

5th Semester

Semester	Paper Code	*E/C/L	Paper	Teaching Hours		Marks			Credits	
				Theory	Practical	IA	Exam	Total		
5	16BE21	C	Software Engineering	4	-	20	80	100	4	
	16BE22	C	Data Communications	4	-	20	80	100	4	
	16BE23	C	E-Commerce	4	-	20	80	100	4	
	16BE24	C	Analysis and Design of Algorithms	5	-	20	80	100	5	
	16BE25	C	ADA Lab	-	6	20	80	100	6	
	16BE26	E5.1		PHP and MySQL [Web Programming]	5	-	20	80	100	5
		E5.2		Advanced Microprocessor 8086						
		E5.3		Computer Graphics						
	16BE27	E5.1		Web Programming Lab	-	6	20	80	100	6
		E5.2		Microprocessor Lab						
E5.3			Computer Graphics Lab							
-	-	C	SDC	2	-	10	40	50	2	
						150	600	750	36	

BCA 5th Semester**Software Engineering**

Subject Code :	16BE21	Total Teaching Hours :	52
IA Marks :	20	Teaching Hours/Week :	04
Exam Marks :	80	Examination Hours :	03
Credits:	4		

- 1. Introduction:** Software definition, program versus software, software process, software characteristics, software applications, terminologies and role of management in Software development. 12Hrs
- 2. Software life cycle models:** SDLC models: Build and test. The waterfall, Prototyping, Interactive, Evolutionary development, Spiral, Rapid Application Development. Selection of a life cycle model, characteristics of requirements, status of development team, involvement of users, type of project and risk. 12Hrs
- 3. Software requirements analysis and specification:** Requirements engineering. Requirements elicitation, analysis documentation. 6Hrs
- 4. Software Design:** Design concepts and techniques, objects and importance, modularity, strategy of design, function oriented design, IEEE recommended practice for software design and object oriented design. 12Hrs
- 5. Software Testing:** Testing process, terminologies, introduction to functional and structural testing, levels of testing, debugging and testing tools. 10Hrs

Text Books:

1. Software Engineering (New Age International Publishers) "K.K. Aggarwal and Yogesh Singh".
2. An Integrated Approach to Software Engineering, "Pankaj Jalote".


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BCA 5 th Semester		Data Communications	
Subject Code :	16BE22	Total Teaching Hours :	52
IA Marks :	20	Teaching Hours/Week :	04
Exam Marks :	80	Examination Hours :	03
Credits :	4		

- 1. Introduction:** Data Communications, Networks, The Internet, Protocols and Standards, Layered Tasks, The OSI Model and the Layers in OSI Model. TCP/IP Protocol Suite.
8Hrs
- 2. Data, Signals and Digital Transmission:** Analog and Digital Signals, Transmission Impairment, Data Rate Limits, Performance. Digital-to-Digital Conversion, Analog-to-Digital Conversion, Transmission Modes.
10Hrs.
- 3. Analog Transmission and Multiplexing:** Digital-to-Analog Conversion, Analog-to-Analog Conversion, Multiplexing, Spread Spectrum.
8Hrs
- 4. Transmission Media, Error Detection and Correction:** Twisted Pair Cable, Co-axial Cable, Fiber-optic Cable, Radio Waves, Micro Waves, Infrared, Introduction to Error Detection, Correction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum
10Hrs
- 5. Data Link Control:** Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels HDLC, Point-to-point Protocol.
8Hrs
- 6. Multiple Access, Ethernet:** Random Access, Controlled Access, Chanellization, Ethernet: IEEE Standards, Standard Ethernet and Changes in the Standard, Fast Ethernet, Gigabit Ethernet.
8Hrs

Text books:

- 1. Data Communications and Networking-** Benrouz A. Forouzan, 4th edition, Tata McGraw-hill 2006

References:

1. "Communication Networks: Fundamental Concepts and Key Architectures", - Alberto Leon, Garcia and Indra widjaja, 3rd edition, Tata / McGraw-hill, 2004
2. Computer Networks — Andrew S. Tanenbaum, 3rd Edition. Pearson Education/PHI
3. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
4. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

BCA 5 th Semester		E - Commerce	
Subject Code :	16BE23	Total Teaching Hours :	52
IA Marks :	20	Teaching Hours/Week :	04
Exam Marks :	80	Examination Hours :	03
Credits:	4		

- Electronic Commerce**-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer Applications, E-Commerce organization applications. 8Hrs
- Consumer Oriented Electronic commerce** – Consumer Oriented Applications, Mercantile Process models. 6Hrs
- Electronic payment systems** – Types of Electronic Payment systems, Digital-Token Based Electronic Payments Systems, Smart cards and Electronic Payments Systems, Credit Card Based Electronic Payments Systems, Risk and Electronic and Designing Electronic Payments Systems. 10Hrs
- Inter Organizational Commerce** - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Custom zation and internal Commerce, Supply chain Management. 08Hrs
- Corporate Digital Library** - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research. 08Hrs
- Consumer Search and Resource Discovery** - Information search and Retrieval, Commerce Catalogues, Information Filtering. 4Hrs
- Multimedia and Digital Video** - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing. 8Hrs.

