"Education for Knowledge, Science, and Culture"
- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(Autonomous)

KOLHAPUR (AUTONOMOUS)

B.Sc. Part–I (Computer science Entire)CBCS Syllabus with effect from June,2018

Structure of the course

To be implemented from June 2018

Theory

Semester I

Semester I (Total credits=22)

Sr. No	Paper Code	Title of the paper	Internal Mark	Enternal Mark	Total Mark
1	GEC-1300A	Discrete Mathematics & Algebra	20	80	100
2	GEC-1301A	Electronics circuits and digital electronic -I	20	80	100
3	GEC-1302A	Descriptive statistics-1 and Discrete probability distributions	20	80	100
4	CC-CS-1303A	Introduction to computers and programming using C-I	20	80	100

Semester II

Sr.NO.	Paper Code	Title of the paper	Internal Mark	External Mark	Total Mark
1	GEC-1300B	Graph Theory & Calculus	20	80	100
2	GEC-1301B	Electronics Devicesand Circuits–II	20	80	100
3	GEC-1302B	Descriptive statistics-II and Continous probability distributions and Testing of Hypothesis	20	80	100
4	CC-CS-1303B	Introduction to computers and programming using C-II	20	80	100

Practical

Sr.NO.	Paper Code	Title of the paper	Internal Mark	External Mark	Total Mark
1	GEC-1300	Computer science -Lab- I (Mathematics)	20	80	100

2	GEC-1301	Computer science -Lab- II (Electronics)	20	80	100
3	GEC-1302	Computer science -Lab- III(Statistics)	20	80	100
4	CC-CS-1303	Computer science -Lab- IV (Introduction to computers and programming using C-II)	20	80	100

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

Nature of Question Paper-Total 80 Marks

Section-I

Q.No.1 Multiple Choice based objective type question 08

Marks (Four options for each question be given)

Q.No. 2 Attempt any two of the following –long Answers (out of three) 16 Marks

Q.No.3 Attempt any four of the following-Short Answers -(out of six)16Marks

Section-II

Q.No.4 Multiple Choice based objective type question 08 Marks

(Four options for each question be given)

Q.No.5 Attempt any two of the following –long Answers (out of three) 16 Marks

Q.No.6 Attempt any four of the following-Short Answers - (out of six)16Marks

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

Nature of Question Paper-Total 100 Marks

Particles 75 marks+ Journal 10 marks +Oral 15 marks= Total 100 Marks

- Total numbers of questions to be attempted are 03 from 06 in following manner format.
  1) Compulsory From Q.No.1 to Q.No.3 attempt any 1
  2) Compulsory From Q.No.4 to Q.No.6 attempt any 1
  3) Optional From Q.No.1 to Q.No.6 attempt any 1

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B.Sc.Part-I (Computer science Entire) CBCS Syllabus with effect from June, 2018 Semester: I

Mathematics -Paper-I

Mathematics GEC-1300 A

Discrete Mathematics& Algebra Theory: 60 Hours

CO 1 Construct simple mathematical proofs and possess the ability to verify them.
Comprehend formal logical arguments.

CO 2 Apply basic counting techniques of combinatorial problems. Specify and manipulate basic mathematical objects such as sets, functions and relations and will also be able to verify simple mathematical properties that these Objects possess.

CO3 Classify numbers into number sets. Determine function is one-one and Onto.

CO4 Prove results involving divisibility & greatest common divisors. Apply Fermat's theorem to Find the remainder when any large number is divided by Any other integer

Section-I: Discrete Mathematics

Unit–1: Counting Principle   (9)

1.1 Set: Definition, Type of sets.
1.2 Counting : Addition & Multiplication principle, Permutation & Combination
    1.2.1   Cardinality of finite set
    1.2.2   Cardinality of union of sets (Addition principle)
    1.2.3   Principle of inclusion & exclusion, examples
1.3 Combinatorial Arguments
1.4 Pigeonhole Principle (Statement Only),Examples

Unit–2: Recurrence relations   (9)

2.1 Introduction
2.2 Linear Recurrence relation with constant coefficient
2.3 Homogeneous solutions
2.4 Particular & Total solutions

Unit –3: Logic   (11)

3.1 Propositions & Logical connectives : Definition, Types of Propositions, Truth values &Truth Tables, Tautology & Contradiction, Logical equivalence
3.2 Rules of inferences
3.3 Valid arguments & proofs
3.4 Methods of proofs: Direct &indirect
3.5 Duality of the statement, Predicates & Quantifiers

Unit –4: Fuzzy Sets   (8)

4.1 Introduction: Fuzzy numbers, Fuzzy set.
4.2 Classical logic
4.3 Applying truth values-continuous variable
4.4 Linguistic variables
4.5 Types of Fuzzy Logics
4.6 Advantages of Fuzzy Logic
4.7 Disadvantages of Fuzzy Logic

Section –II: Algebra

Unit–1: Relations (10)

1.1 Functions : Definition, Types of mapping, Injective, Surjective & Bijecive functions, Inverse function, Composition of functions
1.2 Ordered pairs, Cartesian product
1.3 Relations, Types of relations, Equivalence relation, Partial ordering
1.4 Other types of relation: I reflexive, Asymmetric
1.5 Digraphs of relations, matrix presentation & composition of relations
1.6 Transitive closure, Warshall's algorithm
1.7 Equivalence class, Partition of a set

Unit–2:Divisibilityofintegers (10)

