruences, The Chinese Remainder theorem. **13 hrs**

Unit 4:

Row and column operations, equivalent matrices, Invariance of rank under elementary operations, determination of rank of a matrix by reducing it to the echelon form.
Eigen values and Eigen vectors of a square matrix standard properties, Cayley-Hamilton Theorem (without proof) and Applications. **13 hrs**

Text Books:

1. Introduction to the theory of numbers, Ivan Niven, Herbert S Zuckerman, Hugh L Montgomery, 5th Edition, Wiley India Pvt. Ltd.
2. Contemporary abstract algebra, Joseph A Gallian, Narosa Publication House.
3. Calculus Volume – 1, T. M. Apostol, John Wiley & Sons.

Reference Books:

1. Introduction to Analytic Number Theory, Tom M Apostol, 1st Edition, Narosa Book Distribution Pvt. Ltd.
2. Thomas' Calculus, George B Thomas Jr. Maurice D Weir, Joel R Hass, 12th Edition, Pearson.
3. Abstract Algebra, David Dummit and Richard R Foote, John Wiley & Sons.

Open Elective

Fifth semester

Calculus

Total Hours: 52
Code: OEC MAT-V

Theory: 70 I.A: 30

Unit 1:

Fundamental of Group Theory.

Groups, Subgroups, Cyclic groups, normal subgroups, quotient groups, homomorphism, natural homomorphism. Kernel and image of a homomorphism and their properties. Isomorphism and fundamental theorem of homomorphism of groups. **13 hrs**

Unit 2:

Elements of Calculus Functions of one variable:

Limits, Continuity and Differentiations of Functions of a single variable. Derivatives of composite functions, parametric functions, logarithmic functions, exponential and inverse functions. **13 hrs**

Unit 3:

Successive differentiation, fundamentals, partial derivatives with respect to one and two variables. Basic there on.

13 hrs

Unit 4:

Definition of convergence; divergence and oscillation of series, properties of series of positive terms, Geometric series without proof, Cauchy's criterion, tests for convergence of series-P-series(without proof), Comparison test, Cauchy's n^{th} root test, D'Alembert's test (without proof) Raabe's test (without proof). **13 hrs**

Text Books:

1. Introduction to the theory of numbers, Ivan Niven, Herbert S Zuckerman, Hugh L Montgomery, 5th Edition, Wiley India Pvt. Ltd.
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