Sadguru Gadage Maharaj College, Karad

(An Autonomous College)

Affiliated to Shivaji University, Kolhapur.

Accredited ' A₊ 'with CGPA 3.63 by NAAC ISO 9001:2015 Certified

Department of Computer Science

Syllabus

B.Sc. Computer Science (Entire)
(BCS-I)

Implemented from June, 2019

B.Sc. Computer Science (Entire) - I

Semester- I

BCSE-101: Computer Science Paper-I: Computer Organization
Learning Objectives:-
- i) To learn fundamental concepts of computers, inputs ,outputs
- ii) To learn the concepts Operating System.
- iii) To learn the principle of Office Automation.
- iv) To learn the problem solving using Computers.

Unit –1 Introduction to Computer and Basic Organization (9)
Introduction, Definition of computer, characteristics, Block diagram - Input Unit, Memory Unit, Output unit, Central processing unit, Limitations and Advantages of Computer,
Types of Computers - Mini Computer, Micro Computer, Mainframe and Super Computers, Laptop and tablet.
Computer languages – Machine Language, Assembly Language, High Level Languages
Translators- Assembler, Compiler and Interpreter

Unit –2 Input, Output Devices (9)
Introduction, Concepts of Hardware and Software, Types of Software,
Input devices: - Keyboard, Scanner, MICR, OCR,
Pointing Devices- Mouse, Joystick, Touch Screen,
Output devices: - Monitor-LCD, LED and OLED, Printers – Dot-matrix, Inkjet, Laser, Line, Plotters, CPU-Types and Working of Hardware Parts-Motherboard, Ports, HDD, SMPS

Unit –3 Memory Concept and Computer Hardware (9)
Memory – Primary Storage and Secondary Storage devices-
Primary Storage Devices- RAM, ROM, PROM and EPROM
Secondary Storage devices-CD, DVD, Portable Hard Disk, Pen Drive
Basic Input and Output Settings (BIOS), Network Interface Card (NIC),
Graphic Card, Network protocols-HTTP, FTP, TCP/IP.

Unit –4 Problem Solving using Computer (9)
Problem-Solving, Writing Simple Algorithms, Algorithms Flowcharts,
Installation of Software's, Un-installation of Software's,
Modules of Windows – Windows Explorer, Control panel, Printer Manager.

Reference Books:-
1) Computer Today – Basandara 3rd Edition (Unit 1, 2)
2) Fundamental of computers --V. Rajaraman. (Unit 1, 2, 3, 4)
3) Computer Fundamentals --P.K. Sinha. 4thEdition (Unit 1, 2, 3, 4)

Learning Outcomes:-
i) Understand the basic concepts of computer hardware and software
ii) Understand the basic concepts of Input and output devises of computer system
iii) Understand the basic concepts of Operating System and its types
iv) Understand the basic concepts of Problem solving methods using Computer

BCSE-102: Computer Science
Paper-II: C Programming – I

Learning 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 Introduction to 'C' (9)

Algorithm, Characteristics, Flowcharts- Definition, Symbol, features, Running and debugging the program, History of 'C', Character set and keywords, Structure of 'C' programming, Constant and its type, Basics of Linux Operating System (Ubuntu) and 'C' programming Language, Introduction to GCC Compiler, VimEditor

Unit- 2 Input-Output Statements (9)

Variable and its Data types in 'C' Operators- Arithmetic, logical, relational, bitwise, increment, decrement, conditional, operator precedence.
Character input-output - getch(), getche(), getchar(), putchar() , String input-output - gets(), puts()
Formatted input-output - printf(), scanf().

Unit-3 Control Structures (9)

Conditional control statements- if, if else, nested if, else if ladder, switch .
Looping – for statements, nested for, while, do-while statements, nested while and do while, Infinite loop, Unconditional breaking control statements- break, continue, goto.

Unit-4 Arrays (9)

Definition and declaration of array, Features of Array, Initialization of array, Memory representation of array, Types of Arrays-Single Dimensional Array, Two Dimensional Array,
String functions (strcpy(), strcmp(), strcat(), strlen(), strrev()).

Reference Books:–
   1) ANCI 'C' – E. Balgurusamy (Unit 1,2,3,4)
   2) Let us C- Y. C. Kanetkar(Unit 1,2)
   3) 'C' programming- Dennis Ritchie
   4) Programming in C- Gottfried (Unit 1, 2, 3, 4)
   5) Programming in 'C'- Venugopal (Unit 1, 2, 3, 4)
   5) Let Us C – Yashwant Kanetkar , BPB Publications, Edition
   6) Programming in ANSI C, E. Balagurusamy McGraw Hill Education Edition 6
   7) Programming in C – Schuam outline Series
   8) The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2

Learning Outcomes:-
   1. Illustrate the flowchart and design an algorithm for a given problem and to develop IC programs using operators
   2. Develop conditional and unconditional statements to write C program.
   3. Exercise user defined functions to solve real time problems.
   4. Understand different concepts of Arrays.

BCSE- 103: Mathematics Paper-I
Discrete Mathematical Structure

Learning Objectives:-

    i. To learn fundamental concepts Counting Principal and Recurrence relation.
    ii. To learn the concepts of Logic and Boolean Algebra
    iii. To learn the principle of Recurrence relation.
    iv. Learn above concepts with Examples.

Unit – 1: Counting Principles (12)

    Counting: Addition & Multiplication principle, Permutation and Combination
        o Cardinality of finite set.
        o Cardinality of union of sets (Addition principle)
        o Principle of Inclusion and Exclusion. Examples.
    Combinatorial Arguments, Pigeonhole Principle (Statement only). Examples, Linear Recurrence relation with constant coefficient, Homogeneous solutions, Particular and Total solutions

Unit – 2 : Logic (08)

    Propositions and Logical connectives: Definition, Types of Propositions, Truth values and Truth Tables, Tautology and Contradiction, Logical equivalence, Rules of inferences Valid arguments and proofs, Methods of Proofs : Direct and indirect Quantifiers

UNIT – 3 Boolean algebra (10)

    Hasse-digram
    Lattice: Definition, principle of duality, Basic properties of algebraic systems defined by Lattices, Distributive and complemented lattices, Boolean lattices and Boolean algebras Boolean expressions and Boolean functions, Disjunctive and conjunctive normal forms and examples. , Switching circuit

Unit – 4: Recurrence Relations (06)

    Introduction, Linear recurrence relation with constant coefficient. Homogeneous solutions , Particular and Total solution

Reference Books:
1. A Text book of Discrete mathematics by S. R. Patil and others, NIRALI Prakashan (Unit- 1,Unit-2, Unit-3, Unit-4)

2. Elements of Discrete Mathematics by C.L. Liu
3. Discrete Mathematics by Olympia Nicodemi
4. Discrete Mathematical Structure for Computer Science by Alan Doer and K.Levasicur.
5. Discrete and Combinatorial Mathematics by R.m. Grassl
6. Discrete Mathematics by Kenneth Rosen,Tata McGraw Hill
7. Discrete mathematics by Bhopatkar, Nimbkar, Joglekar, VISION Publication.
8. Discrete mathematics by Naik and Patil, PHADAKE Prakashan

Learning Outcomes:

Unit 1:
  i. Demonstrate mathematical skills, analytical and critical thinking abilities.
  ii. Demonstrate comprehension of discrete structures and their relevance within the context of computer science, in the areas of data structures and algorithms.
  iii. Apply discrete structures into other computing problems such as formal specification, verification, databases, artificial intelligence, and cryptography.