2.1 Introduction
2.2 Divisibility: Division algorithm (Statement only)
2.3 Greatest Common Divisor (g.c.d.), Least Common Multiple (l.c.m.)
2.4 Euclidean algorithm (Statement only), divisibility Test 1)by10(i.e. by2&5)2)by11
2.5 Prime numbers, Euclide's lemma, Fundamental theorem of Arithmetic (without proof)
2.6 Congruence relation & its properties
2.7 Fermat's theorem (Statement only),examples
2.8 Residue classes:definition,examples,addition modulo, multiplication modulo

Unit – 3: Boolean Algebra (10)

3.1 POSET : definition
3.2 Hasse diagram
3.3 Lattice: definition, principle of duality
3.4 Basic properties of algebraic systems defined by Lattice
3.5 Distributive & complemented lattice
3.6 Boolean Lattice & Boolean algebra
3.7 Boolean expression & Boolean functions
3.8 Disjunctive & Conjuctive normal forms & examples
3.9 Finite state machines

Unit –4Abstract Algebra (8)

4.1 Binary operation :definition
4.2 Semi group & Monoids: definition & examples
4.3 Group: definition & examples, simple properties of groups
4.4 Sub-group: definition & examples

Basic readings

1. Algebra Nirali Publication
2. Algebra & calculus Textbook of B.Sc.computer science, Vision Publication
3. Discrete Mathematics by S.R.Patil & others, Nirali Publication
4. Discrete Mathematics, Vision Publication
5. Elements of Discrete Mathematics by C.L.Liiu
6. Discrete Mathematics by Olympia Nicodemi
7. Algebra by Naik & Patil, Phadake Prakashan

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B.Sc.Part-I(Computer science Entire) CBCS Syllabus with effect from June, 2018 Semester: I

Electronics -Paper-I

Electronics GEC-1301 A

Electronics circuits and digital electronics –I
Theory: 60 Hours (75 Lectures) credits -4

On Completion of the course, student will be able :

CO1 Study the current voltage characteristics of semiconductor devices, understand behavior of basic electronic components, Explain the concept Of circuit laws and network theorems and apply them to laboratory Measurements

CO2 Understand to semiconductor devices. Characteristics and biasing of diodes and transistors. Design and analysis of circuits using diodes, bipolar transistors, and field effect transistors. Application of transistors as amplifiers and switches.

CO3 Underst and basic digital electronic systems. . To learn different c theorems And Laws for simplification of basic Digital electronics circuits. Understand Laws for simplification of basic Digital electronics circuits. Understand Symbols, Truth tables, Boolean equations, & working principle

CO4 Teach basic principles of programming. Develop skills for writing programs Using 'C'.

Section – I

UNIT1: Liner components in computer (12)

Definition of active and passive elements

Resistors: Classification, color-code, specifications of resistors

Types of resistors:-Linear Resistors (Fixed):-Carbon composition, carbon film, wire wound.

Linear resistors (Variable): -Wire wound, Potentiometer, Preset.

Non-Linear resistors:-Thermostats, LDR and Varistors.

Capacitors: Definition, Capacitance, capacitive reactance (XC), Charging and discharging of capacitor,

Types of capacitors: -Fixed electrostatic capacitors:-ceramic, mica, paper, etc

Fixed electrolytic capacitors:-Aluminum and Tantalum. (Construction of electrolyte capacitor).Variable capacitors:-Air dielectric capacitor and Trimmers.

Inductors and Transformers:
Inductors:-Definition, symbol, Inductance, Inductive reactance (XL), Types of Inductors:-
Air core, Iron core and ferrite core inductors.
Transformers:-Principle and construction of transformer, Specification of transformer.
Types of Transformer: -Step-up, step-down transformer
Types of Switches :(Explanation using Symbols)
Relays:-Principle, construction and working of electromagnetic relays

UNIT2: DC circuit analysis (10)

Basic laws: Ohm's law, Kirchoff's current and voltage law, concept of current source, Voltage source. Application of Kirchoff's laws to simple circuits.
Network Theorems :-(only for dcresistive circuit) Thevenin's Theorem, Norton's Theorem, superposition Theorem, Maximum power transfer theorem,(only statement and examples)

UNIT3: Semiconductor Diode (06)

Formation of P-N junction, depletion layer, internal potential barrier, working and I-V characteristics of PN junction diode. Diode applications,
zener diode: Breakdown mechanism, Zener and Avalanche Break down I-V Characteristics Photo diode and LED, current limiting resister for LED, Applications-Opto coupler, dot matrix display of LED, 7- segment display.

UNIT4: Bipolar junction Transistor (09)

Structure and working of bipolar junction transistor: CB,CC,CE configurations,CE mode characteristics, Relation between α and β,DC load line and Q point, potential divider Biasing, Concept of transistor as an amplifier and transistor as switch.

Section–II
UNIT1: Number System, Binary Codes and Binary Arithmetic (10)

Different types of number system (Decimal, Binary, Octal, Hexa decimal Number system, Inter conversion From one System to another) and codes (BCD code ,Gray code , Exess 3code, ASCII code, EBCDI C code).Concept of parity, Signed and unsigned numbers,1'scomplement and 2's complement of binary numbers, binary arithmetic (addition, subtraction, multiplication, division).

