SHIVAJI UNIVERSITY, KOLHAPUR.



В

Accredited By NAAC

2009

New Syllabus For

B.C.S.

Part - I (Sem.-I & II)

Syllabus to be implemented from June 2010 onwards.

B.C.S.Part I Mathematics To be implemented from June 2010.

- 1. TITLE: Subject Mathematics
- 2. YEAR OF IMPLEMENTATION : Revised Syllabus will be implemented from June 2010 onwards.
- 3. DURATION :B.C.S Part- I The duration of course shall be one year and Two semesters.
- 4. PATTERN: Pattern of examination will be semester.
- 5. STRUCTURE OF COURSE:

STRUCTURE OF COURSE Mathematics <u>Semester I</u>

Sr.No	Paper	Name of Paper	Marks	
1	Paper I	Discrete Mathematics	40 (Theory)	10 (Internal)
2	Paper II	Algebra	40 (Theory)	10 (Internal)

Semester II

Sr.No	Paper	Name of Paper	Marks	
1	Paper III	Graph Theory	40 (Theory)	10 (Internal)
2	Paper IV	Calculus	40 (Theory)	10 (Internal)

	Practical Annual	
Practical I & II	Mathematics Practical I & II	100 Marks

STRUCTURE OF COURSE ELECTRONICS Semester I

Sr.No	Paper	Name of Paper	Marks	
1	Paper I	Electronics Devices and Circuits – I	40 (Theory)	10 (Internal)
2	Paper II	Digital Electronics- I	40 (Theory)	10 (Internal)

Semester II

Sr.No	Paper	Name of Paper	Marks	
1	Paper III	Electronics	40 (Theory)	10 (Internal)
		Devices and		
		Circuits II		
2	Paper IV	Digital	40 (Theory)	10 (Internal)
		Electronics -		
		II		

Practical Annual

Practical I & II	Electronics Practical's I & II	100 Marks

STRUCTURE OF COURCE : STATISTICS

Sr. No.	Papers / Practical No.	Name	Marks	
		Semester I		
1.	Paper I	Descriptive Statistics I	40 (Theory)	10(practical)
2.	Paper II	Probability and Discrete	40(Theory)	10(practical)
		Probability Distributions		
		Semester II		
1.	Paper III	Descriptive Statistics II	40(Theory)	10(practical)
2.	Paper IV	Continuous Probability	40 (Theory)	10(practical)
		Distributions and Testing of		
		Hypothesis		

Practical Annual

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Practical I & II	Statistics Practical's I & II	100 Marks		

STRUCTURE OF COURCE : COMPUTER SCIENCE Semester- I

Paper No.	Name of the Paper	Total Marks		Theory / Week	Practical / Week
1.1	Introduction to Computer and Data Processing - I	40 (Theory)	10 (Internal)	3	-
1.2	Introduction to Programming Using C - I	40 (Theory)	10 (Internal)	3	

Semester- II

Paper No.	Name of the Paper	Total Marks		Theory / Week	Practical / Week
2.1	Introduction to Computer and Data Processing - II	40 (Theory)	10 (Internal)	3	-
2.2	Introduction to Programming Using C - II	40 (Theory)	10 (Internal)	3	

Practical Annual				
1.3/2.3	Laboratory Course in Computer Science – I &II	100	-	4 *

• 4 hours practical per batch of 20 students

EQIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS(FOR REVISED SYLLABUS)

Sr.N0	Title of Old Paper	Title of new paper
1	Discrete Mathematics	Sem. I-Discrete Mathematics.
		Sem II- Graph theory
2	Algebra and Calculus	Sem. I-Algebra
		Sem. II- Calculus
3	Algorithms in Discrete Mathematics,	Mathematics Practical I
	Algebra and Calculus	Mathematics Practical II

B.C.S. Part-I Mathematics Detail syllabus of semester I and II Semester- I

Paper –I **Discrete Mathematics** 10 lectures <u>Unit - 1 : Counting Principles</u> 1.1 Functions and counting 1.1.1 Cardinality of finite sets. 1.1.2 Cardinality of union of sets(Addition principle) 1.1.3 Princile of Inclusiopn and Exclusion 1.1.4 Multiplication Principle. 1.1.5 Listing of functios from one set to another **1.2 Combinatorial Arguments** 1.3 Pigeonhole Principle(Statement only) Unit - 2: Recurrence Relations 8 lectures 2.1 Homogeneous and nonhomogeneous solutions 10 lectures Unit - 3 : Logic **3.1** Predicates 3.2 Rules of inferences 3.3 Valid arguments and proofs 3.4 Proofs in Mthematics Unit – 4 Algorithms 12 lectures 4.1 Definition 4.2 Pseudocode conventions 4.3 Examples 4.4 Characteristics of an algorithm 4.5 Time complexity. Examples of type:Iterative, Recursion(e.g.Fibonaci Sequency) Evaluation (e.g. Horner's Method) Searching Methods(Linear search, Binary search) Sorting Methods(Insertion sort, Merge Sort, Bubble Sort) 2 Time Complexity (Big-'O', Big- 'Omega') Brief introduction Growth rates of functions together with their comparisons. **Reference Books:** 1. Elements of Discrete Mathematics by C.L. Liu 2 Discrete Mathematics by Olympia Nicodemi 3 Discrete Mathematical Structure for Computer Science by Alan Doer and K.Levasicur. 4 Discrete and Combinatorial Mathematics by R.m. Grassl 5. Discrete Mathematics by Kenneth Rosen, Tata McGraw Hill 6. Graph Theory with Applications to Computer Science and Engineering by Narsing Deo, Prentice Hall, India 7. A First Step in Graph Theory by Raghunathan, Nimkar and Solapurrkar 8. Discrete mathematics by S.R.Patil and others, NIRALI Prakashan. 9. Discrete mathematics by Bhopatkar, Nimbkar, Joglekar, VISION Publication. 10. Discrete mathematics by Naik and Patil, PHADAKE Prakashan