Unit 2:
  i) Apply formal logic proofs or informal, logical reasoning to real problems, such as predicting the behavior of software or solving problems such as puzzles.
  ii) Communicate clearly and effectively using the technical language of the field correctly.
  iii) Develop a critical appreciation of the use of information and communication technology in mathematics

Unit 3:
  i. Define and evaluate polynomials.
  ii. Write and interpret mathematical notation and mathematical definitions.

Unit 4:
  i. Students will learn: some fundamental mathematical concepts and terminology;;how to use and analyses recursive definitions,
  ii. Student should know how to count some different types of discrete structures, techniques for constructing mathematical proofs mathematical concepts and principles to perform computations.

BCSE- 104: Mathematics Paper-I
Computational Algebra

Learning Objectives:-
  i. To learn fundamental concepts Relation and function with an Examples.
  ii. To learn the concepts Divisibility of integers
  iii. To learn the principle of Congruence Equation.
  iv. To learn the concepts of Groups with an examples

UNIT – 1 Relation and Functions   (12)
Functions : Definition, Types of mapping , Injective, Surjective & Bijective functions, Inverse function, Composition of functions, Ordered pairs, Cartesian product, Relations, Types of relations, Equivalence relation, Partial ordering, Digraphs of relations, matrix representation and composition of relations, Transitive closure, Warshall's algorithm, Equivalence class, Partition of a set

UNIT – 2 Divisibility of integers   (9)
Introduction, Divisibility : Definition and properties, Division algorithm (with proof), Greatest Common Divisor (g.c.d.), Least Common Multiple (L.C.M) ,Euclidean algorithm(Statement only) , Prime numbers, Euclid's Lemma, Fundamental theorem of Arithmetic (without proof)

Unit – 3 Congruence Equation   (7)
Congruence relation and its properties, Fermat's Theorem (Statement only), Examples, Euler's theorem, Euler's fi function and its properties (Statement only), Examples. Residue Classes: Definition, Examples, addition modulo n multiplication modulo n.

UNIT – 4 Groups   (8)

Binary operation: Definition, Definition of multiplication and addition modulo, Residue classes, Semi group and Monoids: Definition and examples, Group : Definition and examples.:-Simple properties of groups, Sub - Group: Definition and examples, Definition of Cyclic group and examples

Reference Books:
1. A Text book of Algebra and Calculus by S. R. Patil and Others Nirali Prakashan. (Unit- 1,Unit-2, Unit-3, Unit-4)
2. Algebra by Bhopatkar, Nimbkar, Joglekar, VISION Publication. (Unit- 1,Unit-2, Unit-3, Unit-4)
3 Algebra by Naik and Patil, PHADAKE Prakashan (Unit- 1, Unit-2, Unit-3, Unit-4)

Learning Outcomes:
Unit 1:
i.   Students will develop and apply concepts of expressions, equations and inequalities to investigate and describe relationships and solve problems.
ii.   Students will understand the basic algebraic functions in terms of fundamental concepts such as rate of change, input or output variables, domain & range, and parameters, and use multiple representations of functions.

Unit2:
i.   Add, subtract, multiply and divide fractions and real numbers.
ii.   Analyze and demonstrate examples of divisibility of real number.

Unit3:
i.   Create, use and analyze graphical representations of mathematical relationships.
ii.   Plot ordered pairs, Define properties of real numbers and use them to evaluate algebraic expressions.

Unit4:
i.   Analyze and demonstrate examples of subgroups, cyclic group.
ii.   Understand the use of parameters and variables, including appropriate replacement sets

BCSE- 105: Statistics
Paper-I: Computational Statistics-I

Learning Objectives:-
i.   To learn fundamental concepts of Statistics.
ii.   To learn the concepts of Data Condensation and Graphical Methods
iii. To learn the principle of Measures of central tendency and Measures of dispersion.
iv.   To learn the concepts Moments with an examples

Unit-1 Data Condensation and Graphical Methods: (8)

Definition, importance, scope and limitations of statistics w.r.to computer science.Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction of frequency distribution., Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive Curves and their uses, Box-Plot. Examples and problems.

Unit-2 Measures of central tendency: (10)

Concept of central tendency, Criteria for good measures of central tendency., Arithmetic mean: Definition, computation for ungrouped and grouped data, combined mean, weighted mean, merits and demerits., Median: Definition, formula for computation for ungrouped

and grouped data, graphical method, merits and demerits., Mode: Definition, formula for computing for ungrouped and grouped data, merits and demerits. ,Quantiles: Definition, formula for computation for ungrouped and grouped data, graphical method., Numerical problems.

Unit-3 Measures of Dispersion: **(10)**

Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion, Range and Quartile Deviation: definition for ungrouped and grouped data and their coefficients, merits and demerits, Mean Deviation: definition for ungrouped and grouped data, minimal property (statement only). , Standard deviation and Variance: definition for ungrouped and grouped data, coefficient of variation, combined variance and s.d. for two groups, merits and demerits. , Numerical problems

Unit-4 Moments : **(8)**

Raw and central moments: definition for ungrouped and grouped data (only first four moments), relation between central and raw moments (statement only), Sheppard's Correction., Measures of skewness: Types of skewness, Pearson's and Bowley's coefficient of skewness, Measures of skewness based on moments., Measures of Kurtosis: Types of kurtosis, Measures of kurtosis based on moments., Numerical problems.

Reference Books:-
1. Fundamentals of Statistics by Goon, Gupta, Das Gupta.(Unit-1,2,3,4)
2. Fundamental of Statistics by S. C. Gupta.(Unit-1,2,3,4)
3. Complete Business Statistics by Amir D. Aczel, JayalSounderpandian.(Unit-1,2,3,4)
4. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-1,2,3,4)
5. Basic Statistics by B. L. Agarwal.(Unit-1,2,3,4)
6. Statistical Methods by S. P. Gupta.(Unit-1,2,3,4)
7. Fundamental of Mathematical Statistics by Gupta and Kapoor.(Unit-1,2,3,4)

Learning Outcomes:
Unit1:
i)   To construct the data.
ii)   To classify and tabulate the data.
iii)   To summarize large data.
iv)   To demonstrate classified and tabulated data.
v)   To draw and interpreted various graphs and diagrams.
Unit2:
i)   To define mean, median, mode etc.
ii)   To compute and interpret measures of central tendency.
iii)   To analyses and interpreted the data.
Unit3:
i)   To define S.D., variance etc.
ii)   To compute and interpret measures of dispersion.
iii)   To analyses and interpreted the data.
Unit4:
i)   To define moment, Skewness etc.
ii)   To compute and interpret skewness and kurtosis.
iii)   To analyses and interpreted the data.
iv)   To demonstrate the shape, size and height of data.

BCSE- 106: Statistics
Paper-II: Statistical Methods-I

Learning Objectives:-
  i.   To learn fundamental concepts Probability with an examples.
  ii.   To learn the Theorems on probability
  iii. To learn the types of probability.
  iv. To learn the concepts of standard discrete probability distributions

Unit-1 Probability : (9)
  Idea of permutation and combination, concept of experiments and random experiments, Definitions: sample space, discrete sample space, continuous sample space, events, types of events, power set (sample space consisting at most 3 sample points). ,Illustrative examples., 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., 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 $A \subseteq B$, $P(A) \le P(B)$, v) $0 \le P(A \cap B) \le P(A) \le P(A \cup B) \le P(A) + P(B)$, Illustrative examples.

