

BODOLAND UNIVERSITY
BCA (Bachelor of Computer Application)
Year 2016

SL. NO.	CORE COURSE (14)	ABILITY ENHANCEMENT COURSE (AECC) (2)	SKILL ENHANCEMENT COURSE (SEC) (2)	ELECTIVE: DISCIPLINE SPECIFIC DSE (4)	ELECTIVE: GENERIC (GE) (4)
I	C1 :Computer fundamental & ICT Hardware (4+4 lab)	AECC:1 (English/Hindi/MIL Communication)			GE:1 Computer Fundamentals
	C2: Introduction to C Programming (4+4 lab)				
II	C3: Mathematics-I	AECC:2 Environmental Science			GE:2 Introduction to Programming
	C4: Data Structure & Algorithm (5+1 lab)				
III	C5: Computer based Accounting & financial Management (4+4 lab)		SEC 1: Oracle (SQL/PL-SQL)		GE:3 Computer Networks and Internet
	C6: Digital Logical Fundamentals				
	C7: Mathematics-II				
IV	C8: Software Engineering		SEC 2: UNIX/LINUX Programming		GE:4 Multimedia and Applications
	C9: Computer Organization and Architecture				
	C10: Data Base Management System (4+4 lab)				
V	C11:Object oriented Programming in C++ (4+4 lab)			DSE 1: Digital Image Processing	
	C12: Operating System (5+1 lab/Tutorial)			DSE 2: Numerical Methods	
VI	C13: Web Technology (4+4 lab)			DSE 3: System Programming	
	C14: Computer Networks and Internet			DSE 4: DISSERTATION/PROJECT WORK	

DETAILED SYLLABUS

SEMESTER – I

BCA. C1. COMPUTER FUNDAMENTAL & ICT HARDWARE

Total marks: 100 (Semester end examination - 60, Practical- 20, Internal assessment - 20)

UNIT I

Evolution of Computer system, Classification of Computer, Modern Computer, Hardware and Software. Major components of a Digital Computer.

Number System: Representation of numbers , Representation of signed integers, Sign and magnitude, 1^s complement and 2^s complement representation, conditions for overflow/underflow and its detection.

Assembler, Compiler, Interpreter, Linker and Loader. Definition and concepts of algorithm and its different implementations-pseudo code, flowchart and Computer programs.

UNIT II

Hard Disk Drive: logical structure and file system, Hard disk tools: Disk cleanup, error checking, de fragmentation, scanning for virus, formatting, installing additional HDD. New trends in HDD.

UNIT III

Optical Media, CDROM, theory of operation, drive speed, buffer, cache, CD-r, CD-RW, DVD ROM, DVD technology, preventive maintenance for DVD and CD drives, New Technologies, Driver installation, Writing and cleaning CD and DVD.

UNIT IV

Processor: Intel processor family. Latest trends in processor, Motherboard, Sockets and slots, power connectors. Peripheral connectors. Bus slots, USB, pin connectors. Different kinds of motherboards. RAM. Cache and Virtual Memory concept.

UNIT V

SMPS. BIOS. Network Interface Card, network cabling, I/O Box, Switches, RJ 45 connectors, Patch panel, Patch cord, racks, IP address.

SUGGESTED READINGS:

1. Anita Goel, *Computer Fundamentals*, Pearson, 2010.
2. *Comdex: Hardware and Networking Course Kit.*, DreamTech press.
3. V. Rajaraman, Neeharika Adabala, *Fundamentals of Computers*, PHI, EEE 6th Edition.
4. Ron Gilster, *PC hardware: A beginners Guide*, Tata McGraw Hill.
5. E. Balaguruswamy, *Computer Fundamentals and C Programming*, Tata McGraw Hill.

LABORATORY

Practical Assignments covering paper BCA. C1. (Computer Fundamentals & ICT Hardware) - 40 marks (At least 6 assignments have to be done by each student from the following list.)

Objectives: The Practical introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like Windows OS, LINUX OS, and device drivers. Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, Using wildcards In addition hardware and software level troubleshooting process, tips and tricks would be covered.