Paper- II

ALGEBRA

12 lectures UNIT - 1 Relations 1.1 Ordered pairs, Cartesian product 1.2 Relations, Types of relations, Equivalence relation, Partial ordering 1.3 Digraphs of relations, matrix representation and composition of relations 1.4 Transitive closure, Warshall's algorithm 1.5 Equivalence class, Partition of a set 1.6 Function UNIT – 2 Divisibility of integers 12 lectures 2.1 Well ordering principle 2.2 Division algorithm 2.3 Divisibility and its properties, Prime numbers 2.4 Greatest Commen Divisor(g.c.d.) 2.5 Euclidean algorithm 2.6 Unique factorization in integers 2.7 Congruence relation and its properties 2.8 Fermat's Theorem 2.9 Residue Classes: Definitiuon, Examples, addition modulo n multiplication modulo n, operation table. UNIT – 3 Boolean algebra 12 lectures 3.1 Hasse digram 3.2 Lattice 3.3 Boolean algebra definition as a lattice 3.4 Properties of Boolean algebra 3.5 Finite Boolean algebra 3.6 Boolean expressions and Boolean functions 3.7 Disjunctive and conjunctive normal forms, simplification UNIT – 4 Abstact algebra 4 lectures 4.1 Binary operation 4.2 Group Definition and examples 4.3 Ring Definition and examples **Reference Books** 6. Algebra by S.R.Patil and Others Nirali Prakashan. 7. Algebra by Bhopatkar, Nimbkar, Joglekar, VISION Publication. 8. Algebra by Naik and Patil, PHADAKE Prakashan Practical - I 1. Recurrence relation 2. Linear Searching Methods 3. Combinatorial arguments 4. Euclid's algorithm, Division algorithm 5. Fermat's theorem on remainder 6. Warshall's algorithm 7. Disjunctive and Conjunctive normal forms of Boolean expression 8. Sorting Methods 9. Finite state machine, input tape output tape 10. Proofs of valid arguments using laws of inferences

Semester- II

Paper III

GRAPH THEORY

<u>Unit – 1 : Graphs and operations on graphs</u>

- 1.1 Definition and elementary results
- 1.2 Types of graphs
- 1.3 Isomorphism
- 1.4 Adjacency matrix and incidence matrix
- 1.5 Subgraphs and induced graphs
- 1.6 Complement of a graph, Self complementary graphs
- 1.7 Union, intersection of graphs

Unit – 2 Connected Graphs

2.1 Definitions of connected, disconnected graphs

- 2.2 Definitions and elementary results of walk, trail, path and circuit
- 2.3 Isthumus, cut-vertex
- 2.4 Connectivity
- 2.5 Dijkstra's shortest path algorithm (Breadth—First Search approach)

Unit-3 : Trees

- 3.1 Definition elementary results
- 3.2 Center of a tree
- 3.3 Spanning tree and fundamental circuits and cutsets
- 3.4 Binary trees and elementary results
- 3.5 Kruskal's algorithmfor weighted spanning trees.

Unit - 4 : Directed Graphs

12 lectures

- 4.1 Definition, types of directed graphs
- 4.2 Directed(rooted) trees, arborescence and Polish notation
- 4.3 Isomorphism of digraphs
- 4.4 Connectedness in digraphs
- 4.5 Euler digraph
- 4.6 Network and flows: Def.inition, examples, construction of flows, Maxflow

Min cut theorem.

4.7 Ford-Fulkerson Algorithm(BFS approach)

Reference Books:

- 1. Elements of Discrete Mathematics by C.L. Liu
- 2 Discrete Mathematics by Olympia Nicodemi
- 3 Discrete Mathematical Structure for Computer Science by Alan Doer and K.Levasicur.
- 4 Discrete and Combinatorial Mathematics by R.m. Grassl
- 5. Discrete Mathematics by Kenneth Rosen, Tata McGraw Hill
- 6. Graph Theory with Applications to Computer Science and Engineering by Narsing
- Deo, Prentice Hall, India
- 7. A First Step in Graph Theory by Raghunathan, Nimkar and Solapurrkar
- 8. Discrete mathematics by S.R.Patil and others, NIRALI Prakashan.
- 9. Discrete mathematics by Bhopatkar, Nimbkar, Joglekar, VISION Publication.
- 10. Discrete mathematics by Naik and Patil, PHADAKE Prakashan

10 lectures

10 lectures

8 lectures

Paper- IV

CALCULUS

<u>UNIT – 1 Sequences of real numbers</u>

1.1 Sequence definition, examples

1.2 Convergent, divergent, oscellatory sequences, examples

1.3 Bounded set, Bounded sequence, examples

1.4 Monotonic sequences. Theorems on monotonic and bounded sequences(staements only)

1.5 Limit of (1+1/n)n as nHI is e.

1.6 Convergence of <xn> xLR, x>0.

<u>UNIT – 2 Series of real numbers</u>

8 lectures

10 lectures

2.1 Partial sums

2.2 Converget, divergent series. If Mun is convergent then unH0 as nHI.

- 2.3 Convergence of geometric series.
- 2.4 Comparison Test and its limit form (for the series of positive terms)
- 2.5 Convergence of M1/(np), pLR
- 2.6 D'Alembert's Ratio Test (statement only)
- 2.7 Root Test (statement only)

UNIT-3 Continuity and Mean valueTheorems: 10 lectures

3.1 Continuity of a function and its properties defined on [a,b]

(Properties without proof)

3.2 Differentiability. Differentiability implies continuity but not conversely.

3.3 Roll's theorem(with proof) and its geometric significance

3.4 Lagrange's Mean Value theorem(with proof) and its geometric significance

3.5 Cauchy's Mean Value theorem(with proof), Verification and Applications.

UNIT-4 Successive Differentiation:

6lectures

- 4.1 nth derivatives of some standerd functions.
- 4.2 Leibnitz's Theorem
- 4.3 L'Hospital's Rule (withot proof)

UNIT-5 Taylor's and Maclaurin's Theorems: 4 lectures

5.1 Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's forms of Remainders (without proof)

5.2 Taylor's and Maclaurin's series

5.3 Series expansions of ex,sinx,cosx,log(1+x) etc.

Reference Books:

1. Calculus by Dr. S.B. Nimse

2. Modern Algebra by A.R. Vashistha

3. Applied Discrete Structure for Computer Science by Alan Doerr and Kenneth Levassuer.

4. Real Analysis by R.G. Bartle, D.Sherbert, 3rd Edn, John Wiley & Sons, Indian Edn.

5. Differential Calculus by Shanti Narayan, S.Chand& Co.

6. Algebra

Practical - II

1. Series expansion of log(1+x), ex, sinx, cosx, (1+x)n

9 Rolle's Theorem

- 10 Lagrange's Maean Value Theorem 11 Cauchy's Maean Value Theorem
- 12 L'Hospital's Rule
- 13 Leibnitz's Rule
- 14 Kruskal's algorithm
- 15 Dijkstra's Shortest path algorithm16 Fundamental curcit and fundamental cut set
- 17 Polish prefix, Postfix, notations, arborescence

BCS Part- I

Semester-I

Electronics Paper- I

Electronics Devices and Circuits - I

UNIT - I	Liner components in computer (12)
	Resistors : Classification, contraction of carbon composition resistor only, color code, specifications of resistors
	Capacitors : Classification, construction of electrolyte capacitor only, finding value of capacitor using color code, number
	Inductors : types of inductors, uses, types of transformers, construction of step down transformer and its specifications
	Types of switches, construction and working of electro mechanical relay
UNIT : II	DC circuit analysis (06)
	Ohm's law, Kichoffs current and voltage law, concept of current source,
	Voltage source : application of Kirchoff's laws to simple circuits,
	Concept of equivalent circuits, Thevenin's Theorm : Norton's Theorem, superposition,
	Maximum power transfer theorem, (only statement and examples)
UNIT : III	Semiconductor Diode (06)
	Formation of p-n junction : depletion layer, working and parameters of rectifier diode, zener diode, its parameters, photodiode and LED, current limiting resister for LED Applications- optocoupler, dot matrix display of LED, 7 segment display.

UNIT : IV		Bipolar junction Transistor (08)			
		Structure and working of bipolar junction transistor : CB, CC, CE configurations : CE mode characteristics, relation between a and β DC load line and Q point potential divider Blessing, Concept of transistor asw an amplifier and transistor as a switch.			
		Application –audio Amplifier, use of transistor to switch LED			
REC	RECOMMANDED BOOKS :-				
1	Princip Public	oles of Electronics : A.P. MALVINO, Tata Mc-Graw Hill ation, 7 Edition.			
2	A text	Book of Applied Electronics R.S. Shed, S chand Publication			
3	3 Electronic Devices and circuits by S. Rama Reddy, Narosa publication Dheil				
4	 Principles of Electronics : V.K. Mehets, S.Chand & Company Ltd. 5 Edition 				
5	5 Basic Electronics and Linear Circuits : N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta Tata McGraw Hill Publishing company				
6	Electronic Devices and ciruits : Boyistead, Tata Mc-Graw Hill				

BCS Part I

Semester I Electronics Paper II

Digital Electronics-I

UNIT 1: Number System AND Binary Codes (06

Binary, Octal, Hexadecimal Number system' Interconversion from one system to

Another, BCD code, Gray code, Exess-3 code, ASCII code, Concept of parity.

Signed and unsigned numbers, 1's complement and 2's complement of binary numbers and binary arithmetic.

UNIT 2: Logic Gates (06)

Logic gates-AND.OR.NOT.NOR. NAND EX-OR (Symbol, Expression and Truth Table

Boolean algebra and identities; De Morgan's thectrem and Interconversion of logic

Gates; Simplications of logic expressions using a) Boolean algebra, b) K-map

Introduction to logic families; TTL NAND gate, input output parameters, tristate logic,

Fan in; fan out, propagation delay, noise margin.

UNIT 3: Combinational Circuits (10)

Half adder, Full adder, half subtractor, Parellel adder, nibble Adder; Arithmetic logic unit, Encoder, Decoder, Multiplexer, and De multiplxer, concept of analog multiplexer.

Pin Configuration of 74153, 74156,7447,74138

UNIT 4: Sequential circuits (10)

Concept of sequential circuits; Latch, Flip-flops: RS, Clocked RS, JK, Master Slave JK,

Counter-synchronous, asynchronous, up-down counter, modulo-N counter,

Decade counter (IC 7490); shift register(IC 7495), ring counter, Johnson counter;

RECOMMANDED BOOKS:

- 1. Digital principals and applications; Malvino Leach, Tata McGraw Hill, 4th Edition
- 2. Fundamentals of Digital Electronics; A. Anand Kumar PHI Publications 2001
- 3. Digital Principles; T.L Floyd 3rd edition
- 4. Digital Electronics; C.F. Strahglo
- 5. Modern digital Electronics; R.P Jain, Tata Mc-Graw Hill Publication
- 6. Digital logic and computer design-Morris Mano
- 7. First course in Digital System Design; John P. Uyemura, Brooke/cole, Thompson Learning.

BCS Part I

Electronics Practicals -I

- 1. Positive & Negative Voltage regulators using 3 in IC's
- 2. Verification of Krichhoff's Laws
- 3. Study of CRO
- 4. Transistors as switch (Application for LED & Relay)
- 5. Study of full wave rectifier with & without filter (calculation of ripple)
- 6. Study of basis gates
- 7. Universal building block
- 8. Verification of De-Morgans Theorms
- 9. Study of Flip-Flops (D & JK)
- 10. Half & full adder
- 11. Study of counter

BCS Part I

Semester II

Electronics Paper III

Electronics Devices and Circuits II

UNIT 1: Field Effect Transistor (08)

Structure and working of: JFET I-V characteristics and parameters (transooonduction, drain

resistance, pinch of voltage, amplification factor); MOSFET (construction and application only)

Applications: FET as-Voltage Variable resistance (WR), inverter, switch, memory cell, DRAM

UNIT 2: Amplifier and Oscillators (06)

General classification and amplifier based on frequency response and Q point; idea of

Multistage amplifier; coupling skims (Direct coupling, RC coupling, Transformer coupling)

Concept of positive and negative feedback.