UNIT2: Logic Gates, Boolean algebra and Logic Families (10)

Logic gates: All Logic gates -AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR(Definition, Symbol, Expression and Truth-Table),Universal gates(NAND and NOR) Boolean algebra: Rules and laws of algebra, De- Morgan's Theorems, Simplifications of logic Expressions using
a) Boolean algebra, b) K-map, Logic families: Introduction (Bi-polar and unipolar logic family), Characteristics, TTL NAND gate, tri state logic

UNIT3: Combinational Circuits (07)

Concept of Combinational Circuits, Half adder, Full adder, half subtractor, 4-bit adder/ subtractor, Arithmetic logic unit, Encoder (Decimal to BCD, Octal to binary), Decoder(3:8), Multiplexer, Demultiplexer, tree multiplexing, tree demultiplexing

Unit4: Sequential circuits (10)

Concept of sequential circuits, Flip-flops: RS, Clocked RS, JK, Master Slave JK, D Flip- flop,Counter-Asynchronous, up/down, Decade, Synchronous, Ring counter, Johnson counter (Truth tables and timing diagrams) (4 bit) Shift Register SISO (left shift, right shift), SIPO, PISO, PIPO Registers (4-bi)

RECOMMENDEDBOOKS:

1. Principles of Electronics: A.P.MALVINO,(TMH)
2. A text Book of Applied Electronics R.S.Sedha (Schand Publication)
3. Electronic Devices and Circuits All Motters head(PHI)
4. Principles of Electronics V.K.Mehta (New Edn.)
5. Basic Electronics and Linear Circuit N.N.Bhargava, D.C. Kulshreshtha, S.C.Gupta(TMH)
6. Digitalprincipalsandapplications;MalvinoLeach,TataMcGrawHill,4[th]Edition
7. Fundamentals of Digital Electronics; A.AnandKumarPHIPublications2001
8. Digital Principles; T.L Floyd3[rd]edition
9. Digital Electronics; C.F.Strahglo
10. Modern digital Electronics; R.P Jain, ate Mc- Graw Hill Publication
11. Digital logic and computer design-Morris Mano
12. First course in Digital System Design; John P. Uyemura, Brooke/cole, Thompson Learning.
13.Computer Organization-J.P.Hays TMH

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VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

B.Sc.Part– I(Computer science Entire) CBCS Syllabus with effect from June, 2018

Semester:I   Statistics-Paper-I

Statistics GEC-1302A

Descriptive statistics-I and Discrete probability distributions

Theory: 60 Hours (75Lectures) credits-
4

Section I

On Completion of the course, student will be able :

CO 1 To classify, tabulate and represent the data graphically

CO 2 To compute and interpret various measures of central tendency, dispersion, moments, skewness and kurtosis.

CO 3 To compute probabilities by using definition and probability rules.

CO 4 To compute probabilities by using discrete probability distributions.

Unit 1 Introduction   (8)

1.1 Definition and concept Statistics, Population and Sample:

1.2 Concept of statistical population with illustrations, concept of sample with illustrations.

1.3 Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only). Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction 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: (10)
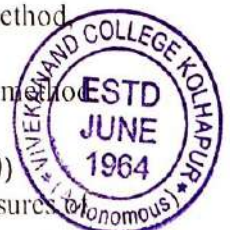
2.1 Concept of central tendency, Criteria for good measures of central tendency.

2.2 Arithmetic mean: Definition, computation for ungrouped and grouped data, Combined mean, weighted mean, merits and demerits.

2.3 Median: computation for ungrouped and grouped data, Graphical method, merits and demerits

2.4 Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits.

2.5 Quartiles: Definition, computation or ungrouped and grouped data graphical method

2.6 Numerical problems.

Unit-3 Measures of Dispersion   (10)

3.1 Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion.

3.2 Range and Quartile Deviation: definition for ungrouped and grouped data, and their coefficients, merits and demerits.

3.3 Mean Deviation: Definition for ungrouped and grouped data, minimal Property (statement only).

3.4 Standard deviation and Variance: definition for ungrouped and grouped data, coeffi coefficient of variation, combined variance and s. d. for two groups, merits and demerits

3.5 Numerical problems.

Unit-4 Moments, Skewness and Kurtosis: (10)

4.1 Raw and central moments: definition for ungrouped and grouped data (only first four moments), relation between central and raw moments (statements only)

4.2 Measures of skewness: Types of skewness. Pearson's and Bowley's coefficients of skewness

4.3 Measures of skewness based on moments.

4.4 Measures of kurtosis: Types of kurtosis. Measures of kurtosis based on moments.

4.5 Numerical problems.

Section-II

Probability and Discrete Probability Distributions

Unit-1 Probability: (10)

1.1 Idea of permutation and combination, concept of experiments and

1.2 random experiments.

1.3 Definitions: sample space (finite and countably infinite), events, types of events,

1.4 power set (sample space consistingatmost3 sample points).
Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an event based on permutations and combinations, axiomatic definition of probability with reference to finite and countably infinite sample space.

1.5 Theorems on probability:
   i) $P(\Phi)=0$
   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) $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A)+P(B)$

1.6 Illustrative examples.

Unit-2 Conditional probability and independence of events: ((

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 there sult 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 Pair wise and complete independence of three events, examples.

2.6 Elementary examples.

Unit-3 Univariate probability distributions (defined on finite and countably infinite Sample space): (09)

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 constan

3.4 Definition of mean and variance of univariate distributions.

3.5 Examples.

Unit-4 Some standard discrete probability distributions: (10)

4.1   Discrete uniform distribution: p.m.f., mean and variance, examples.

4.2   Binomial distribution: p.m.f., mean and variance, additive property of Binomial variates , recurrence relation for probabilities, examples.

