

Bodoland University
Curriculum Structure for UG syllabus for B.Sc. (Regular Course)
SUBJECT: COMPUTER SCIENCE

SL. NO.	CORE COURSE (14)	ABILITY ENHANCEMENT COURSE (AECC) (2)	SKILL ENHANCEMENT COURSE (SEC) (2)	ELECTIVE: DISCIPLINE SPECIFIC DSE (4)
1	DSC – 1A	(English/Hindi/MIL Communication)		
	DSC – 2A: Computer Fundamentals			
	DSC- 3A			
2	DSC – 1 B	Environmental Science		
	DSC – 2B: Introduction to Database Systems			
	DSC- 3B			
3	DSC – 1 C		SEC 1: Android Programming	
	DSC – 2C: Introduction to Programming			
	DSC- 3C:			
4	DSC – 1 D		SEC 2:XML Programming	
	DSC – 2D: Computer Networks and Internet Technologies			
	DSC- 3D : Introduction to Database Systems			
5			SEC 3:PHP Programming	DSE-1A
				DSE -2A: Programming in Visual Basic/Gambas
				DSE-3A
6			SEC 4: UNIX/LINUX Programming	DSE-1B
				DSE -2B: Software Testing
				DSE-3B

1ST SEMESTER

DSC-2A: Computer Fundamentals

Theory: 60 lectures

Introduction: Introduction to computer system, uses	6L
Data Representation: Number systems and character representation, binary arithmetic	12L
	6L
Human Computer Interface: Types of software, Operating system as user interface,	10L
	6L
Devices: Input and output devices	6L
	12L
Memory: Primary, secondary, auxiliary memory	12L
	8L
Computer Organisation and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.	8L
Overview of Emerging Technologies: cloud computing, big data, data mining, mobile computing and embedded systems.	

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. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table
Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

8. Wrapping of text around the image.
9. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except Online collaboration, Tools on Macro, Templates

MS Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate Amount
Delhi	2020	2400	2100	3000	15	
Punjab	1100	1300	1500	1400	20	
U.P.	3000	3200	2600	2800	17	
Haryana	1800	2000	2200	2700	15	
Rajasthan	2100	2000	1800	2200	20	

TOTAL AVERAGE

- (a) Apply Formatting as follow: I.Title in

TIMES NEW ROMAN

- ii. Font Size - 14
- iii. Remaining text - ARIAL, Font Size -10
- iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.
- v. Numbers in two decimal places.
- vi. Qtr. Heading in center Alignment.
- vii. Apply Border to whole data.

- (b) Calculate State and Qtr. Total

- (c) Calculate Average for each quarter

- (d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	HarBhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
≥ 80	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	Salesman		Sales in (Rs.)				
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
≥ 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

- HRA Dependent on Basic
 - 30% of Basic if Basic ≤ 1000
 - 25% of Basic if Basic > 1000 & Basic ≤ 3000
 - 20% of Basic if Basic > 3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is ≤ 1000 Rs. 75/- if Basic > 1000 & Basic ≤ 2000 Rs. 100 if Basic > 2000
- Entertainment Allowance NIL if Basic is ≤ 1000 Rs. 100/- if Basic > 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is ≤ 1500 Rs. 60/- if Basic > 1500 & Basic ≤ 3000 Rs. 80/- if Basic > 3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- (a) Calculate total sale year wise.
 (b) Calculate the net sale made by each salesman
 (c) Calculate the maximum sale made by the salesman
 (d) Calculate the commission for each salesman under the condition.
 (i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 (ii) Otherwise give 2% commission.
 (e) Draw a bar graph representing the sale made by each salesman. (f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	JAN	FEB	MARCH QUARTER TOTAL	QUARTER AVERAGE
Rent	600.00	600.00		

Telephone	48.25	43.50	60.00
Utilities	67.27	110.00	70.00
Credit Card	200.00	110.00	70.00
Oil	100.00	150.00	90.00
AV to Insurance	150.00		
Cable TV	40.75	40.75	40.75

Monthly Total

Calculate Quarter total and Quarter average.

- Calculate Monthly total.
- Surplus = Monthly income - Monthly total.
- What would be total surplus if monthly income is 1500.
- How much does telephone expense for March differ from quarter average.
- Create a 3D column graph for telephone and utilities.
- Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs. 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00	

- Compute the total revenue earned.
- Plot the line chart to compare the revenue of all publisher for 4 years.
- Chart Title should be Total Revenue of sam's Bookstall (1997-2000)
- Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

3RD SEMESTER

DSC-2C: Introduction to Programming

Theory: 60 lectures

Introduction to C and C++

Data Types, Variables, Constants, Operators and Basic I/O (10 Lectures)

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise)

Expressions, Conditional Statements and Iterative Statements (10 Lectures)

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops)

Functions and Arrays (10 Lectures)

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings)

Derived Data Types (Structures and Unions) (5 Lectures)

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures,

File I/O, Preprocessor Directives (8 Lectures)

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros

Using Classes in C++ (8 Lectures)

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables & Functions, Objects as parameters

Inheritance and Polymorphism (4 Lectures)

Introduction to Inheritance and Polymorphism

Reference Books:

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.