Text books:

- Frontiers of electronic commerce – Kalakata, Whinston. Pearson.

Reference books:

- E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
- E-Commerce, S. Jaiswal – Galgotia
- E-Commerce, Efrain Turzon, Jae Lee, David King, H. Michael Chang.
- Electronic Commerce – Gary P. Schneider – Thomson.
- E-Commerce – Business, Technology, Society, Kenneth D. Faucon, Carol Guyerico Traver.

BCA 5 th Semester		Analysis and Design of Algorithms	
Subject Code :	16BE24	Total Teaching Hours :	60
IA Marks :	20	Teaching Hours/Week :	05
Exam Marks :	80	Examination Hours :	03
Credits:	5		

1. Notion of algorithm, Fundamentals of algorithmic problem solving, linear data structures, graphs, trees, sets and dictionaries.
2. Analysis of algorithm efficiency: Analysis frame-work, asymptotic notations and basic efficiency classes, mathematical analysis of non recursive and recursive algorithms, empirical analysis of algorithms.
3. Brute Force and Divide and Conquer- General method, Binary Search, Finding the maximum and minimum, merge sort, quick sort, Strassen's matrix multiplication.
4. Decrease-and-Conquer and Transform-and-Conquer: Insertion sort, depth first search, topological sorting, presorting, Gaussian elimination, balanced search trees, heap sort, Horner's rule.
5. Greedy Method: General method, optimal storage on tapes, knapsack problem, job sequencing, Minimum Cost Spanning Trees- Prim's algorithm and Kruskal's algorithm.
6. Optimal storage on tapes, optimal merge patterns, single source shortest paths, Huffman trees.

References:

1. Computer Algorithms/C++ : Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajashekar

BCA 5 th Semester		ADA Lab	
Subject Code :	16BE25	Total Teaching Hours :	72
IA Marks :	20	Teaching Hours/Week :	06
Exam Marks :	80	Examination Hours :	03
Credits:	6		

1. Program for binary search (Simple and Recursive)
2. Programs for heap sort, merge sort and quick sort
3. Strassen's Matrix multiplication
4. Program for optimal merging
5. Program for Knapsack problem
6. Program for finding out cost of spanning tree by kruskal's/Prim's algorithm
7. Program for single source shortest path
8. Program for Graph coloring
9. Program to find Hamiltonian Cycle from given graph
10. Program for BFS and DFS

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
Viva/Report		20	
Total		100	

BCA 5 th Semester		PHP and MySQL	
Subject Code :	16BE26.1	Elective	5.1
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	05
Credits:	5	Examination Hours :	03

- HTML:** Introduction, Elements, Tags, Attributes, Paragraph, Headings, Line Breaks, Horizontal Rule, Lists, Formatting, Color Codes, Font, Text Links, Email, Images, Image Link, Forms, Table, Frames. 4hrs
- Introduction:** Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, The Building Blocks & Flow Control functions in PHP : Variables Data types, Operators and Expressions, Constants switching, Flow Loops, Code Blocks and Browser Output. 6Hrs.
- Working with Functions, Arrays and Objects:** Function, Calling Function, Defining a Function, Returning Values from User Defined Functions, Variable Scope, Saving State between Function Calls with the static statement, More about Arguments, Testing for the existence of a Function, Arrays: Creating, Array related Constructs and Functions, Object : Creating, Inheritance 08Hrs
- Functions with Forms Cookies and User Sessions:** Creating simple input form, accessing form input with User-Defined Arrays, Combining HTML and PHP Code on a Single Page, Using Hidden fields to save state, Redirecting the User, Sending mail on form submission, creating the form, creating the script to send the mail working with file uploads, Cookies: Setting up and Deleting a cookie with PHP, Session function overview, starting and working with a session variables, Destroying sessions and Unsetting variables, using sessions in an environment with registered users. 08Hrs
- Working with files, directories & Images:** Including Files, Using include_once, Validating Files, Creating and Deleting Files, opening a file for writing reading or appending, reading from files, writing , appending to a file, Working with directories opening pipes to and from processes using popen(), running commands with exec(), running commands with system() or passthru(), understanding the image creation process, necessary modifications to PHP, Drawing a New Image.Modifying existing Images, Image creation from User Input Using Images Created By Scripts. 06Hrs
- Database Design Process & Basic SQL Commands:** The importance of good database design, Types of table relationships, understanding Normalization, Following the design Process, Learning the MySQL Data Types, Table Creation Syntax, Insert Command, Select Command, Where, Selecting from Multiple Tables, Using UPDATE command to modify Records, Using REPLACE, DELETE Commands, Frequently used string Functions, Date and Time Functions in MySQL. 07Hrs.