Different ways of hooking the PC on to the network and internet from home and workplace and effectively usage of the internet. Configuring the TCP/IP setting. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

List of Experiments/Tasks:

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Basic commands in Linux

Task 6: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Task 7: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 8: The test consists of various systems with Hardware / Software related troubles, formatted disks without operating systems. Installation of antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

BCA. C2. INTRODUCTION TO C PROGRAMMING

Total marks: 100 (Semester end examination-60, Practical -20 Internal assessment - 20)

UNIT I

Overview of C

C program structure, executing C program. Variables, Data Types, Constants, Character set, C tokens, variables declaration, Assigning values to variables---Assignment statement, declaring a variable as constant, as volatile.

Operators and Expression

Categories of operator- Arithmetic, Relational, logical, assignment, increment, decrement, conditional, bitwise and special operators; arithmetic expressions, precedence and associativity of operators, type conversions, mathematical functions

Managing Input and Output Operators

Reading and writing a character, formatted input, formatted output.

UNIT II

Decision Making and Branching Statement

if statement, *if.....else* statement, nested *if.... else* statement , *switch....case* statement, *goto* statement.

Decision Making and Looping

Definition of loop, categories of loops, *for* loop *while* loop, *do-while* loop, *break* statement, *continue* statement

UNIT III

Arrays

Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays.

Functions

The form of C functions, Return values and types, return statement, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference

Unit IV

Structures and Unions

Defining, giving values to members, initialization and comparison of structure variables, array of structure, array within structure, structure within structure, structures and functions, unions.

Preprocessors

Macro substitution, file inclusion.

Unit V

Pointers

Definition of pointer, declaring and initializing pointers, accessing a variable through address and through pointer, pointers and arrays, pointers and functions, pointers and structures.

File Management in C

Opening, closing and I/O operations on files, random access to files, command line arguments.

SUGGESTED READINGS:

1. Byron Gottfried, Schaum's *Outline Programming with C*, Second Edition, Tata McGraw-Hill
2. Yashavant Kanetkar, *Let Us C*, Eighth Edition, BPB Publications.
3. Kernighan and Ritchie, *The C Programming Language*, Second Edition, Prentice Hall,

LABORATORY

Practical Assignments covering paper BCA.C2 (Introduction to C programming) - 60 marks (At least 20 programming assignments have to be done by each student from the following list. The assignments should be selected in such a way that all the features of C language are included.) List of Experiments:

1. Write a program to convert a given temperature value from Fahrenheit scale to Centigrade scale and vice versa.
2. Write a program to display ASCII value of a character.
3. Write a program to check whether a number is perfect or not.
4. Write a program to find out the biggest of three numbers using nested if.
5. A company insures its drivers if either of the following conditions are satisfied Driver is married. • Driver is an unmarried, male and above 30 years of age. • Driver is unmarried, female and above 25 years of age. • Write a program to decide if a driver is to be insured using logical operators.
6. Write a program to read a list of positive integers terminated by -1 and display the odd and even numbers separately and also their respective counts.
7. Write a program to read values of n and x and print the value of y using switch case where
 - a. $y=n+x$ when $n=1$
 - b. $y=1+x/n$ when $n=2$
 - c. $y= n+3x$ when $n=3$
 - d. $y=1+nx$ when $n>3$ or $n<1$.
8. Write a program to n values of sales and then calculate the commission on sales amount where the commission is calculated as follows: a. If sales \leq Rs.500, commission is 5%. b. If sales > 500 but ≤ 2000 , commission is Rs 35 plus 10% above Rs 500. c. If sales > 2000 but ≤ 5000 , commission is Rs 185 plus 12% above Rs.2000. d. If sales > 5000 , commission is 12.5%.
9. Write a program to find out minimum, maximum, sum and average of n numbers without using array.
10. Program to find mean and standard deviation (SD) for a set of n numbers without using array.
11. Write a program to find out the roots of a quadratic equation. Use proper testing to find checks for real and complex roots.