Unit-2 Conditional probability and independence of events: (10)
  Definition of conditional probability of an event, examples., Partition of sample space, Baye's theorem (only statement), concept of prior and posterior probability and examples., Concept of independence of two events, examples., 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., Pairwise and complete independence of three events, examples. Elementary examples.

Unit-3 Univariate probability distributions: (9)
  Definitions: discrete random variable, probability mass function (p.m.f.), cumulative distribution function (c. d .f.), properties of c.d.f., median, mode, p.g.f. and examples., Definition of expectation of a random variable, expectation of a function of random variable, variance. 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., Examples.

Unit-4 some standard discrete probability distributions: (8)
  Discrete uniform distribution: p.m.f., mean and variance, examples, Binomial distribution: p.m.f., mean and variance, additive property of binomial variates, recurrence relation for probabilities, examples., 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.

Reference Books:-
  1. Modern Mathematical Statistics by Edward J. Dudewicz, Satya N. Mishra.(Unit-1,2,3)
  2. Fundamentals of Statistics by S. C. Gupta.(Unit-1,2,3,4)
  3. Complete Business Statistics by Amir D. Aczel, Jayal Sounderpandian.(Unit-1,2,3,4)
  4. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-1,2,4)
  5. Basic Statistics by B. L. Agarwal.(Unit-1,2,3,4)
  6. Statistical Methods by S. P. Gupta.(Unit-1,2,3,4)
  7. Fundamental of mathematical statistics by Gupta and Kapoor.(Unit-1,2,3,4)
  8. Mathematical Statistics by J.E. Freund.(Unit-1,2,3)

Learning Outcomes:

Unit1:
- i)   To classify and tabulate the data.
- ii)   To define sample space, event, probability etc.
- iii) To compute probabilities by using definition and probability rules.

Unit2:
- i)   To classify and tabulate the data.
- ii)   To define probability, conditional probability, independent event etc.
- iii) To compute conditional probabilities by using definition and probability rules.

Unit3:
- i.   To define random variable, p.m.f., distribution functions etc.
- ii.   To explain mean, median, mode.
- iii. To compute mean, mode, median etc.

Unit4:
- i)   To compute and interpret statistical distributions.
- ii) To draw and interpreted the shape of discrete probability distributions.
- iii) To explain various discrete distributions.
- iv) To analyses and interpreted the data.
- v)   To compute probabilities by using discrete probability distributions.
- vi) To fit various statistical distributions.
- vii) To draw and analyses model sample for various distributions.

BCSE- 107: Electronics
Paper-I: Electronic Fundamentals for Computer

Learning objectives:-

i. It presents the principle of circuit analysis and design.
ii. To learn the basic concepts and characteristics of electronic devices and circuits.
iii. To understand AC sources, DC sources and their concept.
iv. To verify the theoretical concept through laboratory and simulation experiment.

Unit I: Basic Electricals   (9)

AC Sources, Concept of Single Phase, Three phase Power Supplies, RMS Value, Power Calculations, Fuses and protection circuits (MCB), Earthing, Cable (Types of Cables) DC Sources, Types of batteries, battery rating, charging.

Unit II: Discrete Components in Computer   (9)

Resistor, Capacitor, Inductor
Resistor: Classification, Construction of Carbon Composition Resistor, Color Code, Specification of Resistor.
Capacitor: Classification, Construction of Electrolytic Capacitor only, Specification of Capacitor.
Inductor: Types of Inductor, Uses.
Transformer: Types of transformers, Construction of Step down transformer and its Specifications.

Unit-III Theorems   (9)

Ohm's Law, Kirchhoff's Law, Applications of Kirchhoff's Law, Thevenin's theorem, Superposition Theorem, Norton Theorem, Maximum Power Transfer Theorem

Unit-IV Types of Motors   (9)

DC Motor, Brushless Motor, Stepper Motor, Servomotor, AC Motor, H- B

Reference Books:
1. A text of Applied Electronics, R. S. Sedha, S Chand Publication (Unit 1 & Unit 2)
2. Basic Electronics and linear circuits: N. N. Bhargava, D. C. Kulshreshtra, S. C. Gupta, Tata McGraw Hill Publication (Unit 1 & Unit 3)
3. Electronic Devices and Circuits: Boyistead, Tata McGraw Hill (Unit 1 & Unit 4)
4. Principle of electronics: V.K. Mehta, S. Chand and Company Ltd. 5th Edition
    a. (Unit 1,2,4)

Learning outcomes:-

Unit 1:
i. Understand the basic concepts of AC and DC Sources.
ii. Explain the concept of Single phase & three phase power Supplies
iii. Define the concept of Fuses and protection circuits.
iv. Design the circuit analysis for power supply.
v.

Unit 2:
i. Understand the basic discrete Components in Computer.
ii. Understand the different types of resistors and its construction.
iii. Understand the different types of Capacitors and its construction.
iv. Understand the different types of Inductors and its construction.
v. Explain the concept of types of transformers and its construction.

Unit 3:
i. Define the Network Theorem.

ii. Explain the concept of electrical network topology nodes ,branch,loops to solve the circuit problems.
iii. Verify the Thevenin's theorem and Kirchoff'sLaw,etc.
iv. Explain the concept of Ohm's Law

Unit 4:
i. Explain the basic concept of Motor.
ii. Define the types of Motors.
iii. Understand the concept of H-Bridge.
iv. Demonstrate the DC motor Concept.

BCSE- 108: Electronics
Paper-II: Discrete Electronics for Computer

Learning objectives:-
i. To understand the basic electronic components like resister active and passive component
ii. To observe the characteristics of diode like p-n junction, zener diode
iii. To observe the characteristics transistor, thyrister
iv. To understand the fabrication of electronic component Resistor, Capacitor, etc

Unit I: Diodes   (9)

P-N junction Diode,   Zener Diode, Schottkey Diode, LED, Photodiode.

Unit II: Electronic Devices   (9)
   Transistors: BJT, FET, MOSFET, UJT.
   Thyrister: SCR, TRIAC, DIAC.

Unit III: Audio, Video I/Os   (9)
   Bar Chart, Seven Segment Display, Dot Matrix Display, LCD, Optocoupler, Speaker, MIC, Buzzer

Unit IV: Fabrication Steps and Materials   (9)
   Fabrication of Electronic Components: Resistor, Capacitor, Diode, Transistor (NPN, PNP),
   P- Channel and N- Channel MOSFET.

Reference Books:
1. A text of Applied Electronics, R. S. Sedha, S Chand Publication (Unit 1 & Unit 2)
2. Basic Electronics and linear circuits: N. N. Bhargava, D.C. Kulshreshtra, S. C. Gupta, Tata McGraw Hill Publication (Unit 3)
3. Electronic Devices and Circuits: Boyistead, Tata McGraw Hill (Unit 1 & Unit 3)
4. Power Electronics, techmax publications by J.S.Katre (Unit 2 & Unit 4)

Learning outcomes:-
Unit 1:
i. Explain the basic concept of semiconductor diode .
ii. Define P-N Diode and Schottkey Diode.
iii. Explain the Concept of Zener Diode and their characteristics.
iv. Verify the characteristics of Diodes.

Unit 2:
i. Understand the basic concept of transistors used in computer system.
ii. Explain the structure of transistors.
iii. Analyze the concept of SCR and observe its characteristics.
iv. Analyze and design the basic operation of TRIAC.

