SEMESTER -I

BCA-1.1-AECC-1: ENGLISH-1

(English-I – Syllabus is decided by respective BoS)

BCA-1.2- AECC-2: MIL-1

(MIL – Syllabus is decided by respective BoS)

BCA-1.3- AECC-3: INDIAN CONSTITUTION

(Indian Constitution – Syllabus is decided by respective BoS)

BCA-1.4 - DSC-1A: COMPUTER CONCEPTS AND 'C' PROGRAMMING

Total: 48 Hrs

UNIT 1:

Computer Concepts: Block diagram of computer system, Central Processing Unit (CPU), ALU, CU, Main memory, Input/Output Unit, Input devices:- Keyboard, Mouse, Light pen, Joystick, Scanner, Digitizer. Output devices- Various types of printers, Plotters, Software: System software, Operating System, Application Software, Machine level language, Assembly language, high level programming, Assemblers, compilers and editors, Merits and demerits of all the languages.

(4 Hrs)

UNIT 2:

Computer Programming: Basics Programming concepts- Algorithm, Flowchart. **Overview of C:** Introduction, Importance of C, Sample 'C' programs, Basic structure of C programming, Programming Style, Executing a 'C' program **Data Types in C:** C tokens, Keywords, Identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants, Simple Programs. **Input and Output statements:** Input and Output statements, Reading character, Writing character, formatted input, formatted output statements**.**

(13 Hrs)

UNIT 3:

Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operators, Bitwise operators, Special operators, Type Conversion in expressions, Operator precedence, Mathematical functions**.** **Branching and Looping:** Simple 'if' statement, Simple, Nested, Ladder 'if–else' statement. The 'Switch' statement, The ?; operator, GOTO statement, The 'While' statement, 'do-while' statement, 'for' statement, Simple programs on branching and looping.

(11 Hrs)

UNIT 4:

Arrays: Introduction, One dimensional, Two dimensional and Multi dimensional arrays. Initialization of arrays. **Handling of Character Strings:** Declaring and Initializing string variables, reading string from terminal, writing string to screen, Arithmetic operations on characters, putting strings together, Comparison of two strings, string handling functions: strlen, strcpy, strcat, strcmp.

(8 Hrs)

UNIT 5:

Functions: Definition of function. Return values and their types, Function calls, Function declaration, Categories of function explanation with example, Nesting of function, Recursion, Faction with arrays. Structure and Union: Introduction, Defining Structure, declaring structure variables and structure members, arrays as structure, arrays within structure, Union. Pointers: Understanding Pointers, Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through its pointers.

(12 Hrs)

Text Books:

1. Balaguruswamy: Programming in ANSI C, Tata Mc Graw-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie: The C Programming Language, PHI

Reference:

1. Rajaraman: Fundamentals of Computers, PHI(EEE).
2. Kamthane, Programming with ANSI and Turbo C, Pearson Education, Asia.
3. Herbert Schildt: C. The complete reference, 4th edition.
4. Yeshwant Kanetkar: Let us C, BPB Publications.
5. Rajesh Hongal: Computer Concepts and C Programming.

BCA-1.5- DSC-2A: INTRODUCTION TO LINUX

Total: 48 Hrs

UNIT 1:

Introduction to Unix: Brief History, What is Unix?, Unix Components, Using Unix, Commands in Unix, Some Basic Commands, Getting Help, Command Substitution, Giving Multiple Commands, Aliases.

(8 Hrs)

UNIT 2:

Files and File Organization: Unix Files, Categories of Files, Hidden Files, File System, Path Names, Home Directory, Directory Commands, File Related Commands, Wild Cards, Displaying the Contents of a File, Printing of Files, Comparing Files. **File Attributes and Permissions:** Ownership of Files, File Attributes, File Command, Changing File Permission, Changing the Owner of a File, Changing the group of a File, Times Associated with a File, umask Command.

(10 Hrs)

UNIT 3:

The vi Editor: vi Editor, Editing with vi, Moving the Cursor, Editing, Copying and Moving Text, Pattern Searching, Repeating the Last Editor Command, Undoing Commands, Joining Lines, Writing Selected Lines onto a Separate File, Using the Shell from vi, Configuring the vi Environment.

