PUNE DISTRICT EDUCATION ASSOCIATION'S

MAMASAHEB MOHOL COLLEGE

48/1A, Erandwane, Paud Road, Pune - 411038(Maharashtra) India

DEPARTMENT OF COMPUTER SCIENCE

Course Outcome (CO)

Name: Prof. Dipali Yogesh Jadhav

Class: F.Y.B.Sc(Comp.Sci.)

Course Name: Problem Solving Using Computers and 'C' Programming

Course code: CS-101

Course outcomes:

CO 1. Develop Problem Solving abilities using computers

CO 2. Understand basic principles of programming

CO 3. Develop skills for writing programs using 'C'

CO 4. Familiar with pointers and reference parameter.

CO 5. Familiar with using text file input/output.

Course F.Y.BSc. (Comp.Sci.)	**Course Specific Outcome (CSO)**	**Methodology**	**Reference Book**	**No. of Lectures**
Problem Solving using Computers Problem-Solving Writing Simple Algorithms Algorithms Flowcharts	Problem solving using computers. Writing stepwise Simple Algorithms. To draw pictorial representation using Flowcharts.	Constructive	Programming in ANSI C, E. Balaguruswamy	8
Programming Languages as Tools Machine language Assembly language High level languages Compilers and Interpreters	Understand Machine level language. understand Assembly language understand High level languages	Lecture	Programming in ANSI C, E. Balaguruswamy	6
Introduction to C History Structure of a C program Functions as building	understand the History of C-programming understand Structure of a C program Functions as building	Lecture	A Structured Programming Approach Using C, Behrouz A. Forouzan	

blocks Application Areas C Program development life cycle Sample programs	blocks Various Application Areas of C			
C Tokens Keywords Identifiers Variables Constants – character, integer, float, string, escape sequences Data types – built-in and user defined Operators and Expressions Operator types precedence and associativity rules. Simple programs using printf and scanf	understand the History of C-programming understand Structure of a C program Functions as building blocks Various Application Areas of C	Lecture	Programming in ANSI C, E. Balaguruswamy	12
Input and Output Character input and output String input and output Formatted input and output	Get the knowledge of Character input and output How to use String input and output understand Formatted input and output	Lecture	Approach Using C, Behrouz A. Forouzan	3
Control Structures Decision making structures If, if-else, switch Loop Control structures While, do-while Nested structures break and continue	Develop Decision making knowledge. Loop Control structures like -While, do-while, for where to use Nested structure	Lecture	Programming in ANSI C, E. Balaguruswamy	10
Functions in C What is a function Advantages of Functions Standard library functions User defined functions keyword, Scope of variables, storage classes	solve real world application program using function Understand Advantages of Functions. How to use Recursion.	Demonstrative	Approach Using C, Behrouz A. Forouzan	8

Recursion				
Arrays Array declaration, initialization Types – one, two and multidimensional Passing arrays to functions	Store large amount of data using Array. understand Types To Two and multidimensional array. How to pass arrays to functions	Demonstrative	Programming in ANSI C, E. Balaguruswamy	8
Pointers Pointer declaration, initialization Dereferencing pointers Pointer arithmetic Pointer to pointer Arrays and pointers Functions and pointers – passing pointers to functions, function returning pointers Dynamic memory allocation	How to manipulate data using pointers. understand void pointers.	Demonstrative	Programming in ANSI C, E. Balaguruswamy	6
Strings Declaration and initialization, format specifiers Standard library functions Strings and pointers Array of strings Command Line Arguments	Various Standard library functions Understand differences of Strings and pointers.	Lecture	Approach Using C, Behrouz A. Forouzan	6
Structures and Unions Creating structures Accessing structure members Structure initialization Array of structures Passing structures to functions Nested structures Pointers and structures	How to create structures. Accessing structure members using (dot Operator). To understand Array of structures.	Constructive	Programming in ANSI C, E. Balaguruswamy	6

File Handling Streams Types of Files Operations on files Random access to files	How to store data in various forms. How to perform Operations on files To understand basic features Random access to files .	Constructive	Programming in ANSI C, E. Balaguruswamy	6
C Preprocessor Format of Preprocessor directive File Inclusion directive Macro substitution, nested macro, argumented macro	Get Format of Preprocessor directive Understand File Inclusion directive. Understand need of Macro.	Lecture	Programming in ANSI C, E. Balaguruswamy	2

References:

- Programming in ANSI C, E. Balaguruswamy,ISBN:9781259004612,Tata McGraw Hill Publishing Co.Ltd.-New Delhi
- A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg

Dipali Yogesh jadhav
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DEPARTMENT OF COMPUTER SCIENCE

COURSE OUTCOME

SUBJECT NAME: Discrete mathematics

CLASS – FY B.Sc. (COMPUTRE SCIENCE)

PAPER: - MTC -101

NAME OF SUBJECT TEACHER:- MS. PRIYANKA JAISWAL

Course outcome:-

A) Power of mathematical ideas and tools , know how to use them by modeling , solving And interpreting
B) Clear a concept of logic lattice and Boolean algebra.
C) Explain relation statements rule and examples of counting principles, its application
D) Explain and application of graph, operation on graphs
E) Clear concept of trees and its type with application base examples

COURCE –MTC 102	COURSE SPECIFY OUTCOMES:-	METHODOLOGY	REFRENCE BOOK	NO OF LECTUERS
Unit1:- LOGIC Propositional Logic, Propositional Equivalences. Predicates and Quantifiers : Predicate, n-Place Predicate or ,n-ary Predicate, Quantification and Quantifiers, Universal Quantifier, Existential Quantifier, Quantifiers with restricted domains, Logical Equivalences involving Quantifiers. Rules of Inference : Argument in propositional Logic, Validity Argument(Direct and Indirect methods) Rules of Inference for Propositional Logic, Building Arguments.	a) Predicates and Quantifies type and examples b) Explain Rules of inference.	DEMOSTREATION, PPT,VIDEO LECTURES	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	7

UNIT 2 :- LATTICE AND BOOLEAN ALGEBRA: Poset, Hasse diagram. Lattices, Complemented lattice, Bounded lattice and Distributive lattice. Boolean Functions : Introduction, Boolean variable, Boolean Function of degree n, Boolean identities, Definition of Boolean Algebra. Representation of Boolean Functions : Minterm, Maxterm Disjunctive normal form, Conjunctive normal Form.	a) Explain lattice and its types, Boolean functions b) To find minsters conjunction in normal form	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	**10**
Unit 3:- Counting Principles : Cardinality of Set: Cardinality of a finite set. Basics of Counting: The Product Rule, The Sum Rule, The Inclusion-Exclusion Principle. The Pigeonhole Principle: Statement, The Generalized Pigeonhole Principle, Its Applications. Generalized Permutations and Combinations : Permutation and Combination with Repetitions,	a) Basic of counting, product rule , Pigeonhole Principles. b) generalized permutations and combinations with solving problems	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	**10**
Unit 4:- RECURRENCE RELATIONS: Recurrence Relations : Introduction, Formation. Linear Recurrence Relations with constant coefficients. Homogeneous Solutions. Particular Solutions	a) Solve linear recurrence relation with contact coefficients. b) Solve obtaining Homog enous, Particular, Total solutions.	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	**09**
UNIT 5:- GRAPHS: Definition, Elementary terminologies and results, Graphs as Models. Special types of graphs. Isomorphism. Adjacency and Incidence Matrix of a Graph.	a) Basic concept of graph and its types b) solve and clear concept adjacent and incidence matrix of a graph.	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	**06**
Unit 6:- Operations on Graphs	a) Solve examples onsub	DEMOSTREATION	John Clark and	**04**

Sub graphs, induced subgraphs,Vertex delition, Edge delition. Complement of a graph and self-complementary graphs. Union, Intersection and Product of graphs Fusion of vertices	graph complements of graph b) Obtain union intersections and product of graph , fusion of vertices		Derek Holton, A First Look at Graph Theory (Allied Publishers)	
Unit 7 :- Connected Graph: Walk, Trail, Path, Cycle : Definitions and elementary properties. Connected Graphs : definition and properties. Distance between two vertices, eccentricity, center, radius and diameter of a graph.Isthmus, Cutvetex : Definition and properties. Cutset, edge-connectivity, vertex connectivity. Weighted Graph and Dijkstra's Algorithm	a) Define and explain walk, trail, path ,cycle, connected graph b)Solve and explain with UT application Dijkstra's algorithms	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	**09**
Unite 8 :- Eulerian and Hamiltonian Graph: Seven Bridge Problem, Eulerian Graph : Definition and Examples, Necessary and Sufficient condition. Fleury's Algorithm. Hamiltonian Graphs : Definition and Examples, Necessary Condition. Introduction of Chinese Postman Problem and Travelling Salesman Problem	a) Solve seven bridge problems and Fleury's Algorithm. b) Define and solve Hamilton's graph	DEMOSTREATION	Kenneth Rosen, Discrete Mathematics and It's Applications (Tata McGraw Hill)	**05**
Unit9:- Tree : Definition, Properties of trees. Center of a tree. Binary Tree : Definition and properties. Tree Traversal : Ordered rooted Tree, Preorder traversal, inorder traversal and postorder traversal, Prefix Notation. Spanning Tree : Definition, Properties, Shortest Spanning Tree, Kruskal's Algorithm.	a) Explain and solve related properties of tree b) Examples on binary, sp anning tree.	DEMOSTREATION	1Kenneth Rosen, Discrete Mathematics and It's Applications (Tata McGraw Hill)	**06**