Unit 3:
    i.   Understand the basic concept of bar chart and seven segments Display.
    ii.   Define Common anode and common cathode concept.
    iii.   Explain the construction of LCD and OptoCoupler.
    iv.   Explain the concept of Transducers.

Unit 4:
    i.   Design and analyze the basic operation of MOSFET.
    ii.   Understand the fabrication of basic electronic components.
    iii.   Demonstrate resistor fabrication.

BCSE- 109: English for communication -I

Learning Objectives:
1. To acquaint students with communication skills.
2. To inculcate human values among the students through poems and prose.
3. To improve the language and business competence of the students.

Module I: A. Communication and its types
B. Technology with a Human Face – E.F. Schumacher
C. How Beautiful - P. K. Padhy

Module II: A. Developing Vocabulary
B.As a Flower I Come - by Sundaram

Module III: A. Expansion of Ideas
B.I Have a Dream - Martin Luther King

Module IV: A. The Auspicious Vision- Tagore
                 B. The Book - Iftikar Rizvi

Course Outcomes:
1. The prescribed course equips students with nuances of language that includes proficiency in grammar, its effective usage in speaking and writing. It also develops their personality. ¬ It further helps them to prepare for various competitive exams and to keep up with the increasing demand of English in Indian society.
2. Vocabulary improves their communication and writing skills, and at the same time equipping them to use modern forms of communication. Elective English (BA) ¬ The study of elective subject of English.

Reference Books:
1. Shivaji University, Kolhapur, B.Sc. Part I (AECC) Compulsory English(CBCS)

BCSE-110:LAB1-COMPUTER
(Based on BCSE- 101 and BCSE- 102)

Learning Objectives:
  i.   To understand computer organization, keyboard operations , DOS Commands and Operating System concepts
 ii.   To understand programming and its roles in problem solving
 iii.   To understand and develop well-structured programs using C language
 iv.   To develop programming skills using the fundamentals and basics of C Language.

v. To teach the student to write algorithms and flowchart of programs in C and to solve the problems.

Part A: (**BCSE-101**)
1) Demonstration of Input Device.
2) Demonstration of Output Device
3) Demonstration of Pointing Devices
4) Demonstration of Memory Device
5) Demonstration of CPU.

Part B: (**BCSE-102**)
1) Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.
2) IF Then loop and demonstrate whether given number is even or odd.
3) Write a program to find out First Fifty Prime numbers.
4) Write a program to display Fibonacci series.
5) Write a program to reverse the given number.
6) Write a program to calculate sum and average of given n numbers using array.
7) Write a program to add two Matrices; Use two Dimensional array.
   8) Write a program which display following output-
   A B C D E
   A B C D
   A B C
   A B
   A

Learning Outcomes:-
i. Exercise different internal and external DOS commands.
ii. Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables.
iii. Explain Use of conditional and iterative statements to Write C programs.
iv. Explain Use of C programs using arrays.
v. Explain Use of C programs using functions.

Reference Books:
1. Let Us C – Yashwant Kanetkar, BPB Publications, Edition 15
2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6
3. Programming in C – Schuam outline Series
4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2

BCSE-111: LAB2 - MATHEMATICS
(Based on BCSE- 103 and BCSE- 104)

Learning Objectives:
1. To understand Recurrence relation, Switching Circuit
2. To develop skills of different Algorithms with an examples
3. To teach the student to write theorem and its proof with an examples.
4. To teach principles groups with examples.

I) Student should Explain and verify
   1. Recurrence relation with an example
   2. Switching Circuit with an example
   3. Combinatorial arguments with an example

4. Proofs of valid arguments using laws of inferences.
5. Representation of lattice. With an example
6. Euclid's algorithm, Division algorithm with an example
7. Fermat's theorem on remainder with an example
8. Warshall's algorithm with an example
9. Disjunctive and Conjunctive normal forms of Boolean expression with an example
10. Euler's fi function with an example
11. Representation of relation by matrix and diagraph.
12. Construction of group with an example
13. Congruence relation with an example
.

Learning Outcomes:

i. Understand the foundations of mathematics
ii. Student will able to perform basic computations in higher mathematics
iii. Student will able to read and understand middle-level proofs.
iv. Student will able to write and understand basic proofs
v. Develop and maintain problem-solving skills
vi. Use mathematical ideas to model real-world problems
vii. Acquire a knowledge of the history of mathematics
viii. Student will able to communicate mathematical ideas with other

BCSE-112: LAB3-STATISTICS
(Based on BCSE- 105 and BCSE- 106)

Learning Objectives:
i)   To construct the data.
ii)   To Understand the Graphical representation, Measures of central tendency and dispersion
iii)   Student will able to perform computations for Moments of Skewness and Kurtosis
iv)   To Understand the Probability different distributions.

1) Construction of frequency distributions.
2) Graphical Representation.
3) Measures of Central tendency (Ungrouped data).
4) Measures of Central tendency (Grouped data).
5) Measures of dispersion (Ungrouped data).
6) Measures of dispersion (Grouped data).
7) Moments, Skewness and Kurtosis (Ungrouped data).
8) Moments, Skewness and Kurtosis (Grouped data).
9) Computation of probability.
10) Computation of Conditional probability.
11) Computation of probability on Baye's Theorem.
12) Fitting of Binomial distribution.
13) Fitting of Poisson distribution.
14) Model sampling from Binomial distribution.
15) Model sampling from Poisson distribution.

Learning Outcomes:
i)   To construct data.
ii)   To draw and interpreted the graphs and diagrams.
iii)   To analyses and interpreted the data by various statistical techniques.
iv)   To compute probabilities.
v)   To fit various statistical distributions.
vi)   To draw and analyses model sample for various distributions.
vii)   To draw and interpreted the shape of discrete probability distributions.
viii)   To exhibit critical and creative thinking skills for analysis and evaluation of problems.
To demonstrate MS-Excel

BCSE-113: LAB4-ELECTRONICS
(Based on BCSE- 107 and BCSE- 108)

Learning objectives:-
i.   To understand the basic electronic components like resister active and passive component
ii.   To verify the different theorems.
iii.   To observe the characteristics of HWR, FWR, PN, FET, UJT etc.
iv.   To understand the PCB Designing Software
1. Study of Electronics components
2. Study of CRO
3. Verification of Kirchoff's Law

4. Verification of Thevenin's Theorem
5. Verification of Norton's Theorem
6. Study of Full wave Rectifier
7. Study of Half wave Rectifier
8. Study of PN junction Diode
9. Study of FET Characteristics
10. Study of Transistor as a switch
11. Study of SCR Firing using UJT
12. Study of PCB Designing using Software
13. Study of Phase shift control of SCR
14. Study of Zener diode as voltage regulator

Learning outcomes:-

i. To identify the basic electronic component
ii. To study the operations of multi-meter(Analog & digital) ,function generator, regulator power supply and CRO
iii. To verify Thevenin's Theorem, Norton's Theorem
iv. To understand and demonstration of PN junction Diode, Zener diode as voltage regulator etc.

Semester - II

BCSE-201: Computer Science
Paper-III: Operating System Concepts

Learning Objectives:-

    i.   To learn fundamental concepts of Network Basic Concepts

    ii.   To learn the concepts Operating System.

    iii.   To learn the principle of Office Automation.

    iv.   To learn the problem solving using Computers.

