

Bodoland University
Curriculum Structures for UG syllabus for B.Sc. (Regular Course)
SUBJECT: COMPUTER SCIENCE
No. of papers=12+12=24, Total Credits= 120
Total Marks=2100

Table 1: For SEM-I						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
Paper-101P	DSC-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-102P	DSC-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-103P	DSC-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-104HP	AECC-1: English/Hindi/MIL (Communication)	2	2	50		50
Total-			20	290	60	350

Table 2: For SEM-II						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
Paper-201P	DSC-1B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-202P	DSC-2B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-203P	DSC-3B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-204HP	AECC-2: Environmental Science	2	2	50		50
Total-			20	290	60	350

Table 3: For SEM-III						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
Paper-301P	DSC-1C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-302P	DSC-2C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-303P	DSC-3C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-304HP	SEC-1	2	2	50		50
Total-			20	290	60	350

Table 4: For SEM-IV						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
Paper-401P	DSC-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-402P	DSC-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-403P	DSC-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-404HP	SEC-2	2	2	50		50
Total-			20	290	60	350

Table 5: For SEM-V						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
Paper-501P	DSE-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-502P	DSE-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-503P	DSE-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-504P	SEC-3	2	2	50		50
Total-			20	290	60	350

SYLLABUS FOR REGULAR COURSE (COMPUTER SCIENCE)

Table 1: For SEM-I						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
PHY-101R	DSC-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-DSC-102 R	DSC-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
MATH-103 R	DSC-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
COMM-104H R	AECC-1: English/Hindi/MIL (Communication)	2	2	50		50
Total-			20	290	60	350

Table 3: For SEM-III						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks

Table 2: For SEM-II						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
PHY-201 R	DSC-1B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-DSC-202 R	DSC-2B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
MATH-203P	DSC-3B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
ENV-204H R	AECC-2: Environmental Science	2	2	50		50
Total-			20	290	60	350

PHY-301 R	DSC-1C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-DSC-302 R	DSC-2C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
MATH-303 R	DSC-3C	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-SEC1-304 R	SEC-1	2	2	50		50
Total-			20	290	60	350

Table 4: For SEM-IV						
Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
PHY-401 R	DSC-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-DSC-402 R	DSC-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
MATH-403 R	DSC-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-SEC2- 404 R	SEC-2	2	2	50		50
Total-			20	290	60	350

Table 6: For SEM-VI

Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
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Table 5: For SEM-V

Paper Code	Course	L+T+P	Credit	End Sem	Int	TotalMarks
PHY-501 R	DSE-1A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-DSE-502 R	DSE-2A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
MATH-503 R	DSE-3A	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-SEC3- 504 R	SEC-3	2	2	50		50
Total-			20	290	60	350

Paper Code	DSE Course	L+T+P	Credit	One Sem	Total	Total Marks
Paper-601P	DSE-1B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
Paper-602P	DSE-2B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
PHY-601B Paper-604P	DSE-1B SEC-4	4+0+2 5+1+0	6 2	60(L)+20(P) 50 60(L)+20(T)	20	100 50
CS- DSE-602 R	DSE-2B	4+0+2 5+1+0	6 20	60(L)+20(P) 60(L)+20(T)	20 60	100 350
MATH-603 R	DSE-3B	4+0+2 5+1+0	6	60(L)+20(P) 60(L)+20(T)	20	100
CS-SEC4-604 R	SEC-4	2	2	50		50
Total-			20	290	60	350

1ST SEMESTER

DSC-2A:Computer Fundamentals

Theory: 60 lectures

Introduction: Introduction to computer system, uses, types.

6L

Data Representation: Number systems and character representation, binary arithmetic

12L

6L

Human Computer Interface: Types of software, Operating system as user interface, utility programs

10L

Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter

6L

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks

12L

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.

8L

Overview of Emerging Technologies: Bluetooth, 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	Shwag	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.

- (a) Calculate Monthly total.
- (b) Surplus = Monthly income - Monthly total.
- (c) What would be total surplus if monthly income is 1500.
- (d) How much does telephone expense for March differ from quarter average.
- (e) Create a 3D column graph for telephone and utilities.
- (f) 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	

- (a) Compute the total revenue earned.
- (b) Plot the line chart to compare the revenue of all publisher for 4 years.
- (b) Chart Title should be '_Total Revenue of sam's Bookstall (1997-2000)'
- (c) 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

2ND SEMESTER

DSC-2B:Introduction to Programming

Theory: 60 lectures

Introduction to C and C++ Lectures)

(5

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in 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), Using Comments in programs, Character I/O (getc, getchar, putc, putchar), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h, etc).

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), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

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) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

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, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

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, Specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

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.