Reference Books:

1) Kenneth Rosen, Discrete Mathematics and It's Applications (Tata McGraw Hill)

2) C. L. Liu ,Elements of Discrete Mathematics, (Tata McGraw Hill)

3) John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)

4) NarsinghDeo, Graph Theory with Applications to Computer Science and Engineering, (Prentice Hall).

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DEPARTMENT OF COMPUTER SCIENCE

COURSE OUTCOME

SUBJECT NAME : ALGEBRA AND CALCULUS

CLASS – FY B.Sc. (COMPUTER SCIENCE)

PAPER: - MTC -102 **PATTERN – 2013**

NAME OF SUBJECT TEACHER:- MS. PRIYANKA JAISWAL

Course Specify Outcomes:-

a) Select relevant material in industry by analyzing its physical properties.

b) To introduce binary operation group.

c) To calculate GCD&LCM and define and explain properties of divisibility.

d) Apply to solve differentiation by using continuous function.

e) Using n^{th} derivatives solve examples by Leibnitz's theorem.

f) Apply to solve liner system of equation.

COURCE –MTC 102	Course Specify Outcomes:-	METHODOLOGY	REFRENCE BOOK	NO OF LECTUERS
(1)Relation and functions:- 1 Ordered pairs, Cartesian product of Sets. Relations, types of relations, equivalence relations. Partial orderings. Equivalence Class, properties and partition of a set. Transitive closure and Warshall's Algorithm. Digraphs of relations, matrix representation and composition of relations. Definition of function as relation, types of functions (one-one, onto and bijective)	a) Solve a simple problem based on function. B) Introduce relation and its types.	PPT, VIDEO LECTURES, DEMOSTREATION	H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).	11

(2) <u>Binary Operations and Group</u>:- Definition of binary operation, examples, properties of binary operations. Definition of Monoid, semigroup, examples. Definition of group and examples, finite and infinite groups, permutation groups,	a) Binary operations and its properties. b) Define and solve algebraic systems and semi group. c) Introduce group, its type, permutations and related examples.	DEMOSTREATION	H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).	09
(3) <u>Divisibility in integers</u>:- Well ordering principle First and second Principle of Mathematical Induction, Examples Division Algorithm (without proof) Divisibility and its properties, prime numbers. Definition G.C.D and L.C.M., Expressing G.C.D. of two integers as a linear combination of the two integers. Euclidean Algorithm (Without proof).Relatively prime integers, Euclid are Lemma and its generalization.	a) Explain and related examples on Division Algorithm, Euclidean Algorithm. b) Examples on Euclid lemma. c) Examples on Ferments and Euler's Theorem.	DEMOSTREATION	H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).	16
Unit 4: Continuity and Differentiability: 1Continuity and Properties of continuous functions defined on [a, b]and examples. Differentiability Theorem – Differentiability implies continuity but not conversely. Left hand derivative and Right hand derivative. Intermediate value theorem Rolle's theorem Lagrange's Mean Value Theorem Cauchy's Mean Value Theorem.	a) Explain and related examples on Continuity and Properties of continuous functions defined on [a, b], Differentiability implies continuity but not conversely. b) Apply to solve Rolle 's Theorem, Lagrange's Mean Value Theorem,	DEMOSTREATION	Calculus and Analytical Geometry- Thomas Finny	12