4.3   Geometric distribution : p.m.f., mean and variance, additive property, Recurrence relation for probabilities, examples.

4.4   Poisson distribution :p.m.f., mean and variance, additive property, Recurrence relation for probabilities, Poisson distribution as a limiting case Of binomial distribution (without proof), examples.

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. Fundamental of mathematical statistics by S.C.Gupta and Kapoor.

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

B.Sc.Part– I(Computer science Entire) CBCS Syllabus with effect from June, 2018

Semester: 1 Computer science-Paper-I

CC-CS-1303A

Introduction to computers and programming using C-I

Theory: 60 Hours (75 Lectures) credits -4

Section –I

On Completion of the course, student will be able to:

CO 1 Understand Basic elements of a communication system, Data Transmission modes, Data Transmission media, Types of networking Network Topologies, Definition and declaration, Operations on pointer Pointer initialization

CO 2 Understand Information Technology IT Assets and its managements, IT Act, Definition, declaration, proto type of function, Local and global variable, User Defined functions, Storage classes, Recursion, Pointer and function, Callby value and Call by reference

CO 3 Understand Database Management System, Data Models, Concept of RDBMS, RDBMS Terminologies, DBA & Responsibilities of DBA, Relational Model, Definition and declaration structure, Size of and type def, Definition of Union and declaration, Difference between structured union.

CO 4 Understand Oracle Data types, Classification of SQL commands, Data Constraints, Concept of File, Text and binary files, Opening and closing files, File opening mode.

Unit-1: Introduction to Computer and Basic Organization (07)

Definition of computer, characteristics, limitations, concepts o h/wands/w, 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

Unit–2: Input, Output Devices and Concept of Memory (10)

Devices: - Keyboard, Mouse, Light pen, Joystick, Touch screen, Digitizer, Scanner, MICR,OMR, Barcode reader .Output devices:-VDU, Printers–Dot-matrix, Inkjet, Laser, Line, Plotters Memory–Semi conductor and Magnetic memory. Secondary Storage devices:-Magnetic disk, Magnetic tape, Optical disk-CD ROM

Unit–3: Operating System concepts (10)

Definition and Functions of Operating System. Types of OS– Single user, Multi-user. Process Management-Multi programming, Multitasking, Multiprocessing, Time sharing. Disk Operating System (DOS). Booting Processes, DOS internal and external commands, concept of directory and file. Windows Operating system: Features of Windows O.S., GUI Modules of Windows–Window Explorer, Control panel, Printer Manager. Windows accessories – Paintbrush, Notepad

Unit–4: Office auto motion and Database basic concepts   (10)

Study of Word Processors and Spread sheet: Definition of Word Processor, Detail study of features of MS-WORD Definition of Spread sheet. Detail study of features of MS-Excel Definition of Field, Record, Database. Database Management System Concept. (Primary and Foreign key) MS-Access Data types, Creating tables, Handling data base-using queries

Section-II

Unit–1: Algorithm Programming Concepts   (05)

Definition, Pseudo code conventions, Examples, Characteristics of an algorithm, Time complexity, Iterative, Recursion (e.g. Fibonacci Sequence & Array Recursive Sum)), Characteristics of algorithm, Notation of Algorithm, Flowcharts-Definition, Symbol, features.

Unit-2: Introductionto „C"   (11)

HistoryofʻC', StructureofʻC' programming, Running and debugging the program, Character set and keywords, Constantan its type ,Variable and its Data type sinʻC', Operators-Arithmetic, logical, relational, bitwise, increment, decrement ,conditional, operator precedence

Unit-3Input-OutputStatements   (06)

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

Unit-4ControlStructures   (10)

Conditional control statements-if, if else, nested if, switch, Looping–for statements, nested for, While, Do-while statements, Unconditional breaking control statements- break, continue, goto

Unit-5Arraysandstrings   (06)

Array definition and declaration, Single and multidimensional larray, String functions (strcpy(), strcmp(), strcat(), strlen(), strrev())

Reference Books:
1. Computer Today-- Basandara
2. Fundamental of computers-- V.Rajaraman.
3. Computer Fundamentals--P.K.Sinha.
4. MS-Office Reference Book
5. Introduction to Computer and Data Processing-Pawar, Lad, Shinde, Patil (Dreamtech)
6. ANCI 'C'–E.Balgurusamy
7. Let us C-Y. C.Kanetkar
8. 'C' programming-Dennis Ritchie
9. Programmingin C-Gottfried
10. Programming in 'C'-Venugopal
11. IntroductiontoProgrammingUsingC-A.JPawar,R.A.Lad,S.S.Shinde,D.R.Patil(Wiley-Dreamtech)

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B.Sc.Part– I(Computer science Entire) CBCS Syllabus with effect from June, 2018

Semester: II

Math's GEC-1300B

Graph Theory and Calculus

Theory: 60 Hours(75Lectures)credits-4

Section – I Graph Theory

On Completion of the course, student will be able :

CO 1 Apply principles and concepts of graph theory in practical situations. Understand applications of graph theory in areas of Computer Science, Biology, Chemistry, Physics, Sociology etc

CO 2 To mode real world problems using graph theory. To model real World problems using graph theory

CO 3 Inspect the value of the limit of a function at a point using the definition of The limit. Find the limit of a function at a point numerically and algebraically using appropriate techniques including L'Hospital's rule.

CO 4 Experiment with differentiation of exponential, logarithmic,trigonometric & inverse trigonometric functions n times. Illustrate the consequences of the intermediate value theorem for continuous functions. Show whether a Function is differentiable at a point.