(10 Hrs)

UNIT 4:

Regular Expressions : grep Family of Commands and sed : Regular Expressions, grep Family, egrep Command, fgrep Command, Stream Editor-sed.

(5 Hrs)

UNIT 5:

Shell Programming : Shell Variables, export Command, .profile File – A Script Run during Starting, The First Shell Script, read Command, Positional Parameters, The $? Variable – Knowing the Exit Status, More about the set Command, exit Command, Branching Control Structures, Loop-Control Structures, continue and break Statements, expr Command, Real Arithmetic in Shell Programs, The here Document (<<), sleep Command, Debugging Scripts, script Command, eval Command, exec Command.

(15 Hrs)

Text Books:

1. M.G.Venkateshmurthy: Introduction to Unix & Shell Programming, Pearson Education

Reference Books :

1. John Goerzen: Linux Programming Bible, IDG Books, New Delhi.
2. Sumitabha Das: Your Unix - The Ultimate Guide, TMH.
3. Richard Petersen: The Complete Reference – Linux, McGraw-Hill
4. Yashwant Kanetkar: Unix & Shell programming – BPB

BCA-1.6- DSC-3A: FUNDAMENTALS OF MATHEMATICS FOR COMPUTER

Total: 48 Hrs

UNIT 1:

Trigonometric Functions: Introduction, Angles, Trigonometric Functions, Trigonometric Functions of Sum and Difference of two Angles, Trigonometric Equations.

(5 Hrs)

UNIT 2:

Complex Number and Quadratic Equations: Introduction, Complex Number, Algebra of Complex Number, The Modulus and Conjugate a Complex Number, Argand Plane and Polar Representation, Quadratic Equations.

(10 Hrs)

UNIT 3:

Fundamental principles of counting: The rules of sum and product, Permutations, combinations, the binomial theorem, combinations with repetitions.

(9 Hrs)

UNIT 4:

Fundamental of Logic: Basic connectives and truth tables. Logical equivalence, the laws of logic, logical implication, rules of inference, use of quantifiers, quantifiers, definitions and proofs of theorems.

(15 Hrs)

UNIT 5:

Set Theory: sets and subsets, set operations and laws of set theory, counting and venn diagram, Probability.

(9 Hrs)

Text Books :

1. Ralph. P. Grimaldi, Discrete and Combinational Mathematics, An applied introduction, Pearson Education(LPE) Fourth edition, 4th Indian Reprint.
2. Kolman, Busby & Ross, Discrete Mathematical 5/e, Pearson Education .
3. P.G. Umarani & B.G. Umarani: A Text of Mathematics for PUC I & II.

Reference Books:

1. C. L. Liu, Elements of Discrete Mathematics, McGraw Hill, 1985.
2. Richard Johnsonbaugh, Discrete Mathematics, 5th Edition, Pearson Education, 2003.
3. Rajendra Akerkar and Rupali Akerkar, Discrete Mathematics, Pearson Education, 2004
4. B.M. Shrinivasrao: A Text book of Mathematics: Excellent Publication.
5. H.S. Hali & S.R. Knight: Higher Algebra, Surjeet Publications(1988).
6. Shanti Narayan: Differential Calculus. S. Chand & Co.
7. S. L. Loney, Trigonometry, Surjeet Publication.

BCA-1.7- DSC-1A(Pr): C- PROGRAMMING LAB

Programs:

1. Write a C program to find the area of a circle given radius.
2. Write a C program to find the area of a triangle given three sides.
3. Write a C program to calculate simple interest and compound interest.
4. Write a C program to convert temperature in Fahrenheit to Celsius and Celsius to Fahrenheit.
5. Write a C program to find the GCD and LCM of two integer numbers.
6. Write a C program to check whether the given integer is even or odd using if condition statement.
7. Write a C program to accept two integers and determine in which quadrant it lies using if ladder.
8. Write a C program to simulate a simple calculator with addition, subtraction, multiplication, division and it should display the error message for division for 0 using switch case.
9. Write a C program to print number from 100 to 200 which are divisible by 7 and display their sum and count using for loop.
10. Write a C program to reverse a given integer number and check whether the number is palindrome or not using while loop.
11. Write a C program the pattern given below using nested for loop
12. Write a C program to read N integers (zero, positive and negative) into an array and find sum of positive numbers, sum of negative numbers and average of all numbers.
13. Write a C program to find the addition and subtraction of two matrices.
14. Write a C program to calculate the factorial of a number using function.
15. Write a C program to find if a character is alphabetic or numeric or special character.
16. Write a C program to count the number of vowels, consonants and special characters in a given sentence.
17. Write a C program to accept a sentence and convert all lowercase letters to uppercase letters and vice-versa.
18. Write a C program to find the length of a string using user defined function.
19. Write a program to accept different goods with the number, price and date of purchase, finally display them (using structure).
20. Write a C program to implement array using pointers.

Note: All programs should be carried out on UNIX/LINUX platform

BCA-1.8- DSC-2A(Pr): LINUX LAB

Programs:

1. Study Experiment- UNIX basics
2. Basic Shell Programming (Fibonacci Series generation, Factorial of a given number, Checking for Armstrong number)
3. Designing a Arithmetic calculator
4. Generation of Multiplication table
5. Base Conversion (Decimal to Binary, Binary to Decimal) 6. Checking for a Palindrome of a number
6. Finding the information about the Login name and File name
7. Write a shell script to exchange the contents of two variables.
8. Write a shell script, which accepts three subject marks scored by a student and declare the result.
9. Write a shell script program to find area of a square, rectangle, circle and triangle.
10. Write a shell script to print integer numbers from 1 to 20.
11. Write a shell script to perform arithmetic operation on two number depending on +, -, * and /.
12. Write an interactive shell script to display a menu and perform the following task:

i. Renaming a file ii. Deleting a file iii. Copying a file iv. Exit

13. Write a shell script which counts the number of lines in a file.
14. Write a shell script to accept three command line arguments and display each one of them.
15. Write a c program to a. Display the PID of parent and PID of child. b. Copy the contents of one file into the other using command line arguments.
16. Write a shell script program to check whether the given file is present in a directory and check what is all the permission given for the owner.
17. Write a shell script program to read 2 filename and check which 1 is newer and which is older.
18. Write a shell script program to find the number of directory files and ordinary files in the current directory.

SEMESTER -II

BCA 2.1-AECC-4: ENGLISH-2

(English – Syllabus is decided by respective BoS)

BCA 2.2-AECC-5: MIL-2

(MIL – Syllabus is decided by respective BoS)

BCA 2.3-AECC-6: HUMAN RIGHTS AND ENVIRONMENTAL STUDIES

(HR & ES – Syllabus is decided by respective BoS)

BCA 2.4-DSC-1B: FUNDAMENTALS OF ALGORITHMS

Total: 48 Hrs

UNIT 1:

Introduction to computer problem solving: Introduction, the problem solving aspects, Top-down design, Implementation of Algorithms, program verification, The Efficiency and Analysis of Algorithm.

(6 Hrs)

UNIT 2:

Fundamentals of Algorithms: Exchanging the values of two variables, Counting, Summation of set of Numbers, Factorial Computation, Sine function computation, Generation of Fibonacci Sequence, Reversing the Digits of an Integer, Base conversion, character to number conversion

(8 Hrs)

UNIT 3:

Factoring Methods: Finding the Square Root of a Number, The Smallest Divisor of an Integer, The Greatest Common Divisor of two Integers, Generating Prime Numbers, Computing the Prime Factors of an nteger, Generation of Pseudo-Random Numbers, Raising a Number to a Large Power, Computing □□□Fibonacci number.

(10 Hrs)

UNIT 4:

Array Techniques: Array Order Reversal, Array Counting, Finding the Maximum Number in a Set, Removal of Duplicates from an Ordered Array, Partitioning an Array, Finding the □□□ Smallest Element.

(12 Hrs)

UNIT 5:

Merging, Sorting, Searching: The two-way Merge, Sorting by Selection, Sorting by Exchange, Sorting by Insertion, Sorting by Partitioning, Linear Search, Binary Search.