3RD SEMESTER

DSC-2C: Computer Networks and Internet Technologies

Theory: 60 lectures

Computer Networks: Introduction to computer network, data communication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet. **6L**

Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities. **8L**

Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite.4L

LAN Topologies: Ring, bus, star, mesh and tree topologies.2L

Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router.2L

Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline.2L

Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs.6L

Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration. Customized Features: Cascading style sheet (css) for text formatting and other manipulations.16L

JavaScript Fundamentals: Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.14L

Reference Books:

1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition), PHI, 2010
2. B. A. Forouzan, Data Communication and Networking , TMH, 2003.
3. D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, Springer W. Willard, 2009
4. HTML A Beginner's Guide, Tata McGraw-Hill Education, 2009.
5. J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007

SEC-1 : Android Programming

Introduction: History of Android, Introduction to Android Operating Systems, AndroidDevelopment Too (2L)

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

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

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

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

Database: Understanding of SQLite 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.

4TH SEMESTER

DSC-2D : Introduction to Database System

Theory: 60 lectures

Database: Introduction to database, relational data model, DBMS architecture, data independence, DBA, database users, end users, front end tools

E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, E- R diagrams, database design using ER diagrams

Relational Data Model: Relational model concepts, relational constraints, primary and foreign key normalization: 1NF, 2NF, 3NF

Structured Query Language: SQL queries, create a database table, create relationships between database tables, modify and manage tables, queries, forms, reports, modify, filter and view data.

Reference Books :

1. P. Rob, C. Coronel, Database System Concepts by, Cengage Learning India, 2008
2. R. Elmasri, S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007
3. MySQL : Reference Manual

Introduction to Database System Lab

Practical: 60 lectures

1) Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price)

IssuedBooks (Accession number, Borrower)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Delete the record of book titled —Database System Conceptsl.
 - c) Change the Department of the book titled —Discrete Maths| to —CSl.
 - d) List all books that belong to —CSl department.
 - e) List all books that belong to —CSl department and are written by author —Navathel.
 - f) List all computer (Department=|CSl) that have been issued.
 - g) List all books which have a price less than 500 or purchased between —01/01/1999| and —01/01/2004l.
- 2) Create a database having three tables to store the details of students of Computer Department in your college.

Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)

Paper Details (Paper code, Name of the Paper)

Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.
 - c) List all students who live in —Delhil and have marks greater than 60 in paper 1.
 - d) Find the total attendance and total marks obtained by each student.
 - e) List the name of student who has got the highest marks in paper 2.
- 3) Create the following tables and answer the queries given below:

Customer (CustID, email, Name, Phone, ReferrerID) Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo) BicycleModel (ModelNo, Manufacturer, Style) Service (StartDate, BicycleID, EndDate)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

- b) List all the customers who have the bicycles manufactured by manufacturer —Hondal.
 - c) List the bicycles purchased by the customers who have been referred by customer —C11.
 - d) List the manufacturer of red colored bicycles.
 - e) List the models of the bicycles given for service.
- 4) Create the following tables, enter at least 5 records in each table and answer the queries given below.
- EMPLOYEE (Person_Name, Street, City) WORKS (Person_Name, Company_Name, Salary)**
COMPANY (Company_Name, City)
MANAGES (Person_Name, Manager_Name)
- a) Identify primary and foreign keys.
 - b) Alter table employee, add a column —email of type varchar(20).
 - c) Find the name of all managers who work for both Samba Bank and NCB Bank.
 - d) Find the names, street address and cities of residence and salary of all employees who work for —Samba Bank and earn more than \$10,000.
 - e) Find the names of all employees who live in the same city as the company for which they work.
 - f) Find the highest salary, lowest salary and average salary paid by each company.
 - g) Find the sum of salary and number of employees in each company.
 - h) Find the name of the company that pays highest salary.
- 5) Create the following tables, enter at least 5 records in each table and answer the queries given below.
- Suppliers (SNo, Sname, Status, SCity)Parts (PNo, Pname, Colour, Weight,City) Project (JNo, Jname, Jcity)Shipment (Sno, Pno, Jno, Qunatity)**
- a) Identify primary and foreign keys.
 - b) Get supplier numbers for suppliers in Paris with status>20.
 - c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
 - d) Get suppliers names for suppliers who do not supply part P2.
 - e) For each shipment get full shipment details, including total shipment weights.
 - f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.
 - g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
 - h) Get the names of cities that store more than five red parts.
 - i) Get full details of parts supplied by a supplier in London.
 - j) Get part numbers for part supplied by a supplier in London to a project in London.
 - k) Get the total number of project supplied by a supplier (say, S1).
 - l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

SEC-2 :XML Programming

Introduction: Understanding Mark-up Languages, Introduction to XML and itsGoals. (3L)

XML Basics: XML Structure and Syntax, Document classes andRules. (5L)

Other XML Concepts: Scripting XML, XML as Data, Linking withXML. (4L)

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL stylesheets. (3L)

Books Recommended

1. XML in action web technology by William J. Pardi
2. Step by Step XML by Michael J. Young

Software Lab Based on XML:

Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object. For the sample document provided below:

Label the information structures you see, including containing structures.