Unit 1 Introduction (8)

1.1 Definition and concept Statistics, Population and Sample:

1.2 Concept of statistical population with illustrations, concept of sample with illustrations.

1.3 Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only). Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction 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: (10)

2.1 Concept of central tendency, Criteria for good measures of central tendency.

2.2 Arithmetic mean: Definition, computation for ungrouped and grouped data, Combined mean, weighted mean, merits and demerits.

2.3 Median: computation for ungrouped and grouped data, Graphical method, merits and demerits

2.4 Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits.

2.5 Quartiles: Definition, computation or ungrouped grouped data graphical method.

2.6 Numerical problems.

Unit-3 Measures of Dispersion (10)

3.1 Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion.

3.2 Range and Quartile Deviation: definition for ungrouped and grouped data, and their coefficients, merits and demerits.

3.3 Mean Deviation: Definition for ungrouped and grouped data, minimal Property (statement only).

3.4 Standard deviation and Variance: definition for ungrouped and grouped data, coeffi coefficient of variation, combined variance and s. d. for two groups, merits and demerits

3.5 Numerical problems.

Unit-4 Moments, Skewness and Kurtosis: (10)

4.1 Raw and central moments: definition for ungrouped and grouped data (only first four moments), relation between central and raw moments (statements only)

4.2 Measures of skewness: Types of skewness. Pearson's and Bowley's coefficients of skewness

4.3 Measures of skewness based on moments.

4.4 Measures of kurtosis: Types of kurtosis. Measures of kurtosis based on moments.

4.5 Numerical problems.

Section–II Calculus

Unit – I Sequences of real numbers

1.1 Sequences of real numbers: definition, examples

1.2 Convergent, divergent, oscillatory sequences, definition & examples

1.3 Bounded sequence: definition & examples

1.4 Monotonic sequences, theorem on monotonic & bounded sequences (statement only)

1.5 Show that $\{(11/n)^n\}$ is convergent & its limit is 'e'.

1.6 Convergence of sequence $\{x^n\}$, where $x \in R, x > 0$

Unit–II Series of real numbers (9)

2.1 Partial sums

2.2 Convergent, divergent series, definition & examples

2.3 Convergence of geometric series (with proof)

2.4 Comparison test &its limit form (for the series of positive term)

2.5 Convergence of p-series(with proof)

2.6 D'Alembert's ratio test (statement only) & examples

2.7 Root test (statement only) & examples

Unit–III Continuity & Mean Value Theorem (11)

3.1 Continuity of a function & its properties defined on [a,b] (properties without proof)

3.2 Differentiability, Differentiability implies continuity but not conversely

3.3 Rolle's theorem (with proof) & its geometric significance & examples

3.4 Lagrange'smeanvaluetheorem(withproof)&itsgeometricsignificance&examples

3.5 Cauchy's mean value theorem (with proof) & examples

Unit–IV Successive differentiation (7)

4.1 n^{th} derivatives of some standard functions

4.2 Leibnitz's theorem (with proof) & examples

4.3 L'Hospital's Rule (without proof) & examples

4.4 Taylor's & Maclaurin's theorems with Lagrange's & Cauchy's forms of remainders (without proof)

4.5 Taylor's & Maclaurin's series

4.6 series expansion of $\cos ec.\log(1 + x)$

Basic readings

1. Calculus, Nirali Publication

2. A textbook of calculus and differentiable equations by Dinde H.T.

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 combinational Mathematics by R.M.Grassl
5. Discrete Mathematics by Kenneth Rosen, Tata Mc Graw 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 Solapurkar
   Discrete Mathematics by S.R.Pailand others, Nirali Prakashan

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

B. Sc. Part – I (Computer science Entire) CBCS Syllabus with effect from June, 2018 Semester II

Electronics GEC-1301B

Electronics Devices and Circuits–II

Theory: 60Hours (75Lectures) credits-4

On Completion of the course, student will be able :

CO 1 Design and analyze the basic operations of MOSFET. Know about the multistage amplifier using BJT in various configurations to Determine frequency response and concept of voltage Know the concept of feedback amplifier and their characteristics. Design the different oscillator Circuits for various frequencies

CO 2 Understand and analyze the IC 741 operational amplifier and its Characteristics. Understanding Various operating modes of Op-ampandits linear/non-linear applications

CO 3 Study different types of multivibrator and wave form generator usingIC555. Understand concept of memories and types of memories

CO 4 Understand the basic architecture of 8- bit microprocessors and 16 Bit microprocessor. Identify the addressing modes of an instruction. Develop programming skills in assembly language. Able to write programs on 8085 Microprocessor based systems

Section-1

UNIT1: Field Effect Transistor (08)
Comparison between BJT and FET, classification of FETs, Structure and working of JFET, I-V characteristics and parameters (trans conductance, drain resistance, amplification factor) concept of MOSFET-depletion and Enhancement (construction and application only)
Applications: FET as-Voltage Variable resistance, switch, memory cell, DRAM
UNIT2: Amplifier and Oscillators (09)
General classification of amplifier,, Idea of Multistage amplifier, different coupling methods (Direct coupling, RC coupling, Transformer coupling) Concept of positive and negative feedback. Barkhausen criteria; Types of oscillators RC coupled, wein bridge, Hartley, Colpitts oscillator
UNIT3: Operational Amplifiers (10)
Concept of operational amplifier; ideal characteristics of Opamp; Different parameters of Op Amp, Virtual ground concept, Applications; inverting amplifier, on inverting amplifier, Unity gain amplifier, buffer, Adder, subtract or, integrator and differentiator, comparator. Schmitt trigger
UNIT4Power Supply (10)
Working of rectifier (Half, Full, Bridge);different parameters of rectifiers; filter circuits; concept of Regulator; concept of load and line regulation; Zener diode 1964 regulator; concept of Three pin IC regulator(Block Diagram)positive and negative voltage regulator IC; SMPS block diagram; UPS: on line and offline (block diagram)