(12 Hrs)

Text Books:

1. R.G. Dromey: How to Solve it by Computer, Pearson Education.

Reference Books:

1. N. Writh : Algorithms and Data Structures, Oberon version, 2004.
2. Alan Gibbons: Algorithmic Graph Theory, Cambridge University Press.
3. M.C. Goulmbic: Algorithmic Graph Theory and Perfect Graphs, 2nd edition, Elsevier, 2004

BCA 2.5-DSC-2B: NUMERICAL AND STATISTICAL METHODS

Total: 48 Hrs

NUMERICAL METHODS:

UNIT 1:

Solution of equations (polynomial and transcendental equations), Interval halving methods, secant, Regular Falsi, Newtons-Raphsons methods, fixed point iteration methods, Solutions of system of linear equations, Gaussian elimination method, Gauss- Jordan, Gauss-Siedal iteration methods LU Decomposition method, Eigen values and Eigen vectors of a Square matrix.

(14 Hrs)

UNIT 2:

Newton's forward and backward differences, Interpolation formula- Lagrange interpolation, Curve fitting by least squares method, Numerical Differentiation, Integration, Trapezoidal and Simpson's formula. Romberg integration**.**

(9 Hrs)

STATISTICAL METHODS:

UNIT 3:

Basic Concepts and Definition of Statistics, Mean, standard deviation, Coefficient of variation, Skewness and Kurtosis, Carl Pearson Correlation, rank Correlation and illustrated examples**. Probability:** Basic concepts and definition of probability axions, Laws of Probability (based on set theory concepts), Conditional probability Boy's theorem, Problems and applications.

(**12 Hrs)**

UNIT 4:

Random variable and Expectation: Discrete and continuous random variables, expectation of random variables, theorems on expectation, illustrative examples, Probability Distribution: Probability function, probability mass / density function, Discrete Distribution- Bernoulli Binomial, Geometric distributions, Continuous distribution- Exponential, normal and Weibul Distribution, applications and problems.

(10 Hrs)

UNIT 5:

Reliability: Basic concepts and definition of reliability, hazard, IFR and DFR, parallel and series system, Application and problems.

(3 Hrs)

References:

1. M. K. Jain, SRK Iyengar and R. K Jain Numerical methods for Scientific and engineering computation: Wiley Eastren(1998).
2. S. S. Shastry: Introductory methods of numerical Analysis PHI(New Delhi) 2001.
3. K. S Trevedi (1998) Probability and statistics with Relability Queing and computer Science application Prentice Hall of India, Pvt Ltd, New Delhi.
4. Vik Kapoor & Gupta: Mathematical statistics S. Chand & Co., New Delhi.
5. S. K. Shina & B. K. Gale: Theory & Relability.

BCA 2.6-DSC-3B: FUNDAMENTALS OF DIGITAL LOGIC

Total: 48 Hrs

UNIT 1:

Number system and codes: Binary number system, decimal number system, octal number system, hexadecimal number system. Bases inter conversions. Representation of negative numbers 1's and 2's complements. Codes: BCD, GRAY, EXCESS-3.

(4 Hrs)

UNIT 2:

Boolean algebra and logic systems: Laws of Boolean algebra, Boolean laws. Evaluation of Boolean expression, De Morgan's theorems and proof, simplification on Boolean expressions using Boolean laws Basic gates (AND, OR, NOT): truth table, Definition, Boolean expression and symbols, universal gates (NAND, NOR): truth table, definition, Boolean expression and symbols, design of basic gates using NAND and NOR gates. Logical gates using NAND and NOR, Design of given Boolean expression using basic gates or NAND gate or NOR gate. XOR and XNOR gate (Definition, Boolean expression and symbols, truth table).

(10 Hrs)

UNIT 3:

Simplification of Boolean functions: SOP and POS form, min term and max term, expression of Boolean equation in Min and Max term (conversion of SOP and POS forms to standard form) K-map method: Rules, simplification of Boolean equation using K-map (up to 4 variables), without and with don't-care condition, Implementation using basic gates or NAND gate or NOR gate, Quine - Mc Cluskey Tabulation method, determination and selection of prime implicates.