; Barkhausen criteria; Hartley oscillator; Colppits oscillator, Crastal Oscillator (Only working of circuits and for frequency)

UNIT 3: Operational Amplifiers (08)

Concept of operational amplifier (black box level); ideal characteristics of Opamp;

Opamp as comparator; Virtual ground concept

Applications; Unity gain amplifier, buffer, inverting amplifier, noninverting amplifier,

Comparator, Adder, subtractor, integrator and differentiator,

Phase shift Oscillator using OP AMP

UNIT 4 Power Supply (10)

Working of rectifier (Half, Full, Bridge); concept of ripple voltage; filter circuits;

regulated power supply; concept of load and line regulation; Zener

as regulator; 3-pin positive and negative voltage regulator;

AMPS block diagram; UPS: online and offline (block diagram and different parameters);

RECOMMANDED BOOKS:

- 1. Principles of Electronics: A.P.MALVINO, Tata Mc-Graw Hill Publication, 7 Editions.
- 2. A text Book of Applide Electronics R.S.Sheda, S. Chand Publication
- 3. Electronics Device and circuits by Rama Reddy, Narosa Publicaion Dheli
- Principles of Electronics: V.K.Meheta, S. Chand & company Ltd. 5 Edition
- 5. Basic Electronics and Linear Circuits: N N Bhargava, D.C.Kulshreshtha, S.C.Gupta, Tata Mc-Graw Hill Publishing company
- 6. Electronics Devices and circuits; Boylstead, Tata Mc-Graw Hill
- 7. Operation Amplifiers By Ramakant Gaikwad.

BCS Part I

Semester II

Electronics Paper IV

Digital Electronics - II

UNIT 1: Multivibrator (06)

Types of multivibrator, block diagram of IC 555; Application of IC 555 as Astable, and

Monastable (Calculation of frequency and Pulse width) Crystal clock using inverter.

Clock circuit using NAND gate

UNIT 2: Memory devices and memory Organization (10)

Types of Memory – volatile and nonvolatile, SRAM and DRAM, Classification and

Working principle of memory devices; RAM, ROM, PROM, EPROM, and EEPROM;

Concept of Diode Matrix ROM, speed and cost range of memory devices, Memory

organization - building the required memory size by using available memory chips,

memory address map

UNIT 3 Introductions to Microprocessor (08)

Introduction, Types (8, 16, 32 Bits), Pin Diagram and Architecture of 8085,

Pin Diagram and Architecture of 8086,

UNIT 4 Programming of process (08)

Instruction Set of 8085, ALP Programs for Data transfer

Additions, Subtraction, Multiplication, Division, Block Transfer

RECOMMANDED BOOKS:

- 1. Digital principals and applications; Malvino Leach, Tata McGraw Hill, 4th Edition
- 2. Fundamentals of Digital Electronics: A. Anand Kumar PHI Publication 2001
- 3. Digital principals: T.L. Floyd 3rd edition
- 4. Digital Electronics: C.F. Strangio
- 5. Modern digital Electronics: R.P. Jain, Tata McGraw Hill Publication
- 6. Digital logic and computer design Morris Mano
- 7. First course in Digital System Design: John P. Uyemura, Brooke/Cole, Thompson Learning (2001)
- 8. 8085 Microprocessor by R.S.Gaonkar
- 9. 8085 Microprocessor BY B.Ram

Shivaji University, Kolhapur

BCS Part I

Electronics Paper III

Electronics Practicals –II

- 1. Phase shift oscillator using 741
- 2. Adder & substractor using 741
- 3. Temperature controller using LM 35 and 741
- 4. Transistor Characteristics in CE (calculation of B)
- 5. Characteristics of JFFT calculation of parameters
- 6. Study of crystal oscillator using transistor and gate
- 7. IC 555 as astable, Monostable, Multivibrator
- 8. Study of Shift Register
- 9. Multiplexer & Demultiplexer using IC's
- 10. Arithmetic operations using 8085 up kit or simulator
- 11. Block transfer using 8085 kit or simulator.

EQIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS(FOR REVISED SYLLABUS)

Sr.N0	Title of Old Paper	Title of new paper
1	Electronics Paper I	Sem-I
	Electronics Devices and	Electronics Paper I
	CIrcuits	Electronics Devices and

		Circuits I
		Sem-II
		Electronics Paper III
		Electronics Devices and Circuits II
2	Electronics Paper II	Sem-I
	Digital Electronics	Electronics Paper II
		Digital Electronics
		Sem-II
		Electronics Paper IV
		Digital Electronics II
3	Practical	Practical I & II

B.C.S. Part I : STATISTICS

Structure of the course.

To be implemented from June 2010.

Semester I

Objectives:

The main objective of this course is to provide basic knowledge of Statistical Techniques to the students. Some elementary statistical methods of analysis are introduced in the course as well as the basic concepts of probability, discrete probability distributions. At the end of the course the students are expected to be able

- i) To classify, tabulate and represent the data graphically.
- ii) To compute and interpret various measures of central tendency, dispersion, and moments.
- iii) To compute probabilities by using definition and probability rules.
- iv) To compute probabilities by using discrete probability distributions.

Paper I : Descriptive Statistics I

Unit-1 1.1 Introduction:

(11)

Definition, importance and scope of statistics.

1.2 Population and Sample:

Concept of statistical population with illustrations, concept of sample with illustrations, methods of sampling (description only).