12. Write a program to print the digits of a number in words. (eg. if a number 841 is entered through the keyboard your program should print “Eight Four One”.)
13. Write a program to print the PASCAL Triangle up to the n-th row where n is an input to the program.
14. Write a function to return the HCF of two positive integers. Write a main function to read two positive integers and print their HCF and LCM by using the above function.
15. Write a program to convert a decimal number into binary number using function.
16. Write a program to display the result of sine series using function.
17. Write a program to find the sum of the following series $1+x-x^3/3!+x^5/5!-x^7/7!+\dots$ corrected up to the 3 decimal place.
18. Write a program to read n numbers in a sorted array and insert a given element in a particular position
19. Write functions to compute the factorial of a number using both recursive and non-recursive procedure.
20. Write a program to print the values of $n C r$ and $n P r$ for given positive integers $n > 0$. Use a function fact(n) to return the factorial of a non-negative integer.n. $n C r = n! / r! * (n-r)!$ $n P r = n! / (n-r)!$
21. Write a program to display the first n Fibonacci numbers using function.
22. Write a program to display the prime numbers within a given range. Write a function to check whether a given integer is prime or not and use it.
23. Write a program to Multiply two matrices using function
24. Write a program to display the upper Triangle and lower Triangle of a given square matrix using function.
25. Write a function to check if a given square matrix is symmetric or not. Write a main function to implement it.
26. Write a program to read a m X n matrix and calculate the Row sum and Column Sum of the matrix
27. Write a function to read in an integer and print the representation of the number using the sign and magnitude representation scheme using 8 bits. The program should check for overflow/under flow conditions. The left most bit is to be used as the sign bit.
28. Write a program to merge two sorted arrays.
29. Write a program to implement selection sort using function.
30. Write a program to count the number of vowels in a string.
31. Write a program to concatenate two strings using function (without using library function).
32. Write a program to convert a string from upper case to lower case and vice versa.
33. Write a program to swap two numbers using function (pass the pointers).
34. Write a program to sort n number of strings in ascending order using pointer.
35. Write a program using pointers to copy a string to another string variable (without using library function).
36. Declare a structure of a student with details like roll number, student name and total marks. Using this, declare an array with 50 elements. Write a program to read details of n students and print the list of students who have scored 75 marks and above.
37. Create a structure to store the following information of employees. a. Employee’s number, name, pay and date of joining.

It has been decided to increase the pay as per the following rules: Pay \leq Rs.3000 : 20% increase Pay \leq Rs.6000 but $>$ Rs.3000 :15% increase Pay $>$ Rs.6000 : no increase Write a program to implement the above structure. 38. Write a program to read a text file and count the number of vowels in the text file. 39. Write a program to copy a text file to another file.

GE-1: Computer Fundamentals
Theory: 60 lectures

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| 1. Introduction: Introduction to computer system, uses, types. | 6L |
| 2. Data Representation: Number systems and character representation, binary arithmetic | 12L |
| 3. Human Computer Interface: Types of software, Operating system as user interface, utility programs | 6L |
| 4. Devices: Input and output devices | 10L |
| 5. Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks | 6L |
| 6. Computer Organisation and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. | 12L |
| 7. Overview of Emerging Technologies: Cloud computing, big data, data mining, mobile computing and embedded systems. | 8L |

Reference Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

Computer Fundamentals Lab
Practical: 60 lectures

Practical exercises based on MS Office/ Open Office tools using document preparation and spreadsheet handling packages.

MS Word

1. Prepare a **grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.

- Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.
2. Create a **telephone directory**.
- The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier New Font.
 - The footer should show the page number as well as the date last updated.
3. Design a **time-table form** for your college.
- The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - The second line should give the course name/teacher's name and the department in 14-point Arial.
 - Leave a gap of 12-points.
 - The rest of the document should use 10-point Times New Roman font.
 - The footer should contain your specifications as the designer and date of creation.
4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first page of the book** as per the given specifications.
- The title of the book should appear in bold using 20-point Arial font.
 - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one page documents.
- a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
 - b. Design a certificate in landscape orientation with a border around the document.
 - c. Design a Garage Sale sign.
 - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
6. Create the following documents:
- (a) A newsletter with a headline and 2 columns in portrait orientation, including at least

one image surrounded by text.

(b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter
Type the following as shown (do not bold).

Color, Style, Item

Blue, A980, Van

Red, X023, Car

Green, YL724, Truck

Name, Age, Sex

Bob, 23, M

Linda, 46, F

Tom, 29, M