UNIT1: Multivibrator   (08)

Types of multivibrator block diagram of IC 555; Application of IC 555 as Astable, and Mona stable (Calculation of frequency and Pulse width) Crystal clock using inverter. Clock circuit using NAND gate

UNIT2: Memory devices and memory Organization   (10)

Types of Memory-volatile and on volatile, 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

UNIT3 Introductions to Microprocessor

Introduction, Types (8,16,32 Bits), Pin Diagram and Architecture of 8085, Pin Diagram and Architecture of 8086

UNIT4 Programming of process   (10)

Instruction Set of 8085, ALP Programs for Addition, Subtraction, Multiplication, Division, Data transfer, Block Transfer

RECOMMENDEDBOOKS:

5. Principles of Electronics: A.P.MALVINO,(TMH)
6. A text Book of Applied Electronics R.S.Sedha (Schand Publication)
7. Electronic Devices and Circuits All Motters head(PHI)
8. Principles of Electronics V.K.Mehta (New Edn.)
5. Basic Electronics and Linear Circuit N.N.Bhargava, D.C. Kulshreshtha, S.C.Gupta(TMH)
6. Digitalprincipalsandapplications;MalvinoLeach,TataMcGrawHill,4thEdition
7. Fundamentals of Digital Electronics; A.AnandKumarPHIPublications2001
8. Digital Principles; T.L Floyd3rdedition
9. Digital Electronics; C.F.Strahglo
10. Modern digital Electronics; R.P Jain, ate Mc- Graw Hill Publication
11. Digital logic and computer design-Morris Mano
12. First course in Digital System Design; John P. Uyemura, Brooke/cole. Thompson Learning.
13.Computer Organization-J.P.Hays TMH

"Education for knowledge, science and culture"

- Shikshanmaharshi Dr Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

B.Sc.Part–I (Computer science Entire) CBCS Syllabus with effect from June, 2018 Semester II

Statistics-Paper-II

StatisticsGEC-1302B

Descriptive statistics-and Continuous probability distributions and Testing of Hypothesis

Theory: 60Hours (75 Lectures) credits-4

Section-I

On Completion of the course, student will be able :

CO 1 Relation between two and three variables, Fitting of simple and multiple regression equations
CO 2 Finding of probabilities of various distributions
CO 3 Knowing the relations among the different distributions with real life Situations and Simulation of various distributions.
CO 4 Applying the small sample and large sample tests in various situations.

| Unit-1 | Correlation(for ungrouped data) | (09) |

1.1 Concept of bivariate data, scatter diagram. Concept of correlation ,positive
Correlation, negative correlation, cause and effect relation.

1.2 Karl Pearson's coefficient of correlation, properties of correlation Coefficient, interpretation of correlation coefficient.

1.3 Spearman's Rank Correlation coefficient
(Formula with and without ties).

1.4 Numerical problems.

Unit-2   Regression (for ungrouped data):

2.1 Conceptofregression.Derivationoflinesofregressionbymethodofleast

2.2 Regression coefficients and their significance. Properties of regression coefficients.

2.3 Point of intersection and acute angle between regression lines (Without proof).

2.4 Numerical problems.

Unit- 3 Multiple, partial Correlation & Regression for Trivariate Data):

3.1 Concept of multiple regressions. Yule's Notations.

3.2 Residual: definition, order, properties, mean and variance of residual.
Fitting of multiple regression planes (without proof).

3.3 Partial regression coefficients, interpretations.

3.4 Concept of multiple correlations. Definition of multiple Correlation Coefficients and its formula.
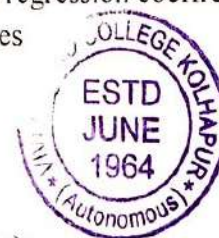
3.5 Properties of multiple correlation coefficient (statements only)
3.6 Properties of partial correlation coefficient.
3.7 Example sand problems.

Unit-4 **Time Series:**
4.1 Definition and Uses of Time Series, Components of time series,
4.2 Methods of determination of trend. Method of Moving Averages, Method of Least Squares (only for straight line).
4.3 Determination of Seasonal Variations by Simple Average Method.
4.4 Definition and Uses of Time Series, Components of time series,
4.5 Methods of determination of trend. Method of Moving Averages, Method of Least Squares (only for straight line).
4.6 Determination of Seasonal Variations by Simple Average Method.

4.7 Definition and Uses of Time Series, Components of time series,
4.8 Methods of determination of trend. Method of Moving Averages, Method of Least Squares (only for straight line).
4.9 Determination of Seasonal Variations by Simple Average Method.

Section-II

Continuous Probability Distributions and Testing of Hypothesis

Unit-1 Continuous Univariate Distributions: (12)
1.1 Definitions: infinite sample space with illustrations, continuous random variable,probabilitydensityfunction(p.d.f.),cumulativedistribution Function (c.d.f.), properties ofc.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 and examples.
1.4 Exponential distribution :p.d.f. ,c.d.f., mean, variance, lack of memory Property and examples.
1.5 Normaldistribution:p.d.f.,standardnormaldistribution,propertiesof Normal curve, distribution of $aX+bY$, whereX and Y are independent
Normal variates, normal distribution as a limiting case of Binomial and Poisson distributions (withoutproof),examples.