	Cauchy's Mean Value Theorem.			
Unit 5: Successive Differentiation: The nth derivatives of standard functions. Leibnitz's Theorem (with proof).	**a)** Apply to solve The nth derivatives of standard functions **b)** Explain and related examples on Leibnitz's Theorem	DEMOSTREATION, VIDEO LECTURES	Calculus and Analytical Geometry- Thomas Finny	05
Unit 6: Taylor's and Maclaurin's Theorems: Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders. Taylor's and Maclaurin's Series.	a) To calculate Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders b) Apply to solve Successive Differentiation by using Taylor's and Maclaurin's Theorems c) Explain and related examples on Taylor's and Maclaurin's Series.	DEMOSTREATION	Calculus and Analytical Geometry- Thomas Finny	05
Unit 7 : Matrices and System of Linear Equations: Revision: Elementary operations on matrices. Echelon form of matrix System of linear equations: Gauss Elimination Method, Gauss –Jordan Elimination Method, L.U. Decomposition Method Rank of matrix, Row rank, Column rank	**a)** Apply to solve System of Linear Equations by using matrix . **b)** Solve a simple problem Gauss Elimination Method, Gauss – Jordan Elimination Method, L.U. Decomposition Method **c)** Use of rank to know the given matrix is consistence or inconsistence	DEMOSTREATION	Calculus and Analytical Geometry- Thomas Finny	14

Reference Books:

1) Calculus and Analytical Geometry- Thomas Finny

2) J.B. Fraleigh, A. First Course in Abstract Algebra, Third Ed., Narosa, New Delhi, 1990

3) H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).

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DEPARTMENT OF COMPUTER SCIENCE

Course Outcome

Course Name : Statistical Methods I

Name of the Teacher: Prof. Seema Patil

Class: F.Y.B.Sc. (C.S.) Pattern:2013(Annual)

Course Outcomes: COs:

CO 1)To understand basic tools and methods required for data analysis.
CO 2) To understand how to apply required techniques in computer based applications.
CO 3) To understand graphical methods for data representation.
CO 4) Know the relationship between data elements.
CO 5) Apply statistical methods in the field of data mining.

Course: Statistical Methods I	**Course Specific Outcomes CSO**	**Methodology**	**Reference Book**	**No.of Lectures**
Data condensation and Graphical methods: histogram, stem and leaf chart,Ogives.	To understand basic terms about the statistics. To understand graphical methods for data representation	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Review/Revision of Descriptive Statistics: Measures of Central tendency, Measures of Dispersion	To understand basic concept about central tendency. To understand basic concept about dispersion. To develop knowledge about partition values.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7
Moments: Raw and Central moments, Relation between raw and central moments upto fourth order,Numerical problems.	To understand various types of moment.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	3
Measures of Skewness and Kurtosis: Measures of skewness-Pearson's measure, Bowley's measure, $\beta 1$, $\gamma 1$. type of kurtosis: leptokurtic, platykurtic and mesokurtic. Numerical problems related to real life situations.	To understand symmetry of the data. To know peakedness and flatness of the data.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	4
Discrete Random variable: Definition of random variable and discrete random variable.	To understand basic concept about discrete random variable.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and	8

Definition of probability mass function, distribution function and its properties. Definition of expectation and variance, theorem on expectation.			Kapoor V. K.	
Standard Discrete Distributions: Uniform, Bernoulli, Binomial Distribution: definition, mean, variance, additive property. Geometric Distribution definition, mean, variance. Poisson Distribution: definition, mean, variance,Numerical problems related to real life situations.	To know different discrete distribution. Apply the applications of distributions in real life. To understand basic concepts about distributions.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	15
Correlation (for bivariate raw data) : Bivariate data, Scatter diagram. Correlation, Positive Correlation, Negative Correlation, Karl Pearson's coefficient of correlation (r), interpretation of r, Numerical Problems.	To understand relationship between data elements. To know the types of correlation.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6
Regression (for ungrouped data): Regression,Linear Regression..Fitting of straight line using least square method. Properties of regression coefficients.Non Linear regression models.Numerical problems.	Apply regression technique for prediction.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	9
Multiple and Partial Correlation and Regression (for trivariate data): Yule's notation and concept of multiple regressions. Fitting of multiple regression plane. Partial regression coefficient, interpretation. Multiple correlation coefficient, Partial correlation coefficient.	To understand relationship between more than two variables. Analyze regression plane.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	8
Time Series: Components of Time Series.Additive and Multiplicative models.Methods of	To understand the components of time series. Use different methods of time series for calculating	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7

estimating trend: moving average method, least squares method and exponential smoothing method. Elimination of trend using additive and multiplicative models.Simple time series models, Numerical problems.	trend.			