Unit -1: Operating System concepts   **(09)**

Definition and Functions of O. S. ,Types of O.S. –Single user, Multiuser.
Process Management-Multiprogramming, Multitasking, Multiprocessing, Time sharing.
Disk Operating System (DOS), Booting Processes , DOS commands, concept of directory and file.
Windows Operating system: Features of Windows O.S.
Open Source Operating System- Linux/Ubantu

Unit -2:Open Source Operating System (Ubantu /Linux)   **(09)**

Introduction to Linux, Comparison of Linux with Windows operating system.
Architecture of Linux,   Login, Logout, Shell, Kernel, GPU Commands (cal, date, who etc.)
Directory management(mkdir, cd, rmdir), File handling using Linux commands,
commands – ls, cat, cp, mv, rm ,Types of files, chmod command,
 Basic filter- head, tail, sort, grep.

Unit – 3: Shell Programming (10)

Introduction, Creating files using VI editor, Handling command mode, insert mode and ex
Mode, Concept of Shell scripting, Conditional statements-if, if else, case.
Looping-for, while, until, Continue and break statement, read, echo statement,
Writing and executing shell script

Unit – 4: Internet Concepts   **(08)**

Introduction of Internet,History of Internet,Uses and benefits, Introduction to different Web
Browsers, Internet Protocol(SMTP,POP,IMAP),Concept of Email, Working with Email(Compose
email, Send email, File Attachment, Uploading and Downloading)

Reference Books:–

    1) Web Publishing- Monica D'Souza & Jude D'Souza (BPB)(Unit 4)

    2) MS-Office Reference Book(Unit 2)

    3) Introduction to Computer and Data Processing- Pawar, Lad, Shinde, Patil (Dreamtech)
    (Unit 1, 2, 3, 4)

Learning Outcomes:-

    i) Understand the basics concepts of computer networks.

    ii) Study different MSOffice/Open Source Word Tools.

    iii) Study different MSOffice/Open Source Excel Tools.

    iv) Study different MSOffice/Open Source PowerPoint Tools.

BCSE-202: Computer Science
Paper-IV: C Programming–II

Learning Objectives:-
  i.   To Develop a Programming logic.
  ii. To teach basic principles of programming.
  iii. To develop skills for writing programs using 'C'.
  iv.

Unit- 1   Functions (9)
  Definition, declaration, prototype of function, Local and global variable, User defined
  functions
  Storage classes, Recursion, Call by value and Call by reference, Preprocessor

Unit-2 Pointers (09)
  Definition and declaration, Operations on pointer , Pointer initialization , Pointer And
  Function, Pointer And Array, Pointer of pointer, Dynamic memory allocation

Unit-3 Structures and Union (09)
  Definition and declaration, Array of structures, Passing structure to function, Pointer to
  structure , Nested structure, self-referential structure, Size of and typedef , Definition of
  Union and declaration, Difference between structure and Union

Unit-4 File Handling (09)
  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(), Formatted output- printf(), sprintf(), fprintf(),
  fwrite()
   Functions- fseek(), ftell(), fflush(), fclose(), fopen(), rewind()

Reference Books:-
        1) ANCI 'C' – E. Balgurusamy (Unit 1, 2, 3, 4)
        2) Let us C- Y. C. Kanetkar (Unit 1,2)
        3) 'C' programming- Dennis Ritchie
        4) Programming in C- Gottfried (Unit 1,2,3,4)
        5) Programming in 'C'- Venugopal(Unit 1,2,3,4)

Learning Outcomes:-
Unit1:
  i.   Study different basic concepts pointers in C
  ii. Understand the different concepts of operations on Pointers.
  iii. Describe C programs that use Pointers to access arrays and functions.
  iv. Describe C programs using pointers and to allocate memory using dynamic memory
       management functions.

BCSE- 203: Mathematics
Paper-III: Graph Theory and Algorithms

Learning Objectives:

i.   To understand the concepts of Graphs and operations on graphs with an examples
ii.   To understand the concepts of Tree graphs and directed graphs with an examples

Unit – 1: Graphs and operations on graphs (10)

Definition and elementary results, Types of graphs, Isomorphism, Matrix representation of graphs : Adjacency matrix and incidence matrix, Sub graphs and induced graphs Complement of a graph, Self complementary graphs, Union, intersection of graphs, Ring sum of two graphs

Unit – 2 Connected Graphs   (8)

Definitions: walk, trail, tour, path and circuit, Definitions of connected, disconnected graphs, Dijkstra's shortest path algorithm, Definition of Euler's and Hamiltan Graph and Example.

Unit-3 : Tree Graphs   (8)

Tree: Definition, 1 Theorem: A tree with n vertices has n -1 edges. 2 Theorem: A
Connected graph G with n vertices and n – 1, edges is a tree, 3 Theorem: A graph with n
Vertices is a tree if and only if it is circuit free and has n – 1 edges., 4 Theorem : A graph G is
a tree if and only if it is minimally connected., Center of a tree, Spanning tree: Definition and examples, Fundamental circuit and cut – set : Definition, Binary trees and elementary results, Kruskal's algorithm.

Unit - 4 : Directed Graphs   (10)

Definition, types of directed graphs, Directed (rooted) trees, arborescence and Polish notation, Isomorphism of digraphs, Connectedness in digraphs, Euler digraph, Network and flows: Definition, examples, Maximal flow algorithm.

Reference Books:

1. A Text book of Discrete mathematics by S.R.Patil and others, NIRALI Prakashan
   (Unit- 1, Unit-2, Unit-3, Unit-4)
2. Elements of Discrete Mathematics by C.L. Liu (Unit-2)
3. Discrete Mathematics by Olympia Nicodemi
4. Discrete Mathematical Structure for Computer Science by Alan Doer and K.Levasicur.
5. Discrete and Combinatorial Mathematics by R.m. Grassl
6. Discrete Mathematics by Kenneth Rosen, Tata McGraw Hill
7. Graph Theory with Applications to Computer Science and Engineering by

8. A First Step in Graph Theory by Raghunathan, Nimkar and Solapurrkar
9. Discrete mathematics by Bhopatkar, Nimbkar, Joglekar,
VISION Publication.
10. Discrete mathematics by Naik and Patil, PHADAKE Prakashan

Learning Outcomes:
Unit 1:

i.   Student able to formulate problems in terms of graphs, solve graph theoretic problems.
ii.   To understand the concepts of Graph and types of graphs

Unit 2:
    i.   Use mathematical definitions to identify and construct examples and to distinguish examples.
    ii.   To understand the concepts of
    iii.   problem solving methods using algorithms of graphs

Unit 3:
    i.   Solve problems using basic graph theory
    ii.   To understand the concepts of

Unit 4:
    iii.   Solve problems involving vertex and edge.
    iv.   Determine whether graphs are Hamiltonian and/or Eulerian

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BCSE- 204: Mathematics
Paper-IV: Computational Calculus

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Learning Objectives:
    i.   To understand the concepts of Successive differentiation
    ii.   To teach the student continuity and Mean value theorem
    iii.   To understand Sequences and series of real numbers

UNIT-1 Successive Differentiation (6)
n^{th} derivatives of some standard functions., Leibnitz's Theorem (with proof) and examples. L'Hospital's Rule (without proof) and examples

UNIT-2 Continuity and Mean value Theorems (11)
Continuity of a function and its properties defined on [a,b], (Properties without proof) Differentiability. Differentiability implies continuity but not conversely. ,Rolle's theorem(with proof) and its geometric significance and examples, Lagrange's Mean Value theorem(with proof) and its geometric, significance and examples., Cauchy's Mean Value theorem (with proof) and examples., Taylor's and Maclaurin's Theorems (without proof) Taylor's and Maclaurin's series, Series expansions of ex, sinx, cosx, log(1 + x) etc.