1.3 Data Condensation:

Raw data, Attributes and variables, discrete and continuous variables, principles of classification of raw data, frequency distribution,

- 1.4 Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive Curves and their uses.
- 1.5 Examples and Problems
- **Unit-2** Measures of central tendency:

(12)

- 2.1 Concept of central tendency, Criteria for good measures of central tendency.
- 2.2 Arithmetic mean: Definition for ungrouped and grouped data, combined mean, weighted mean, merits and demerits.
- 2.3 Median: Definition, formula for computation for ungrouped and grouped data, graphical method, merits and demerits.
- 2.4 Mode: Definition, formula for computing for ungrouped and grouped data, merits and demerits.
- 2.5 Quartiles: Definition, formula for computation for ungrouped and grouped data.
- 2.6 Numerical problems.
- Unit-3 Measures of Dispersion

(12)

- 3.1 Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion.
- 3.2 Range: definition for ungrouped and grouped data, coefficient of range, merits and demerits.
- 3.3 Variance: definition for ungrouped and grouped data, combined variance for two groups, merits and demerits.
- 3.4 Standard deviation: definition for ungrouped and grouped data, coefficient of variation.
- 3.5 Numerical problems.
- Unit-4 Moments:

(10)

- 4.1 Raw and central moments: definition for ungrouped and grouped data (only first four moments).
- 4.2 Relation between central and raw moments.
- 4.3 Numerical problems.

Paper II : Probability and Discrete Probability Distributions

Unit-1 Probability:

(13)

1.1 Concept of experiments and random experiments.

- 1.2 Definitions: sample space, discrete sample space (finite and countably infinite), events, types of events, power set (sample space consisting at most 3 sample points).
- 1.3 Illustrative examples.
- 1.4 Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an events based on permutations and combinations, axiomatic definition of probability with reference to finite and countably infinite sample space.
- 1.5 Theorems on probability :
 - i) P(Φ) = 0
 - ii) P(A') = 1 P(A)
 - iii) $P(A \cup B) = P(A) + P(B) P(A \cap B)$
 - iv) If $A \subseteq B$, $P(A) \leq P(B)$
 - v) $0 \le P(A \cap B) \le P(A) \le P(A \cup B) \le P(A) + P(B)$
- 1.6 Illustrative examples based on results in (1.5) above.
- Unit-2 Conditional probability and independence of events: (10)
 - 2.1 Definition of conditional probability of an event, examples.
 - 2.2 Partition of sample space, Baye's theorem (only statement) and examples.
 - 2.3 Concept of independence of two events, examples.
 - 2.4 Proof of the result that if A and B are independent events then i) A and B', ii) A' and B, iii) A' and B' are also independent.
 - 2.5 Pairwise and complete independence of three events, examples.
 - 2.6 Elementary examples.
- Unit-3 Univariate probability distributions (defined on finite and countably infinite sample space):
 (10)
 - 3.1 Definitions: discrete random variable, probability mass function (p.m.f.), cumulative distribution function (c.d.f.), properties of c.d.f., median, mode and examples.

- 3.2 Definition of expectation of a random variable, expectation of a function of random variable.
- 3.3 Results on expectation : i) E(c) = c, where c is constant.

ii) E(aX + b) = a E(X) + b,

where *a* and *b* are the constants.

- 3.4 Definition of mean and variance of univariate distributions.
- 3.5 Definition of probability generating function (p.g.f.) of a random variable.
- 3.6 Examples.
- Unit-4 Some standard discrete probability distributions: (12)
 - 4.1 Discrete uniform distribution: p.m.f., hence mean and variance, p.g.f. and hence mean and variance, examples.
 - 4.2 Binomial distribution: p.m.f., mean and variance, p.g.f. and hence mean and variance, additive property of binomial variates, recurrence relation for probabilities, examples.
 - 4.3 Poisson distribution: p.m.f., mean and variance, p.g.f. and hence mean and variance, additive property, recurrence relation for probabilities, Poisson distribution as a limiting case of binomial distribution (without proof), examples.

Note: Give idea of permutation and combination before starting the

first unit.

Statistical Practical I

- 1) Construction of frequency distributions and graphical methods.
- 2) Diagrammatic representation.
- 3) Measures of Central tendency.
- 4) Measures of dispersion.
- 5) Fitting of second degree curves.
- 6) Fitting of exponential curves.
- 7) Fitting of Binomial distribution.

- 8) Fitting of Poisson distribution.
- 9) Model sampling from Binomial distribution.
- 10) Model sampling from Poisson distribution.

Semester II

Objectives:

The main object of this course is to introduce to the students the basic concepts of skewness and kurtosis, linear and multiple correlation and regression. As well as continuous univariate distributions, exact sampling distributions and test of hypothesis and simulation.

By the end of course students are expected to:

- 1) Study the shape of the distribution.
- 2) Relation between two and three variables.
- 3) Fit simple and multiple regression equations.
- 4) Find probabilities of various distributions.
- 5) Know the relations among the different distributions with real life situations.
- 6) Apply the small sample and large sample tests in various situations.
- 7) Simulation study of various distributions.

Paper III : Descriptive Statistics II

- Unit-1 Measures of Skewness and Kurtosis:
 - 1.1 Idea of symmetric frequency distribution.(8)
 - 1.2 Skewness: Skewness of a frequency distribution, positive and negative skewness, empirical relation between mean, mode and median. Pearson's and Bowley's coefficients of skewness. Measures of skewness based on moments.
 - 1.4 Kurtosis: Idea of kurtosis for a frequency distribution. Leptokurtic, platykurtic and mesokurtic distributions. Measures of kurtosis based on moments.
 - 1.5 Numerical problems.

Unit-2 Correlation (for ungrouped data)

(12)

- 2.1 Concept of bivariate data, scatter diagram. Concept of correlation, positive correlation, negative correlation, cause and effect relation.
- 2.2 Karl Pearson's coefficient of correlation (r). Limits: $-1 \le r \le 1$ and interpretation of r.
- 2.3 Spearman's Rank Correlation coefficient.
- 2.4 Numerical problems.

(10)

- Unit-3 Regression (for ungrouped data):
 - 3.1 Concept of regression. Derivation of lines of regression by method of least squares.
 - 3.2 Properties of regression coefficient. Effect of change of origin and scale on regression coefficients.
 - 3.3 Point of intersection and acute angle between regression lines (without proof).
 - 3.4 Concept of non linear regression.
 - 3.5 Numerical problems.

(15)

Unit-4 Multiple Regression, multiple and partial Correlation (For Trivariate Data):

- 4.1 Concept of multiple regressions. Yule's Notations.
- 4.2 Fitting of multiple regression planes. Partial regression coefficients, interpretation.
- 4.3 Multiple correlation coefficients: concept definition and limits.
- 4.4 Partial correlation coefficient: concept, definition and limits.
- 4.5 Numerical Problems.

