शासकीय कला एवं वाणिज्य कन्या महाविद्यालय रायपुर

Elective विषय के चयन हेतु प्रारूप

विभाग: Mathamatics

विभागाध्यक्ष: Dr. Ravi Sharma

वर्ष: 2

सेमेस्टर/भाग: B. SC. III (paper III Optional)

विश्वविद्यालय द्वारा प्रस्तुत सेमेस्टर के अंतर्गत छात्राओं को Elective विषय के रूप में जो विषय प्रस्तावित किये गए है वे इस प्रकार है:-

1. Principle of Computer Science
2. Discrete Mathamatics
3. Application of Mathamatics in Finance and Insurance
4. Programming in 'c' and Numerical Analysis
5. Mathamatical Modelling

विभाग कि आंतरिक बैठक में छात्राओं के रुझान को देखते हुए निम्नलिखित विषय को छात्राओं को पढ़ने का निर्णय लिया गया

निर्धारित विषय   Discrete Mathamatics

विभागाध्यक्ष
(Dr Ravi Sharma)
Deptt of Physics

PAPER - III - (OPTIONAL)
(II) DISCRETE MATHEMATICS (Paper Code-0901)

UNIT-I **Sets and Propositions** - Cardinality. Mathematical Induction, Principle of Inclusion and exclusion.

Computability and Formal Languages - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

UNIT-II **Relations and Functions** - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle. **Graphs and Planar Graphs** - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs.

TREES.

UNIT-III **Finite State Machines** - Equivalent Machines. Finite State Machines as Language Recognizers. Analysis of Algorithms - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

UNIT-IVl **Recurrence Relations and Recursive Algorithms** - Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

UNIT-V **Boolean Algebras** - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Prepositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

REFERENCES :

C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.

PAPER - III - (OPTIONAL)
(III) APPLICATION OF MATHEMATICS IN FINANCE AND INSURANCE
(Paper Code-0902)

Application of Mathematics in Finance :

UNIT-I **Financial Management** - An overview. Nature and Scope of Financial Management. Goals of Financial Management and main decisions of financial management. Difference between risk, speculation and gambling.

Time value of Money-Interest rate and discount rate. Present value and future valuediscrete case as well as continuous compounding case. Annuities and its kinds.

UNIT-II Meaning of return. Return as Internal Rate of Return (IRR). Numerical Methods like Newton RaphsonMethod to calculate IRR. Measurement of returns under uncertainty situations. Meaning of risk. Difference between risk and uncertainty. Types of risks. Measurement of risk. Calculation of security and Portfolio Risk and Return-Markowitz Model. Sharpe's Single Index Model Systematic Risk and Unsystematic Risk.

UNIT-III Taylor series and Bond Valuation. Calculation of Duration and Convexity of bonds. Financial Derivaties - Futures. Forward. Swaps and Options. Call and Put Option. Call and Put Parity Theorem. Pricing of contingent claims through Arbitrage and Arbitrage Theorem.