(12 Hrs)

UNIT 4:

Combination logic: Design procedure, design of half adder and full adder, half subtract or and full sub tractor. Code converters:- BCD to Excess 3 code, gray code, magnitude comparator, encoders (BCD to decimal), decoder (decimal to BCD), multiplexer(4:1 and 8:1), de-multiplexer(1:4 and 1:8).

(08 Hrs)

UNIT 5:

Sequential logic: Introduction, Flip-flops – SR, JK, D, T, JK-MS (Detailed Study) Registers – Introduction, shift register- types and applications. Counters – synchronous and asynchronous counters (Up, down, up down).

(14 Hrs)

Text Book:

1. M. Moris Mano, Computer System Architecture, 2nd Edition, Prentice Hall of India.

Reference:

1. Heuring and Jordan, Computer systems design and architecture, Pearson Education
2. William Stallings, Computer Organization and Architecture, Pearson Education 2003.
3. Andrew S Tenenbaum, Structured Computer Organization, 3rd Edition, Prentice Hall of India(1990).

BCA 2.7-DSC-1B(Pr): ALGORITHMS LAB

Programs:

1. Write a function that accepts N integers to find maximum and minimum element in an 1 to N integers.
2. Write a C program to find N Fibonacci Series.
3. Program to read N (minimum 5) students marks and find number of students passed and fail depending on the marks.
4. Write a C program to find the roots of the given quadratic equation using nested if statement.
5. Write a C Program to compute $x^n/_{n!}$
6. Program to convert binary number to decimal.
7. Program to find Geometric Mean G.M=$\sqrt[n]{(x1Xx2Xx3Xx4 \ldots . xn)}$
8. Program to iteratively compute the reciprocal of a number.
9. Check whether given number is Armstrong or not
10. Generate N prime numbers.
11. Partition given array into two sub array and print each sub array elements.
12. Program to remove duplicates from an ordered array.
13. Program to merge two separate array into single array.
14. Sort the array elements by using Exchange. Selection and Insertion
15. Binary search using recursive as well as iterative techniques.
16. Write a C program to reverse the digits of an integer and characters of the string.
17. Write a C program to display all possible permutations of given input string – if the string contains duplicate characters, you may have multiple repeated results. Input should be of the form permute string and output should be a word per line. sample: cat: cat, cta, act, atc, tac, tca
18. Write a C program design and implement scientific calculator using math and string functions.

Note: All programs should be carried out on UNIX/LINUX platform

BCA 2.8 -DSC-2B(Pr): NUMERICAL AND STATISTICAL METHODS LAB

Programs:

Numerical Methods Programs

1. Program to check whether the given matrix is singular or not.
2. Program to find the root of the equation using Bisection Method.
3. Program to find roots of an eqn f(x) =0 using Regular-Falsi Method.
4. Program to find the root of the equation using Newton Raphson Method.
5. Program to solve the system of equation Ax = B using Gauss Elimination Method.
6. Program to solve the system eqn Ax = B using Gauss Jacobin Method.
7. Program to solve the system eqn Ax = B using Gauss Seidel Method.
8. Program to find integral of a function using Trapezoidal rule.
9. Program to find integral of a function using Simpson's $1/3_{rd}$ rule.
10. Program to find integral of a function using Simpson's $3/8_{th}$ rule.

Statistical Methods Programs

1. Program to construct a discrete frequency distribution table and find the mean and standard deviation.
2. Program to construct a continuous frequency distribution table and find the mean and standard deviation.
3. Program to find the mean, mode and median of continues frequency distribution.
4. Program to find the Karl Pearson correlation coefficient between two variables.
5. Program to find AM, GM, HM for given set of observation.
6. Program to calculate GM for tabulated data.
7. Program to calculate combined AM and find HM for continuous set of data
8. Program to calculate combined SD.
9. Program to calculate median for raw set of data.
10. Program to find median for tabulated data.

Note: All programs should be carried out on UNIX/LINUX platform