Paper IV : Continuous Probability Distributions and Testing of Hypothesis

- Unit-1 Continuous Univariate Distributions: (15)
 - 1.1 Definitions: continuous sample space with illustrations, continuous random variable, probability density function(p.d.f.), cumulative distribution function(c.d.f.), properties of c.d.f.. sketch of p.d.f. and c.d.f.
 - 1.2 Expectation of random variable, expectation of function of a random variable, mean , variance and examples.
 - 1.3 Uniform distribution: p.d.f., c.d.f., mean, variance, sketch of p.d.f. and c.d.f., examples.
 - 1.4 Exponential distribution: p.d.f., c.d.f., mean, variance, sketch of p.d.f. and c.d.f., lack of memory property and examples.
 - 1.5 Normal distribution: p.d.f., standard normal distribution, sketch of p.d.f., properties of normal curve, distribution of aX+bY+c, where X and Y are independent normal variates, normal distribution as a limiting case of Binomial and Poisson distributions (without proof), examples.
- **Unit-2** Exact sampling distributions:

(12)

- 2.1 Chi-square distribution: definition, chi-square variate as the sum of square of n i.i.d. S.N.V., statement of p.d.f., mean , variance, additive property, normal approximation and examples.
- 2.2 Students t distribution: definition, nature of probability curve, statement of mean and variance, normal approximation, examples.
- 2.3 F- distribution: definition, inter-relationships between normal, chi-square, t and F distributions, examples.
- Unit-3 Test of Hypothesis:

(10)

- 3.1 Definitions: random samples, parameter, statistic, standard error of statistic.
- 3.2 Concept of null and alternative hypothesis, critical region, level of significance, types of error, concept of test of hypothesis, one sided and two sided tests.
- 3.3 Large sample tests: i) H_0 : $\mu = \mu_0 v/s H_1$: $\mu \neq \mu_0$,

examples.

3.4 Small sample tests: Chi-square test for goodness of fit and 2×2 contingency table, t-test for testing H₀: $\mu = \mu_0$ v/s H1: $\mu \neq \mu_0$, examples.

Unit-4 Simulation:

(8)

- 4.1 Introduction to simulation, merits and demerits.
- 4.2 Pasedo-random number generator, model sampling from uniform and exponential distribution as simulation technique.
- 4.3 Model sampling from normal distribution using Box-muller transformation.
- 4.4 Examples.

Statistical Practical-II

- 1) Measures of skewness and kurtosis
- 2) Computation of correlation coefficient and scatter diagram.
- 3) Fitting of lines of regression for ungrouped data.
- 4) Fitting of regression planes and estimation.
- 5) Computation of partial and multiple correlation coefficients.
- 6) Fitting of Uniform distribution.
- 7) Fitting of Exponential distribution.
- 8) Fitting of Normal distribution.
- 9) Model sampling from Normal distribution using :i) Normal table andii) Box- Muller transformation.
- 10) Model sampling from Uniform distribution and Exponential distribution.

Books Recommended:-

- 1. Fundamentals of Statistics by Goon, Gupta, Das Gupta.
- 2. Statistical Methods by S. P. Gupta.
- 3. Business Statistics by S. Saha.
- 4. Modern Elementary Statistics by J.E. Freund.
- 5. Fundamental of Statistics by S.C.Gupta.
- 6. Fundamentals of Mathematical Statistics by Gupta and Kapoor.
 - 7. Statistical Methods (An introductory text by J. Medhi)
 - 8. Probability and statistics with reliability queuing and computer science applications by K. S. Trivedi.

9. Fundamental of mathematical statistics by Gupta and Kapoor.

10. Operation Research by S.D. Sharma.

Notes:

- i) Test of goodness of fit is necessary for every practical on fitting of distributions.
- ii) All the practicals are to be done on computers using MS_EXCEL.
- iii) Calculations (observation table) should be done by using Statistical formulae.
- iv) Computer printout is to be attached to the journal.
- v) Student must complete the entire practical to the satisfaction of the teacher concerned.
- vi) Student must produce the Laboratory Journal along with the completion certificate signed by the Head of the department, at the time of practical examination.

Laboratory Requirements:

Laboratory should be well equipped with sufficient number of (20) computers along with necessary software, printers, UPS. Statistical tables should be provided to the students during practicals as per requirement.

Practical Examination will be conducted as :

- 1) Paper Work: In this session a student is expected to write formulae and format of required table. (one and half hr.)
- Laboratory Work: A student is expected to execute the problems selected by him on computer by using MS-EXCEL. (two and half hrs.)

STRUCTURE OF COURCE :

FIRST YEAR B.C.S. (NO. OF PAPERS 4 and 2 practicals)

No of theory papers : 2 (per semester)

Sr. No.	Papers / Practical No.	Name	Marks	
		Semester I		
1.	Paper I	Descriptive Statistics I	40 (Theory)	10(practical)
2.	Paper II	Probability and Discrete Probability Distributions	40(Theory)	10(practical)
		Semester II		
1.	Paper III	Descriptive Statistics II	40(Theory)	10(practical)
2.	Paper IV	Continuous Probability Distributions and Testing of Hypothesis	40 (Theory)	10(practical)
3.	Practical I & II	Statistics Practical I & II		100
		Total		300

SCECHEM OF TEACHING AND EXAMINATION :

FIRST YEAR B.C.S. (Sem. I)

Note : A practical batch will consist of 20 students.

FIRST YEAR B.C.S. (Sem. II)

Note : A practical batch will consist of 20 students.

EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAP-ERS (For revised syllabus From June-2010)

Old Syllabus		Revised Syllabus		
Sr. No.	Title of old Paper	Title of new Paper		
1.	Descriptive Statistics	SemI Descriptive Statistics I SemII Descriptive Statistics II		
2.	Probability and probability distributions.	SemI Probability and Discrete Probability Distributions SemII Continuous Probability Distributions and Testing of Hypothesis		
3.	Statistics Practical – I	SemI Statistics Practical – I SemII Statistics Practical – II		

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Structure of Syllabus

PROPOSED

BACHELOR OF COMPUTER SCIENCE (BCS) COURSE

(SUBJECT : COMPUTER SCIENCE)

w.e.f Academic year 2010-2011 onwards

Semester-I

Paper No.	Name of the Paper	Total Marks		Theory / Week	Practical / Week
1.1	Introduction to Computer and Data Processing - I	40 (Theory)	10 (Internal)	3	-
1.2	Introduction to Programming Using C - I	40 (Theory)	10 (Internal)	3	

Semester-II

Paper No.	Name of the Paper	Total Marks		Theory / Week	Practical / Week
2.1	Introduction to Computer and Data Processing - II	40 (Theory)	10 (Internal)	3	-
2.2	Introduction to Programming Using C - II	40 (Theory)	10 (Internal)	3	

Practical

1.3/2.3	Laboratory Course in Computer Science – I &II	100	-	4 *

* 4 hours practical per batch of 20 students

Semester- I

Paper Number : 1.1

Paper Title : Introduction to Computer and Data Processing - I

Specific Objectives:

i) To learn fundamental concepts of computers, inputs, outputs and operating

systems.

ii) To learn the principles of office automation.

Unit -1 Introduction to Computer and Basic Organization (10)

Definition of computer, characteristics, limitations, concepts of h/w and s/w,

Evolutions, generations, classification based on size and Purpose, applications of computers in various fields, computer languages – high level, low level, assembly level, compiler, interpreter.

Block diagram - Input Unit, Memory Unit, Output unit, Central processing unit

(ALU, Control unit),

Unit -2 Computer Codes and Number System (10)

Bit, Byte, BCD, EBCDIC, ASCII, Gray Code, Excess 3- code

Number System – Binary, Octal, Decimal, Hexadecimal, Conversion of Number System,

Binary Arithmetic – addition, subtraction, multiplication, one's and two's

Complement.

Unit - 3 Input, Output Devices and Concept of Memory (10)

Input devices: - Keyboard, Mouse, Light pen, Joystick, Touch screen, Digitizer,

Scanner, MICR, OMR, Barcode reader.

Out put devices: - VDU, Printers – Dot-matrix, Inkjet, Laser, Line, Plotters

Primary Memory – RAM, ROM, EPROM, PROM, Cache, EEPROM.

Secondary Storage devices: - Magnetic disk, Magnetic tape, Optical disk -CD ROM

Unit - 4 Operating System concepts

(10)

Definition and Functions of O.S.

Types of O.S. –Single user, Multi-user.

Process Management-Multiprogramming, Multitasking, Multiprocessing,

Time sharing.

Disk Operating System (DOS), DOS internal and external commands, concept of directory and file.

Windows Operating system : Features of Windows O.S., GUI

Modules of Windows – Windows Explorer, Control panel, Printer Manager.

Windows accessories – Paintbrush, Notepad.

Reference Books :

- 1) Computer Today --Basandara
- 2) Fundamental of computers --V. Rajaraman.
- 3) Computer Fundamentals --P.K. Sinha.
- 4) Web Publishing- Monica D'Souza & Jude D'Souza (BPB)
- 5) MS-Office Reference Book

6) Introduction to Computer and Data Processing- Pawar, Lad, Shinde, Patil (Dreamtech)

Paper Number : 1.2

Paper Title : Introduction to Programming using 'C' - I

Specific Objectives:-

- i) To develop a programming logic.
- ii) To teach basic principles of programming.
- iii) To develop skills for writing programs using 'C'.

Unit –1 Programming Concepts and Introduction to 'C' (12)

- Algorithm, Characteristics, Notation of Algorithm
- Flowcharts- Definition, Symbol, features
- Running and debugging the program.
- History of 'C'
- Character set and keywords
- Structure of 'C' programming
- Constant and its type
- Variable and its Data types in 'C'.
- Operators- Arithmetic, logical, relational, bitwise, increment, decrement,

conditional

Unit- 2 Input-Output Statements

- Character input-output getch(), getche(),getchar(),putchar(),
- String input-output gets(), puts()
- Formatted input-output printf(), scanf()

Unit-3 Control Structures

- Conditional control statements- if, if else, nested if, switch
- Looping for statements, nested for, while, do-while statements
- Unconditional control statements- break, continue, goto

Unit-4 Arrays

Array definition and declaration

(8)

(10)

(10)

- Single and multidimensional array
- String functions(strcpy(), strcmp(), strcat(), strlen(), strrev())

Reference Books:

- 1) ANCI 'C' E. Balgurusamy
- 2) Let us C-Y.C. Kanetkar
- 3) 'C' programming- Dennis Ritchie
- 4) Programming in C- Gottfried
- 5) Programming in 'C'- Venugopal
- 6) C Programming Dr. Vishal M. Lichade , Dreamtech

7) Introduction to Programming Using C- A. J Pawar, R. A. Lad, S. S. Shinde, D. R. Patil (Wiley-Dreamtech)

Paper Number : 1.3

Paper Title : Laboratory Course in Computer Science - I

Lab course on paper 1.1 -

- 1) Demonstration of peripherals
- 2) Linking of various peripherals
- 3) Operation of all keys of keyboard
- 4) DOS external and internal commands, batch files commands
- 5) Windows Operating System -

Windows explorer, program manger, control panel, print manager,

Creating folders, files, icons, shortcuts

Lab course on paper 1.2 -

1) Write a Program to convert the Temperature in centigrade degree to the

Fahrenheit degree.

- 2) Check whether given number is even or odd.
- 3) Write a program to find out First Fifty Prime numbers.
- 4) Write a program to find GCD & LCM of given number.

5) Write a program to convert given Binary number into its Octal / Decimal,

Hexadecimal Equivalent.

- 6) Write a program to display Fibonacci series.
- 7) Write a program to find Factorial of Given Number.
- 8) Write a program to reverse the given number.