Unit-2 Exact sampling distributions: (10)
2.1 Chi-square distribution: definition, chi-square variate as the sum of square Of i.i.d. S.N.V., statement of p.d.f., mean, variance, additive property,
Approximation to normal distribution and examples.
2.2 Student's t-distribution: definition, nature of probability curve, State mean and
variance, approximation to normal, examples.
2.3 Snedecor'sF-distribution:definition,Statemeanandvariance,interrelationships Between chi-square,t and F distributions, examples.

Unit-3 Testing of hypothesis:
3.1 Definitions: random samples, parameter,statistic,standard error of statistic.
3.2 Concept of null and alternative hypothesis, types oferror, criticalregion, Level of significance, one sided and two sided tests, general procedure of Testing of hypothesis,.
3.3 Large sample tests for:i)population mean,ii)Population proportion.

3.4 Small sample tests')Test for population variance, Chi-square test for Goodness of fit and test for independence of attributesusing2×2 Contingency table.

ii)t-test for testing population mean.

iii)F test for equality of two population variances.

3.5 Examples.

Unit-4 Simulation: (5)

4.1 Introduction to simulation, merits and demerits.

4.2 Pasedo-random number generator, model sampling from uniform and exponential distribution.

4.3 Model sampling from normal distribution using Box-Muller transformation.

4.4 Examples.

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. Fundamental of mathematical statistics by S.C.Gupta and Kapoor.

VIVEKANANDCOLLEGE (AUTONOMOUS),KOLHAPUR

B.Sc.PartI(ComputerscienceEntire)CBCSSyllabuswitheffectfromJune,2018SemesterII

Computer science -Paper-II

CC-CS-1303B

Introduction to computers and programming using C-II Theory:60
Hours(75 Lectures)credits-4

Section –I

Introduction to computers

On Completion of the course, student will be able :

CO 1 Underst and Basic elements of a communication system, Data Transmission modes, Data Transmission media, Types of networking Network Topologies, Definition and declaration Operations on pointer, Pointer initialization, Pointer And Array, Pointer Dynamic memory allocation

CO 2 Understand Information Technology IT Assets and its managements, IT Act, Definition, declaration, proto type of function, Local and global variable, User defined functions, Storage classes, Recursion, Pointe and function, Call by Value and Call by reference

CO 3 Understand Database Management System, Data Models, Concept of RDBMS, RDBMS Terminologies, DBA & Responsibilities of DBA, Relational Model, Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, Self referential structure, Size of and type def, Definition of Union and declaration, Difference between structure and union

CO 3 Understand Oracle Data types. Classification of SQL commands. Data Constraints, Concept of File, Text and binary files, Opening and closing files, File opening mode.

Section-1

Unit–1:ComputerNetworkBasicConcepts (10)

BasicelementsofacommunicationsystemsenderreceiverandmediumDataTransmissionmodes–Simplex,HalfDuplex,FullDuplexDataTransmissionMedia–wirepairs,Co-axialcable,MicrowaveSystem,CommunicationSatellite,OpticalfiberDefinitionofnetworking,Typesofnetworking–LAN,MAN,WANNetworkTopologies-BUS,Ring,Star,MeshandHybrid

Unit–2: IT Management (10)

Definition of Information Technology IT Assets and its managements- Data –Access rules,confidentialityofdata,Backupprocedure.ITActinbrief,Definedifferenttermsasmentionedin IT Act – Access , Address , Data , Digital signature , Electronic form , Electronic Gazette ,License, Electronic record ,License ,Private key, Public key etc.

Unit-3:Introduction to RDBMS (10)

Data, Database, Database Management System, Concept of Data Models (Network, Hierarchical ,Relational), Concept of RDBMS, RDBMS Terminologies : relation, attribute, domain, tuple, entities,

DBA & Responsibilities of DBA, Relational Model: Structure of Relational Databases, Relational Algebra

Unit4:Structured Query Language(SQL)   (07)\

Or Data types, Classification of SQL commands.3.Create Table Command 4.Inser t Command, Select Command using Where Clause, Delete Command and Update Command 5.Data Constraints : Primary Key and Foreign key.

Section-II

Unit-1 :Pointers   (10)

Definition and declaration, Operations on pointer, Pointer initialization, Pointer And Array, Pointer of pointer, Dynamic memory allocation

Unit-2: Functions   (10)

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-3: Structures and Union   (10)

Definition and declaration, Array of structures, Passing structure to function, Pointer to structure Nested structure, self referential structure, Size of and type def, Definition of Union and declaration, Difference between structure and Union

Unit-4: File Handling   (10)

Concept of File ,Text and binary files, Opening and closing files, File opening mode- read, write, append, character and integer handling (getc(), putc() , getw() , putw()), Formatted input-scanf(),sscanf(),fscanf(),fread(),Formattedoutput-printf(),sprintf(),fprintf(),fwrite()Functions-fseek(),ftell(), fflush(), fclose(), fopen(), rewind()