3. Bjarne Stroustrup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
4. E. Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.
5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.
6. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.
7. Andrew Koenig, Barbara E. Moo, "Accelerated C++", Published by Addison-Wesley
8. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.
9. Harry H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA. 2014
10. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.
11. Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

Introduction to c/c++ Programming Lab

Practical: 60 lectures

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find divisor or factorial of a given number.
5. Write a program to print first ten natural numbers.
6. Write a program to print first ten even and odd numbers.
7. Write a program to find grade of a list of students given their marks.

SEC-1 : Android Programming

Introduction: Introduction to Android Operating Systems, Android Development Tools, Android Architecture. (2L)

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Java Virtual Machine. (4L)

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator (5L)

User Interface Architecture: Application context, intents, Activity life cycle (2L)

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes), Images, Menu, Dialog. (2L)

Database: Understanding of SQL Lite database, connecting with the database (2L)

Book Recommended:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. <http://www.developer.android.com>
2. <http://developer.android.com/about/versions/index.html>
3. <http://developer.android.com/training/basics/firstapp/index.html>
4. <http://docs.oracle.com/javase/tutorial/index.htm> (Available in the form of free downloadable ebooks also).
5. <http://developer.android.com/guide/components/activities.html>
6. <http://developer.android.com/guide/components/fundamentals.html>
7. <http://developer.android.com/guide/components/intents-filters.html>
8. <http://developer.android.com/training/multiscreen/screensizes.html>
9. <http://developer.android.com/guide/topics/ui/controls.html>
10. <http://developer.android.com/guide/topics/ui/declaring-layout.html>
11. <http://developer.android.com/training/basics/data-storage/databases.html>

Software Lab Based on Android Programming:

1. Create —Hello World application. That will display —Hello World in the middle of the screen in the emulator. Also display —Hello World in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

5TH SEMESTER

SEC-3:PHP Programming

(1 +2 Lab)

Introduction to PHP:

(3L)

- PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.)
- Basic Syntax, PHP variables and constants
- Types of data in PHP , Expressions, scopes of a variable (local, global)
- PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator.

Handling HTML form with PHP: (2L)

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

PHP conditional events and Loops:

(3L)

- PHP IF Else conditional statements (Nested IF and Else)
- Switch case, while ,For and Do While Loop
- Goto , Break ,Continue and exit

PHP Functions:

(3L)

- Function, Need of Function , declaration and calling of a function
- PHP Function with arguments, Default Arguments in Function
- Function argument with call by value, call by reference
-

String Manipulation and Regular Expression:

(3L)

- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array:

(3L)

- Anatomy of an Array ,Creating index based and Associative array ,Accessing array
- Looping with Index based array, with associative array using each() and foreach()

Reference Books:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.
4. Luke Welling, Laura Thompson, "PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professional, 2008.
5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

Software Lab Based on PHP:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.
Sample string : 'The quick " " brown fox'
Expected Output : Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Create a script to construct the following pattern, using nested for loop.

```
*
* *
* * *
* * * *
* * * * *
```

14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. \$color = array('white', 'green', 'red')
Write a PHP script which will display the colors in the following way :
Output :
white, green, red,
•
green
• red
• white
17. Using switch case and dropdown list display a —Hello! message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.

Sample :'the quick brown fox jumps over the lazy dog.'

Expected Result :That quick brown fox jumps over the lazy dog.

DSE-2A :Programming in VB/GAMBAS

Theory: 60 lectures

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), compiling, debugging, and running the programs. **4L**

Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface **8L**

Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations. **4L**

Decision Making : If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box **8L**

Modular programming: Menus, sub-procedures and sub-functions defining / creating and modifying a menu, using common dialog box, creating a new sub-procedure, passing argument by value or by reference, writing a function/ procedure. **6L**

Forms Handling : Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword **6L**

Iteration Handling: Do/loops, for/next loops, using msg box function, using string function **4L**

Arrays and Grouped Data Control: Arrays - 1-dimension arrays, two dimensional arrays. lists, loops and **10L**

printing list boxes & combo boxes, filling the list using property window / add item method, clear method, list box properties, removing an item from a list, list box/ combo box operations.

Database Connectivity: Database connectivity of forms with back end tool like mysql, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion. **10L**

Reference Books:

1. Reference: Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh(Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004)

Programming in VB/GAMBAS Lab
Practical: 60 lectures

1. Print a table of numbers from 5 to 15 and their squares and Cubes.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list.use arrays.
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array.
10. Create a database Employee and Make a form in VB 6.0 to allow data entry to **Employee Form** with the following command buttons:

Employee Form

Employee Name:

Employee Id:

Date of Joining:

Designation:

Department:

Address:

Basic Pay:

FIRST

LAST

PREV