UNIT – 3 Sequences of real numbers (09)
Sequences of real numbers: Definition, examples, Convergent, divergent, oscillatory sequences, Bounded sequence: Definition and examples, Monotonic sequences. Theorems on monotonic and bounded sequences(statements only), Show that sequence $<(1+1/n)n >$ is convergent and its limit is ' e '., Convergence of sequence $<xn>$, where x $\in$ R, 0< x<1

UNIT – 4 Series of real numbers (10)
Partial sums, Convergent, Divergent series. Definition and examples, Convergence of geometric series (with proof)., Comparison Test and its limit form (for the series of positive terms), Convergence of p – series (without proof)., D-Alembert's Ratio Test (statement only) and examples., Root Test (statement only) and examples.

Reference Books:
1. A Text book of Algebra and Calculus by S. R. Patil and Others Nirali Prakashan. (Unit- 1,Unit-2, Unit-3, Unit-4)
2. Calculus by Dr. S.B. Nimse (Unit- 1,Unit-2, Unit-3, Unit-4)
3. Mathematical Analysis : Malik and Arrora
4. Real Analysis by R.G. Bartle,D.Sherbert, 3rd Edn, John Wiley & Sons,
5. Differential Calculus by Shanti Narayan, S.Chand& Co.

6. A text book of Calculus and Differential equations by Dinde H. T. ,Lokhande A.D.etc. SUMS publication.

Learning Outcomes:

Uni11:
    i.   Compute limits, derivatives of algebraic, trigonometric, piece-wise defined functions, logarithmic and exponential functions.

Unit2:
    i.   Apply the Fundamental Theorem of Calculus.

Unit3:
    i.   Determine the continuity and differentiability of a function at a point and on a set

Unit4:
    i)   Define the concepts of sequence and series, and determine limits of sequences and convergence of sequence and series.

BCSE- 205: Statistics
Paper-III: Computational Statistics-II

Learning Objectives:-
  i.   To learn fundamental concepts of Correlation and Regression with an examples.
  ii.   To learn the Multiple Regression and Partial Correlation with an examples

Unit-1 Correlation (for ungrouped data):   (12)
   Concept of bivariate data, scatter diagram. Concept of correlation, positive correlation, negative correlation, cause and effect relation., Karl Pearson's coefficient of correlation, Properties of correlation coefficient, interpretation of correlation coefficient., Spearman's Rank Correlation coefficient (formula with and without ties)., Numerical problems.

Unit-2 Regression (for ungrouped data):(10)
   Concept of regression. Derivation of lines of regression by method of least squares., Regression Coefficients and their significance. Properties of regression coefficients. Point of intersection and acute angle between regression lines (without proof)., Numerical problems.

Unit-3 Multiple Regression (For Trivariate Data):(15)
   Concept of multiple regressions. Yule's Notations., Residual: definition, order, properties, mean and variance of residual. , Fitting of multiple regression planes. Partial regression coefficients, interpretations., Numerical Problems.

Unit-4 Multiple and Partial Correlation (For Trivariate Data):(12)
   Concept of multiple correlation. Defination of multiple correlation coefficients and its formula., Properties of multiple correlation coefficients (Statements only)., Interpretation of multiple correlation coefficient when it is equal to zero and one., Concept of partial correlation. Defination of partial correlation coefficients and its formula., Properties of partial correlation coefficients (Statement only). , Examples and Problems.

Reference Books:-
   1. Fundamentals of Statistics by S. C. Gupta.(Unit-1,2)
   2. Complete Business Statistics by Amir D. Aczel, JayalSounderpandian.(Unit-1,3)
   3. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-1,2)
   4. Mathematical Statistics by J.E. Freund.(Unit-1,2)
   5. Basic Statistics by B. L. Agarwal.(Unit-1,2)
   6. Mathematical Statistics by J. N. Kapur, H. C. Saxena.(Unit-3)
   7. Statistics by D. N. Sancheti, V. K. Kapoor.(Unit-1,2,3,4)

Learning Outcomes:

Unit1:
   i.   To compute relation between two variables.
  ii.   To define correlation, types of correlation methods of correlation etc.
 iii.   To compute and interpret correlation, methods of correlation etc.
  iv.   To analyses and interpreted the data.

Unit2:
   i.   To compute relation among three variables.
  ii.   To define regression, lines of regression etc.
 iii.   To fit lines of regression by method of least square

iv.   To analyses and interpreted the data.
Unit3:
   i.   To define multiple regression.
  ii.   To fit plane of multiple of regression.
 iii.   To analyses and interpreted the data.
Unit4:
   i.   To define partial correlation, multiple correlation etc.
  ii.   To compute and interpret partial and multiple correlation
 iii.   To analyses and interpreted the data.

BCSE- 206: Statistics
Paper-IV: Statistical Methods-II

Learning Objectives:-
   i.   To learn concepts of Continuous Univariate Distributions.
  ii.   To learn the Exact sampling distributions with an examples
 iii.   To learn the Test of Hypothesis and Simulation with an examples

Unit-1 Continuous Univariate Distributions : (15)
Definitions: continuous random variable, probability density function (p.d.f.), cumulative distribution function (c.d.f.), properties of c.d.f. , Expectation of random variable, expectation of function of a random variable, variance, m.g.f. and examples.
Uniform distribution: p.d.f., c.d.f., mean, variance and examples. ,Exponential , istribution: p.d.f., c.d.f., mean, variance, lack of memory property and examples., Normal distribution: p.d.f., standard normal distribution, properties of normal curve, distribution of aX+bY, 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)
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. , Student's t distribution: definition, nature of probability curve, statement of mean and variance, approximation to normal, examples.,Snedecor's F- distribution: definition, mean and variance, inter-relationships between chi- square, t and F distributions, examples.

Unit-3 Test of Hypothesis:(10)
Definitions: random samples, parameter, statistic, standard error of a statistic., Concept of null and alternative hypothesis, types of error, critical region, level of significance, one sided and two sided tests, general procedure of testing of hypothesis., Large sample tests:
i) population mean ii) equality of population mean iii) population proportion.
Small sample tests: i) test for population variance, Chi-square test for goodness of fit and test for independence of attributes using 2×2 contingency table.
ii) t-test for testing population mean, equality of population mean and Paired t-test.
iii) F-test for equality of two population variances.,
Examples.

Unit-4 Simulation :(8)
Introduction to simulation merits and demerits, Pseudo-random number generator, model sampling from uniform and exponential distribution. Model sampling from normal distribution using Box-Muller transformation. Examples.