Course: Statistical Methods II

Name Of the Teacher: Prof. Seema Patil

Class: F.Y.B.Sc.(C.S.) Pattern:2013(Annual)

Course Outcomes: COs: Statistical Methods II

CO 1) Improve logical thinking.
CO 2) To know statistical inferential methods.
CO 3) To know probability and the mathematical foundation of statistics.
CO 4) Know statistical modeling and its limitations.
CO 5) Analyze data using statistical computing tools and software.

Course: Statistical Methods II	**Course Specific Outcomes CSO**	**Methodology**	**Reference Book**	**No.of Lectures**
Detailed Review / Revision of Theory of Probability Counting Principles, Permutation and Combination, Deterministic and non-determination models. Random Experiment, Sample Spaces, Events: types of events, Operations on events. Classical definition, probability models, axioms of probability, probability of an event. Theorems of probability (with proof) Numerical problems.	To understand basic terms related to probability theory.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Advanced Theory of Probability: Concepts and definitions of conditional probability, multiplication theorem $P(A \cap B)=P(A).P(B\|A)$ Bayes' theorem (without proof) Concept and definition of independence of two events. Numerical problems.	To understand how to calculate probability for given condition. Implement application of conditional probability.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	12
Continuous Random Variable: Definition of continuous random variable. Probability density function (p.d.f.), Cumulative	To understand basic terms related to continuous random variable	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6

distribution function (c.d.f.), its properties. Numerical problems.				
Standard Continuous Probability Distributions: Uniform Distribution p.d.f., mean, variance, Exponential Distribution: mean, variance, lack of memory property. Normal Distribution: statement of p.d.f., standard normal distribution, independent normal variables, computations of probabilities using normal probability table, normal approximation to binomial and Poisson distribution,Numerical problems.	To understand the use of continuous probability distribution in real life. Able to compute the expected value and variance.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	13
Concepts and definitions related to testing of hypothesis Definitions: population, statistic, SRSWR, SRSWOR, random sample from a probability distribution, parameter, statistic, standard error of estimator. Concept of null hypothesis and alternative hypothesis, critical region, level of significance, type I and type II error.	To understand basic terms of testing of hypothesis. Develop the research skills.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	5
Large Sample Tests : Ho: $\mu = \mu_o$ Vs H1: $\mu \neq \mu_o$, $\mu < \mu_o$, $\mu > \mu_o$ (One sided and two sided tests) Ho: $\mu_1 = \mu_2$ Vs H1: $\mu_1 \neq \mu_2$, $\mu_1 < \mu_2$, $\mu_1 > \mu_2$ (One sided and two sided tests) Ho: $P = P_o$ Vs H1: $P \neq P_o$, $P < P_o$, $P > P_o$ (One sided and two sided tests) Ho: $P_1 = P_2$ Vs H1: $P_1 \neq P_2$, $P_1 < P_2$, $P_1 > P_2$ (One sided and two sided tests) Numerical problems.	Apply the test procedure for a test of hypothesis concerning a population mean, proportion.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7
Tests based on t-distribution: Ho: $\mu = \mu_o$ Vs H1: $\mu \neq \mu_o$, $\mu < \mu_o$, $\mu > \mu_o$ (One sided and two sided	To understand inference for comparing means of two populations.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	8

tests) Ho: μ1 = μ2 Vs H1: μ1≠μ2, μ1 < μ2, μ1 > μ2 (One sided and two sided tests) Paired t-test.Test of significance of correlation coefficient for bivariate raw data. Test of significance of regression coefficients for bivariate raw data. Numerical problems.				
Test based on Chi-square distribution: Chi square test for goodness of fit,Test for independence of attributes (m X n contingency table) Test for significance of variation for a population, Numerical problems.	Use a chi-square test to evaluate the fit of a hypothesized distribution.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	3
Non parametric tests: Run test ,Sign test.Kolmogrov - Smirnov test, Mann – Whitney test ,Numerical problems.	To understand non parametric test procedure.	Constructive	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	6
Simulation: Introduction to Simulation, merits and demerits random number generator , Model Sampling from uniform and exponential distribution., Box-Muller transformation. Numerical problems.	To understand the procedure for simulation. Know the use of simulation in real life.	Demonstrative	Fundamentals of Applied Statistics Gupta S. C. and Kapoor V. K.	7