Reference Books:
12. Computer Today--Basandara
13. Fundamental of computers--V.Rajaraman.
14. Computer Fundamentals--P.K.Sinha.
15. MS-Office Reference Book
16. Introduction to Computer and Data Processing-Pawar, Lad, Shinde,Patil(Dreamtech)
17. ANCI'C'–E. Balgurusamy
18. Letus C-Y. C.Kanetkar
19. 'C'programming-DennisRitchie
20.   Programming in C-Gottfried
21. Programming in' C'-Venugopal
22. IntroductiontoProgrammingUsingC-A.JPawar,R.A.Lad,S.S.Shinde,D.R.Patil(Wiley-Dreamtech)

GEC-1300

Computer Science Lab-1 (Mathematics)

60Hours(75Lectures)credits3.2

1. Recurrence relation
2. Advantages & Disadvantages of Fuzzy Logic
3. Combinational Arguments
4. Euclid's algorithm, division algorithm
5. Fermat's theorem on remainder
6. Warshall's algorithm
7. D.N.F.&C.N.F.
8. Hasse Diagram
9. Finite state machine, input tape, output tape
10. Proofs of valid arguments using laws of inferences
11. Kruskal's algorithm
12. 12 Dijkstra's shortest path algorithm
13. Fundamental circuits & cut sets
14. Ford Fulkerson's maximal flow network
15. Rolle's theorem

16. Lagrange's mean value theorem

17. Cauchy's mean value theorem

18. Series expansion of $e^x, \sin x, \cos x, \log(1 + x)$

Computer Science Lab-II (Electronics)

60Hours (75Lectures) credits3

Analog Electronics

1. Positive & Negative Voltage regulators using 3 in IC's
2. Verification of Kirchhoff's Laws
3. To verify Theorem in, Norton theorem for a resistive circuit.
4. To study for ward bias characteristic of rectifier diode.
5. Study of CRO
6. Transistors as switch (Application for LED & Relay)
7. Study of full wave rectifier with & without filter (calculation of ripple)
8. Transistor characteristics (CE) configuration
9. RC phase shift oscillator
10. Hartley Oscillator
11. Colpitts Oscillator
12. Op Amp as adder
13. Op Amp as subtractor
14. Characteristics of JFFT calculation of parameters

Digital Electronics

1. Study of basic gates
2. Universal building block using NAND and NOR gates
3. Verification of De-Morgans Theorems
4. Study of Flip-Flops(D&JK)
5. Half & full adder
6. Study of Flip Flop: RS, Clocked RS,D.
7. Study of as table Multivibrator circuit using IC555
8. StudyofmonostableMultivibratorcircuitusingIC555
9. Study of Multiplexer
10. Study of Demultiplexer
11. Arithmetic Operation using uP8085-I
12. Arithmetic Operation using uP8085-II
13. Block transfer using up 8085
14. Block Exchange using up 8085

At least12 experiments from each group

GEC-1302

Computer Science Lab-III (Statistics)

60Hours (75Lectures) credits3

Statistics Practical: List of Statistics experiments to be performed

1) Construction of frequency distributions and graphical methods.
2) Measures of Central tendency(Ungrouped data)
3) Measures of Central tendency(Grouped data)
4) Measures of dispersion(Ungrouped data).
5) Measures of dispersion (Grouped data).
6) Moments, skewness, kurtosis (Ungrouped data).
7) Moments, skewness, kurtosis (Grouped data).
8) Fitting of Binomial & Geometric distribution.
9) Fitting of Poisson distribution.
10) Model sampling from Binomial & Geometric distribution.
11) Model sampling from Poisson distribution.
12) Computation of correlation coefficient and scatter diagram.
13) Fitting of lines of regression(Ungrouped data).
14) Fittingofregressionplanesandestimation&computationofpartialandmultiplecorrelationcoefficients.
15) Time Series
16) Fitting and sketch of Uniform distribution.
17) Fitting and sketch of Exponential distribution.
18) Fitting and sketch of Normal distribution.
19) Model sampling from Normal distribution using:
    i) Normal table and   ii)Box-Muller transformation.
20) Model sampling from Uniform distribution and Exponential distribution.

Note:i)For the experiment numbers16,17and18 it is expected to sketch both observed and expected frequency distributions on the same graph.

ii) Testofgoodnessoffitisnecessaryforeverypracticalonfittingofdistributions.

iii) All the practical's are to be done on computers using MS-EXCEL.

iv) Calculations (observation table) should be done by using Statistical formulae.

v) Computer printout is to be attached to the journal.

vi) Studentmustcompletetheentirepracticaltothesatisfactionoftheteacherconcerned.

Student must produce the Laboratory Journal along with the completion certificate signed by the Head of t department, at the time of practical examination

GEC-1303

Computer Science Lab-IV

(Introduction to computers and programming using C-II)

60Hours (75Lectures) credits3

1) Demonstration of peripherals
2) Linking of various peripherals
3) Operation of all keys of key board
4) DOS–external and internal commands, batch files commands
5) Windows Operating System–
Windowsexplorer,programmanger,controlpanel,printmanager,Creatingfolders, files, icons, shortcuts
6) 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.
7) MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if statement, types of functions
8) MSACCESS-Creating data bases, writing queries
9) Write Program to print biodata.
10) Write a program to perform all arithmetic operations on any two numbers.
11) Write a program to check whether given number is even or odd.
12) Write a program to fine largest among three numbers.
13) Write a program to display Fibonacci series.
14) Write a program to find Factorial of Given Number.
15) Write a program to reverse the given number.
16) Write program to find prime number.
17) Write a program to demonstrate witch statement.

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

18) Write a program to calculate Matrix Addition, Multiplication