Exercise 2# Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

```
<book>
<coverInfo>
  <title>The          XML
  Handbook</title><author>Charles  F.
  Goldfarb</author><author>Paul
  Prescod</author><edition>Second</edi
  tion>
```

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.)
- PHP with other technologies, scope of PHP
- 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.
- PHP operator Precedence and associativity

Handling HTML form withPHP: (2L)

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

PHP conditional events andLoops: (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
- Scope of Function Global and Local

String Manipulation and RegularExpression: (3L)

- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use and advantage of regular expression over inbuilt function
- 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()
- Some useful Library function

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), the GUI environment, 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, keyboard access, tab controls, default & cancel property, coding for controls. **8L**

Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data. **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, testing whether input is valid or not. **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 variables to procedures, 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, referring to objects on a different forms **6L**

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

Arrays and Grouped Data Control: Arrays - 1-dimension arrays, initializing an array using for each, user-defined data types, accessing information with user-defined data types, using list boxes with array, two dimensional arrays. lists, loops and 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. **10L**

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:

NEXT

Employee Id:

Date of Joining:

Designation:

Department:

Address:

Basic Pay:

FIRST

LAST

PREV

SAVE

CANCEL

6TH SEMESTER

SEC-4: Unix/ Linux Programming Syllabus

(1+2 Labs)

Introduction

(5 L)

- What is linux/unix Operating systems
- Difference between linux/unix and other operating systems
- Features and Architecture
- Various Distributions available in the market
- Installation, Booting and shutdown process

- System processes (an overview)
- External and internal commands
- Creation of partitions in OS
- Processes and its creation phases – Fork, Exec, wait

User Management and the File System

(5 L)

- Types of Users, Creating users, Granting rights
- User management commands
- File quota and various file systems available
- File System Management and Layout, File permissions
- Login process, Managing Disk Quotas
- Links (hard links, symbolic links)

Shell introduction and ShellScripting (6L)

- What is shell and various type of shell, Various editors present in linux
- Different modes of operation in vi editor
- What is shell script, Writing and executing the shell script
- Shell variable (user defined and system variables)
- System calls, Using system calls
- Pipes and Filters
- Decision making in Shell Scripts (If else, switch), Loops in shell
- Functions
- Utility programs (cut, paste, join, tr , uniq utilities)
- Pattern matching utility (grep)

Reference Books:

1. Sumitabha, Das, Unix Concepts And Applications, Tata McGraw-Hill Education, 2006
2. Michael Jang RHCSA/ RHCE Red Hat Linux Certification: Exams (Ex200 & Ex300) (Certification Press), 2011
3. Nemeth Synder& Hein, Linux Administration Handbook, Pearson Education, 2nd Edition ,2010
4. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Unix Network Programming, The sockets Networking API, Vol. 1, 3rd Edition,2014

Software Lab Based on Linux:

1. Write a shell script to check if the number entered at the command line is prime or not.
2. Write a shell script to modify —call command to display calendars of the specified months.
3. Write a shell script to modify —call command to display calendars of the specified range of months.
4. Write a shell script to accept a login name. If not a valid login name display message –
—Entered login name is invalidl.
5. Write a shell script to display date in the mm/dd/yy format.
6. Write a shell script to display on the screen sorted output of —whol command along with the total

- number of users .
7. Write a shell script to display the multiplication table any number,
 8. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
 9. Write a shell script to find the sum of digits of a given number.
 10. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
 11. Write a shell script to find the LCD(least common divisor) of two numbers.
 12. Write a shell script to perform the tasks of basic calculator.
 13. Write a shell script to find the power of a given number.
 14. Write a shell script to find the binomial coefficient $C(n, x)$.
 15. Write a shell script to find the permutation $P(n,x)$.
 16. Write a shell script to find the greatest number among the three numbers.
 17. Write a shell script to find the factorial of a given number.
 18. Write a shell script to check whether the number is Armstrong or not.
 19. Write a shell script to check whether the file have all the permissions or not.

DSE-2B:Software Testing

(1+2 Labs)

Introduction

(4L)

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

Functional Testing\ Black-box Testing

(5L)

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

Structural Testing\ White-box Testing

(6L)

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

Books Recommended:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009
2. Yogesh Singh, Software Testing, Cambridge University Press.2011.

Computer Lab Based on Software Testing:

1. Write a program that take three inputs (a,b&c) that represent the sides of a triangle, and the output is one of the below four:
 - a. Not a triangle
 - b. Scalene triangle
 - c. Isosceles triangle
 - d. Equilateral triangle
 - 1.1 Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
 - 1.2 Generate test cases using Basis path testing.
 - 1.3 Run code coverage tool.
2. Write a program that determines the nature of roots of a quadratic equation. Output should be one of the following:-
 - Not a quadratic equation.
 - Complex roots
 - Real roots
 - Single roots
 - I. Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and

Decision Table Testing.

II. Generate test cases using Basis path testing. III.

Run code coverage tool

3. Write a program that checks whether the number is even or odd. Run code coverage tool and find the amount of code being covered.
4. Write a program that dynamically allocates memory to 10 integers using `malloc()` or `calloc()` and
 - do not free memory leading to memory leaks. Verify the same using Valgrind.
 - Now, free memory using `free()` at the end of the program to avoid memory leaks. Verify the same using Valgrind.

Use LoadUI load testing tool to test the web application performance.