9) Write a program to calculate sum and average of given n numbers using

array

10) Write a program to calculate Matrix Addition, Multiplication

Paper Number : 2.1 Paper Title : Introduction to Computer and Data Processing - II

Unit – 1 Computer Network Basic Concepts

Basic elements of a communication system – sender, receiver and medium

Data Transmission modes – Simplex, Half Duplex, Full Duplex

Data Transmission Media – wire pairs, Co-axial cable, Microwave System, Communication Satellite, Optical fiber

Definition of networking, Types of networking – LAN, MAN, WAN

Network Topologies - BUS, Ring, Star, Mesh and Hybrid

Unit -3 Internet & HTML

(10)

(10)

Concept of Internet, Uses and benefits

HTML: Introduction, Features and limitations

Essential Tags: <HTML>, <HEAD>, <TITLE>, <BODY>,

Creating simple web pages using HTML, Adding comments,
, <P> tags

Heading tags: <H1> to <H6>, Formatting tags: , <I>, <U>, <P>, Font tag

Adding lists: Ordered, unordered and definition lists: , , ,

Creating hyperlink using <A>, Marquee tag, inserting images

Creating tables

Unit – 3 Office automation and Database basic concepts (10)

Study of Word Processors and Spreadsheet :

Definition of Word Processor, Detail study of features of MS- WORD

Definition of Spreadsheet, Detail study of features of MS-Excel

Definition of Field, Record, Database.

Data Base Management System

Concept of Primary key and Foreign key

MS-Access Data types, Creating tables, Handling database-using queries.

UNIT - 4 IT Management

(10)

Organization of IT Department – set up , roles & responsibilities , Interfacing with other functional departments , Functions of IT Management Department.

IT Assets & its Management – Data – Access rules , Confidentiality of Data, Back up procedure .

Reference Books :

1) Computer Today --Basandara

2) Computer Fundamentals --P.K. Sinha.

3) Web Publishing- Monica D'Souza & Jude D'Souza (BPB)

4) Introduction to Computer and Data Processing- Pawar, Lad, Shinde, Patil (Dreamtech)

5) Information Technology for Management : henry C. Lucas Jr. Tata McHill

6) Information Technology Planning – Lori A.Goetsch - Jaiko Books

Paper Number : 2.2

Paper Title : Introduction to Programming using 'C' - II

Specific Objectives:-

i) To develop a programming logic.

ii) To teach basic principles of programming.

iii) To develop skills for writing programs using 'C'.

Unit-1 Pointers

(10)

Definition and declaration

- Operations on pointer
- Pointer initialization
- Pointer And Array
- Pointer of pointer
- Dynamic memory allocation

Unit-6 Functions

- Definition, declaration, prototype of function
- Local and global variable
- User defined functions
- Storage classes
- Recursion
- Pointer and function
- Call by value and Call by reference
- Preprocessor

Unit-7 Structures and Union

- Definition and declaration
- Array of structures
- Passing structure to function
- Pointer to structure
- Nested structure, self referential structure
- Sizeof and typedef
- Definition of Union and declaration
- Difference between structure and Union

Unit-8 File Handling

- Text and binary files.
- File opening mode- read, write, append
- Formatted input- scanf(), sscanf(), fscanf(), fread()

(10)

(10)

(10)

- Formatted output- printf(), sprintf(), fprintf(), fwrite()
- Functions- fseek(), ftell(), fflush(), fclose(), fopen(), rewind()

Reference Books:

- 1) ANCI 'C' E. Balgurusamy
- 2) Let us C-Y.C. Kanetkar
- 3) 'C' programming- Dennis Ritchie
- 4) Programming in C- Gottfried
- 5) Programming in 'C'- Venugopal
- 6) C Programming Dr. Vishal M. Lichade , Dreamtech

7) Introduction to Programming Using C- A. J Pawar, R. A. Lad, S. S. Shinde, D. R. Patil(Wiley-Dreamtech)

Paper Number : 2.3Paper Title: Laboratory Course in Computer Science - II

Lab course on paper 2.1 -

1) MS – WORD – Creating new documents, typing, deleting, selecting text, undo, Redo, formatting text – auto format, formatting characters, drop caps,

Paragraphs, line spacing, margins, page setup, headers and footers

Writer's tools – spelling checker, auto format, auto correct, find and replace

Mail merge – Data source, Main document, creating mail merge document.

2) MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if

statement, types of functions

3) MS ACCESS - Creating data bases , writing queries

4) Internet – creating e – mail accounts, browsing, searching information

5) Creating simple Web pages using HTML.

Lab course on paper 2.2 -

1) Write a program to find given string is Palindrome or not using function.

2) Write a program that accepts the Roll No, Name, Marks obtained in three

tests of 'N' students & display the total and Average in tabular format.

3) Write a program to add two Matrices; Use two Dimensional array as Pointer

& Dynamic Memory allocation.

4) Write a program to input 10 names each of the length at least 8 characters

sort them in a alphabetical order.

- 5) Write a program to remove blank lines from a file.
- 6) Write a program to count the no. of words in a given text file.

Equivalence in Accordance with titles and contents of Papers

(For revised Syllabus):

Sr. No.	Title of Old Paper	Title of New Paper	
1.	Paper – I: Introduction to Computer and Data Processing	Sem- I: Paper No. 1.1 Introduction to Computer and Data Processing -I Sem - II: Paper No. 2.1 Introduction to Computer and Data Processing - II	
2.	Paper – II: Introduction to Programming Using C	Sem- I: Paper No. 1.2 Introduction to Programming Using C -I Sem - II: Paper No. 2.2 Introduction to Programming Using C - II	
3.	Laboratory Course in Computer Science - I	Paper No. 1.3 Laboratory Course in Computer Science – I Paper No. 2.3 Laboratory Course in Computer Science - II	

Nature of Question Paper for all (Theory) papers U.G. Courses under Faculty of Science.

	Nature of Question Paper				
Q.No.1	Multiple Choice based objective type question (four options for each question be given)	8 Marks			
Q.No. 2	Attempt any two of the following (out of five)	16 Marks			
Q.No. 3	Shot notes (4 out of 6)	16 Marks			
	Total	40 Marks			