Reference Books:-
   1. Fundamentals of Statistics by S. C. Gupta.(Unit-3)

2. Modern Mathematical Statistics by Edward J. Dudewicz, Satya N.
   Mishra. (Unit-1,3)
3. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-3)
4. Mathematical Statistics by J.E. Freund.(Unit-3)
5. Basic Statistics by B. L. Agarwal.(Unit-1,2,3)
6. Fundamental of Statistics by Gupta and Kapoor.(Unit-1,2,3)
7. Statistics by V. K. Kapoor.(Unit-1,2,3)

Learning outcomes:
Unit1:
   i.   To define continuous random variable, p.d.f., distribution functions etc.
   ii.   To compute and interpret statistical distributions.
   iii.   To draw and interpreted the shape of continuous probability distributions.
   iv.   To explain various continuous distributions.
   v.   To analyses and interpreted the data.
   vi.   To compute probabilities by using continuous probability distributions.
   vii.   To fit various statistical distributions.
   viii. To draw and analyses model sample for various distributions.

Unit2:
   i.   To compute and interpret statistical distributions.
   ii.   To draw and interpreted the shape of continuous probability distributions.
   iii.   To explain various continuous distributions.
   iv.   To analyses and interpreted the data.
   v.   To compute probabilities by using continuous probability distributions.
   vi.   To fit various statistical distributions.
   vii.   To draw and analyses model sample for various distributions.
   viii. To draw and interpreted the shape of continuous probability distributions

Unit3:
   i.   To define statistic, parameter, test statistic etc.
   ii.   To explain procedure of testing of hypothesis.
   iii.   To explain the small sample and large sample tests in various situations
   iv.   To compute the small sample and large sample tests in various situations

Unit4:
   i.   To analyses and interpreted the data.
   ii.   To fit various statistical distributions.
   iii.   To draw and analyses model sample for various distributions.
   iv.   To Simulation study of various distributions.

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BCSE- 207: Electronics
Paper-III: Electronic Circuits for Computer

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Learning objectives:-
   i.   It presents the principle of circuit analysis and design.
   ii.   To learn the basic concepts and characteristics of electronic devices and circuits.
   iii.   To analyze transistor amplifier their frequency response
   iv.   To verify the theoretical concept through laboratory and simulation experiment

Unit I- Rectifier Circuits   (9)
Filters, Regulator (Zener and Positive Voltage Regulator, Negative Voltage Regulator), IC
7805, IC 7905, LM 317.

Unit II- Transistor Amplifiers   **(9)**

CE, CB, CC Amplifier, Transistor as Buffer, Transistor as Switch, MOSFET Amplifier.

Unit III- FET as VVR   **(9)**

UJT as Sweep Generator, Transistor Oscillator, Crystal Oscillator

Unit IV- Multivibrators   **(9)**

Transistor as Astable, Bistable and Monostable Multivibrator

Reference Books:
1. Electronic Device and Circuit by Rama Reddy, Narosa publication Delhi(Unit 3 &
   a. Unit 4)
2. A text book of Applide Electronic by R. S. Sedha, S Chand ublication (Unit 1 & Unit 2)
3. Principle of electronics: V.K. Mehta, S. Chand and Company Ltd. 5th Edition (Unit 1,2,3)
4. Power Electronics, techmax publications by J.S. Katre (Unit 2 & Unit 4)

Learning outcomes:-

Unit 1:
- i. Understand the concept of rectifier circuits.
- ii. Demonstrate the positive and negative voltage regulator.
- iii. Define the concept of Filters.

Unit 2:
- i. Explain the concept of Amplifier.
- ii. Understand the concept of CE,CB,CC amplifier.
- iii. Define Transistor as a Switch and Transistor as a buffer.
- iv. Define the concept of MOSFET amplifier.

Unit 3:
- i) Define the concept of VVR.
- ii) Explain UJT as sweep generator.
- iii) Understand the types of Oscillator.
- iv) Demonstrate Crystal Oscillator.

Unit 4:
- i) Explain basic concept of Multivibrator.
- ii) Demonstrate Transistor as Astable Multivibrator.
- iii) Define the concept of Monostable Multivibrator.
- iv) Verify the duty Cycle for Astable Multivibrator

BCSE- 208: Electronics
Paper-IV: Digital Fundamentals for Computer

Learning objectives:-
- i. To understand number representation and conversion between different representation in digital electronics circuit
- ii. To analyze logucproceses and implement logical operation using combinational logic circuit
- iii. To understand concept of sequential circuit and to analyze sequential system in terms of state machines
- iv. To implement the combinational and sequential circuit

Unit I: Number System AND Binary Codes   **(9)**

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 II: Logic Gates (9)
Logic gates-AND, OR, NOT, NOR, NAND EX-OR (Symbol, Expression and Truth Table) Boolean algebra and identities; De Morgan's theorem and Interconversion of logic Gates; Simplications of logic expressions using a) Boolean algebra), K-map.
Introduction to logic families: TTL NAND gate, input output parameters, tristate logic, Fan in; fan out, propagation delay, noise margin.

Unit III: Combinational Circuits (9)
Half adder, Full adder, half subtractor, Parallel adder, nibbles Adder; Arithmetic logic unit, Encoder, Decoder, Multiplexer, and Demultiplxer, concept of analog multiplexer.
Pin Configuration of 74153, 74156,7447,74138.

Unit IV: Sequential circuits (9)
Concept of sequential circuits; Latch, Flip-flops: RS, Clocked RS, JK, Master Slave JK, Counter-synchronous, asynchronous, up-down counter, modulo-N counter

Reference Books:
1. Digital Principals and applications- Malvino Leach, Tata McGraw Hill, 4th Edition (Unit 1)
2. Digital Electronics C.F.strahglo (Unit 1 & Unit 2)
3. Digital logic and Computer Design:Morris Mono.(Unit 3 & Unit 4)
4. Fundamental computers-V.Rajaraman (Unit 1 & Unit 2)

Learning Objectives:
Unit 1:
i) Understand the concept of Binary Number system used in computer.
ii) Understand the inter conversion from one number system to another number
iii) system.
iv) Define the concept of ASCII code, gray code,etc.
v) Explain the concept of parity.

Unit 2:
i) Understand the basic concept of Logic Gates.
ii) Verify the De Morgons theorem.
iii) Explain the concept of K-Map.
iv) Define the logic families and its characteristics.

Unit 3:
i) Analyze Logic processes and implement logical operations using Combinational logic circuits.
ii) Explain the concept of Adder.
iii) Demonstrate the Half adder.
iv) Define the concept of Analog Multiplexer.

Unit 4:
i) Define and implement Sequential Logic Circuits.
ii) Explain the concept of Flip/Flop .
iii) Understand the Concept of Counter.

BCSE -209- : English for communication –II

Learning Objectives:
1. To acquaint students with communication skills.
2. To inculcate human values among the students through poems and prose.
3. To improve the language and business competence of the students.

Module V: A. Telephonic Communication
   B. Lost Forest - Johannes Jensen
   C. Stopping by Woods - Robert Frost

Module VI: A. English for Specific Purposes
   B. Putting Data to Effective Use – Satish Tripathi

Module VII: A. Presentation Skills
   B. An Epithet- W. H. Davies

Module VIII: A. The Golden Touch -Nathaniel Howthone
   B. Night of the Scorpion

Course Outcomes:
1. The prescribed course equips students with nuances of language that includes proficiency in grammar, its effective usage in speaking and writing. It also develops their personality. ¬ It further helps them to prepare for various competitive exams and to keep up with the increasing demand of English in Indian society.
2. Vocabulary improves their communication and writing skills, and at the same time equipping them to use modern forms of communication. Elective English (BA) ¬ The study of elective subject of English.

Reference Books:
1. Shivaji University, Kolhapur, B.Sc. Part I (AECC) Compulsory English(CBCS)

BCSE-210: LAB5-COMPUTER
(Based on BCSE-201 and BCSE-202)
Learning Objectives:
   i. To understand computer programming and its roles in problem solving
   ii. To understand and develop well-structured programs using C language
   iii. To develop programming skills using the fundamentals and basics of C Language.
   iv. To teach the student to write algorithms and flowchart of programs in C and to solve the problems.
   v. To teach the student MS-Access and its concepts to database management.

Part A: (BCSE-201)
1. Starting and Stopping Linux: Booting a Linux System, Shutting Down a Linux System,.
2. Demonstration of Linux commands with attributes: - pwd, cd, ls, echo, clear, kill, ps, man, cal, date, who, who am I, wc, mkdir, rmdir, rm, sort.
3. Creation of Files, and changing their permission using chmode command.
4. Write a shell script which check given number is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified range of months.

6. Write a shell script which display date in the mm/dd/yy format.
7. Write a shell script which check given number is positive or not.
8. Write a shell script to find the sum of digits of a given number.
9. Write a shell script to find the factorial of a given number.
10. Create your E-Mail ID and send an E-mail
11. Login through your E-Mail ID and do the following:. Read your mail Compose a new
Mail , Send the Mail to one person , Send the same Mail to various persons ,Forward the
Mail. ,Delete the Mail ,Send file as attachment

Part B :(BCSE-202)
1) Student should explain program to reverse string using Pointer.
2) Student should demon state 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) Student should Write a program to separate even and odd numbers available in input file.
4) Student should Write a program to count the no. of words in a given text file.
5) Write a program which swap two number using call by reference.
6) Write a program to find given string is Palindrome or not using function.

Learning Outcomes:-
   i.   Exercise MS Word, MS Power point and
  ii.   Use various operations using Internet in detail.
 iii.   Write C programs using Pointers to access arrays, strings and functions.
  iv.   Write C programs using File functions and Graphics functions.

BCSE-211: LAB6-MATHEMATICS
(Based on BCSE-203 and BCSE-204)

I) Student should explain and verify
   1. Kruskal's algorithm with exapmple
   2. Dijkstra's Shortest path algorithm with exapmple
   3. Fundamental curcit and fundamental cut set with exapmple
   4. Polish prefix, Postfix, notations, arborescence with exapmple
   5. Ford Fulkerson Algorithm with exapmple
   6 Program on Ford Fulkerson Algorithm with an example
   7. Program on Shortest path Algorithm with an example.
   8. Program on Shortest path Algorithm with an example.
   9. Rolle's Theorem with an example
   10. Lagrange's Maean Value Theorem with an exaple
   11. Cauchy's Maean Value Theorem with an exaple
   12. Series expansion of $\log(1+x)$, e^x, sinx, cosx, $(1+x)^n$
   13. L'Hospital's Rule with an exaple
   14. Leibnitz's Rule with an exaple
   15. Convergence of monotonic sequence with an example

Learning Outcomes:
   i.   1. Students will be able to model and solve real-world problems using graphs
        and trees, both quantitatively and qualitatively.
  ii.   Apply mathematics to solve problems.
 iii.   Solve problems of rounding to the nearest whole number, place of decimal, cent,
        metre, kilogram etc.
  iv.   Apply methods of counting and tallying in practical situations 3. operate a
        calculator to solve problems

BCSE-212: LAB7-STATISTICS
(Based on BCSE-205 and BCSE-206)

Learning Objectives:
  i)   To understand the Computation of correlation, Fitting of different distribution
  ii)   To understand the Computation of partial correlation coefficients
  iii) To verify different Model sampling
  iv)   To understand Computation on different tests

1) Computation of correlation coefficient and scatter diagram.
2) Fitting of lines of regression (Ungrouped data).
3) Fitting of regression planes and estimation.
4) Computation of partial correlation coefficients.
5) Computation of 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 and ii) Box- Muller transformation.
10) Model sampling from Uniform distribution.
11) Model sampling from Exponential distribution.
12) Computation on Large sample test, Chi-square test
13) Computation on t-test, F-test.

Learning Outcomes:
  i)   To compute relation between two and three variables.
  ii)   To fit simple and multiple regression equations.
  iii)   To draw and interpreted the graph of bivariate data.
  iv)   To compute and interpret data by statistical techniques.
  v)   To demonstrate bivariate and multivariate data.
  vi)   To know the relations among the different distributions with real life situations.
  vii)   To compute probabilities by using continuous probability distributions.
  viii) To measure and analyses the data by various statistical techniques.
  ix)   To draw and interpreted the shape of continuous probability distributions.
  x)   To explain various continuous distributions, statistical distributions and model sample

BCSE-213: LAB8- ELECTRONICS
(Based on BCSE-207 and BCSE-208)

Learning Objectives:
- i)   To understand the use of Voltage Regulator
- ii)   To understand the concept of multivibrator
- iii)   To use different adder and multiplexer
- iv)   To Understand Counter and De-multiplexer

1. Positive Voltage Regulator using Three pin IC 7805
2. Negative Voltage Regulator using Three pin IC 7905
3. FET as VVR
4. Study of Astable/ bistable/ monostable multivibrator, Crystal Oscillator
5. Study of Logic Gate
6. Verification of De-Morgan's Theorem
7. Universal gate using NAND gate
8. Universal gate using NOR gate
9. Study of Full / Half Adder
10. Study of Half Adder, Multiplexer, Flip-Flop, Counter, De-multiplexer

Learning outcomes:-
- i.   To study the basic logic gates, combinational and sequential circuits
- ii.   To study the operations of multi-meter(Analog & digital) ,function generator, regulator power supply and CRO
- iii. To verify De-Morgans Theorem
- iv.   To understand and demonstration of analog and digital experiment

BCS-I Semester –I and II

Evaluation Pattern from June2019

- **Semester End Examination(SEE)**   **-30**
- **Continuous Comprehensive Evaluation (CCE)**   **-10**

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Semester End Examination   SEE (50Marks)

Total Mark – 60 Duration – 2 Hours

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Q.1 Multiple Choice Questions   10 marks.

Q.2 Broad Question (Attempt any Two out of Three)   20 marks.

Q.3 Short Question (Attempt any Four out of Six)   20 marks.

Continuous Comprehensive Evaluation CCE (20 Marks)

1) Offline test   **- 1**0 Marks

2) Online test   **-** 10 Marks

Criteria of Passing-(separate heads of passing)

1) 4 Marks out of 10 Marks for Internal Evaluation.

2) 20 Marks out of 50 Marks for Theory Examination.

Pattern of Question Paper

SEMESTER-I and II

Q. No.	Sub question	Type of Question	Based on Unit	Marks
Q.1	A	Four multiple choice questions with four alternatives to be set.	Prose and poetry units.	04
	B	Answer in one word/phrase/sentence each. (Skimming and scanning questions to be set.	Prose and poetry units.	04
Q.2	A	Answer the following questions in three to four sentences each (4 out of 6)	Prose and poetry units.	08
	B	Write short notes on the following in about seven to eight sentences each (3 out of 5)	Prose and poetry units.	09
Q.3	A	Questions to be set on A)Telephonic Communication	Module V A	08
	B	B)English for advertising	Module VII A	07
Q.4	A	Question to be set on English for specific purposes	Module VI A	05
	B	Question to be set on Prose and poetry	Module VI A	05

Chairman   **Principal**

Board of Studies in Computer Science   **Sadguru Gadage Maharaj College, Karad**