Text Books:

- PHP, MySQL and Apache ALL in ONE by Julie C Meola, SamsTeach Yourself.
- PHP 5 and MySQL Bible 1st Edition By Joyce Park with Clark Morgan, Tim Converse.

BSc 5 th Semester		PHP and MySQL Lab	
Subject Code :	16BE27.1	Elective Lab	5.1
IA Marks :	20	Total Teaching Hours :	72
Exam Marks :	80	Teaching Hours/Week :	06
Credits:	6	Examination Hours :	03

LAB PROGRAMS

1. Program to find largest among three numbers using ternary operator.
2. Program to print sum of digits of a given number using While Loop.
3. Program to print fibonacci series upto a given number.
4. Program to generate prime number upto a given number.
5. Program to enter numbers in an array, and then display the count of positive and negative and zeros in that array (using do-while loop)
6. Function to count number of occurrences of each word from a string of characters inputted (Not Case sensitive).
7. Form to find string length, reverse of string, Uppercase of the string, lowercase of string, using the text entered in a text field.
8. Program using javascript to convert decimal number to its binary equivalent. Use an html form to accept number from the user
9. Program to store current date-time in a Cookie and display the last visited on [], date time on the reopening of same webpage again.
10. Program to store page views count in SESSION, to increment the count on each refresh and to show the count on the web page.
11. PHP code that define class student with attributes RollNo, Name, Branch, and Year create 3 instances of it sets the values of each instance appropriately and print the values of all attributes and store it in database.
12. PHP function for searching and deleting a student information based on rollNo for the above program(Prog No 11).
13. Program using PHP and MySQL, to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with title specified by the user to display the search results with proper headings.

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
Viva/Report		20	
Total		100	

BCA 5 th Semester		Advanced Microprocessor 8086	
Subject Code :	16BE26.2	Elective	5.2
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	05
Credits :	5	Examination Hours :	03

1. Introduction to Microprocessor, Evolution of Microprocessor, Overview of Intel Pro-Pentium, Motorola 68000 Series, Introduction to DEC Alpha, Power PC RISC & CISC Characteristics, 12Hrs
2. BASIC MICROPROCESSOR ARCHITECTURE AND INTERFACE: Internal Architecture, External System Bus Architecture, Memory and Input/Output Interface. 12Hrs
3. PROGRAMMING MODE: Register Organization of 8086, Memory Addressing and Instruction Formats, Memory Interfacing, Cache Memory and Cache Controllers. 12Hrs
4. BASIC I/O INTERFACE, I/O Interface, 8255 Programmable Interface, 8254 Programmable Timer, 8251 Programmable/Communication Interface, Interrupts, 8259 Programmable Interrupts Controller, Real Time Clock DMA, 8237/8257 DMA Controller. 12Hrs
5. 8086 ASSEMBLY LANGUAGE PROGRAMMING: Instruction set of 8086, Assembler Directives and Operators, A Few Machine Level Programs, Machine coding and Programs, Programming with an Assembler. 12Hrs

References:

1. 16-bit microprocessors: architecture, software, and interface techniques, Walter A Triebel, Pearson Technology Group
2. 8080a/8085 Assembly Language Programming, Lance Leventhal / Osborne & Associates
3. The 8086/8088 family of microprocessors: software, hardware, and system applications, Wunnava Subbarao / Delmar
4. Crash Course in Microcomputers, Louis E. Frenzel, Newnes.
5. Embedded Controllers: 80186, 80188, and 80386ex, Barry B Brey, Prentice Hall
6. Introduction to Microprocessors, John Crisp Butterworth-Heinemann
7. The 8088 and 8086 microprocessors: programming, interfacing, software, hardware, and applications, Walter Triebel, Pearson Technology Group
3. 8088 assembler language programming: the IBM PC, David Willen, Pearson Indiana

BCA 5 th Semester		Microprocessor Lab	
Subject Code :	16BE27.2	Elective	5.2
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	06
Credits:	6	Examination Hours :	03

Programs:

1. Write a program for addition of two numbers.
2. Write a program for the addition of a series of 8-bit numbers. The series contains 100 (numbers).
3. A program to find out the largest number from a given unordered array of 8-bit numbers, stored in the locations starting from a known address.
4. Modify the above 3rd program for a series of words.
5. A program to find out the number of even and odd numbers from a given series of 16-bit hexadecimal numbers.
6. Write a program to find out the number of positive numbers and negative numbers from a given series of signed numbers.
7. Write a program to move a string of data words from offset 2000H to offset 3000H the length of the string is 0FH
8. Write an assembly language program to arrange a given series of hexadecimal bytes in ascending order.
9. Write a program to perform a one byte BCD addition.
10. Write a program that performs addition, subtraction, multiplication and division of the given operands. Perform BCD operation for addition and subtraction.
11. Write a program to find out whether a given byte is in the string or not. If it is in the string, find out the relative address of the byte from the starting location of the string.
12. Write a program to convert the BCD numbers 0 to 9 to their equivalent seven segment codes using the look-up table technique. Assume the codes [7-seg] are stored sequentially in CODELIST at the relative addresses from 0 to 9. The BCD number (CHAR) is taken in AL.
13. Decide whether the parity of a given number is even or odd. If parity is even set DL to 00; else, set DL to 01. The given number may be a multibyte number.
14. Write a program for the addition of two 3 x 3 matrices. The matrices are stored in the form of lists (rowwise). Store the result of addition in the third list.
15. Write a program to find out the product of two matrices. Store the result in the third matrix. The matrices are specified as in the Program Above 14.
16. Write a program to add two multibyte numbers and store the result as a third number. The numbers are stored in the form of the byte lists stored with the lowest byte first.

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
Viva/Report		20	
Total		100	

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BCA 5 th Semester		Computer Graphics	
Subject Code :	16BE26.3	Elective	5.3
IA Marks :	20	Total Teaching Hours :	72
Exam Marks :	80	Teaching Hours/Week :	05
Credits:	6	Examination Hours :	03

- Graphics Output Primitives and Attributes:** Introduction to open GL. Coordinate reference frames, Specifying two dimensional world coordinate reference frame in Open GL, Open GL point functions, Open GL line functions, Line drawing algorithms, Circle generation algorithms, Ellipse generation algorithms, Fill area primitives, Polygon fill areas, Open GL polygon fill area functions, General scan line polygon fill algorithm, Fill methods for areas with irregular boundaries, Open GL fill area attribute functions. 12Hrs.
- Two – Dimensional and Three - Dimensional Geometric Transformations:** Basic two dimensional geometric transformations, Matrix representations and homogeneous coordinates, Inverse transformations, Two dimensional composite transformations, Other two dimensional transformations 08Hrs
- Three dimensional Translation, Rotation, Scaling** Other three dimensional transformations, Affine transformations, Open GL geometric transformation functions. 04 Hrs
- Two Dimensional Viewing.** The two dimensional viewing, Clipping window, Normalization and viewport transformations, Clipping algorithms, Two dimensional point clipping, Two dimensional line clipping algorithms, Polygon fill area clipping, Curve clipping, Text clipping. 10Hrs
- Three Dimensional Viewing:** The three dimensional viewing concepts, Three dimensional viewing pipeline, Three dimensional viewing coordinate parameters, Transformation from world to viewing coordinates. 5Hrs.

Text books:

1. Donald Hearn, M. Pauline Baker, Computer Graphics with Open GL, Pearson (Indian Edition),

Reference Books:

1. Edward Angel, 'Interactive Computer Graphics' – A top down approach using Open GL, Pearson, Fifth Edition
2. Peter Shirley, Steve Marschner, 'Computer Graphics, Cengage Learning (Indian edition).

BCA 5 th Semester		Computer Graphics Lab	
Subject Code:	16BE27.3	Elective	5.3
IA Marks:	20	Total Teaching Hours:	72
Exam Marks:	80	Teaching Hours/Week:	06
Credits:	6	Examination Hours:	03

1. Write a program to create a chess board using DDA line algorithm
2. Write a program to implement Bresenham's line drawing algorithm with all values of slopes
3. Write a program to implement Midpoint circle generation algorithm
4. Write a program to create a wireframe model of globe using equation of ellipse
5. Write a program to create and fill the two dimensional object by using boundary fill algorithm
6. Write a program to create (without using built in function) a cube by implementing translation algorithm by translating along 1. X-axis, 2.Y-axis and 3. X and Y plane
7. Write a program to create (without using built in function) and rotate (1. given an angle 2. Around x and y axis) a triangle by implementing rotation algorithm.
8. Write a program to create (without using built in function) a triangle by implementing scaling algorithm by zooming/un-zooming along 1. X-axis 2.Y-axis and 3. X and Y plane
9. Write a program to create (without using built in function) a Cube by implementing reflection algorithm: 1. X-axis, 2.Y-axis
10. Write a program to create (without using built in function) a square by implementing shear algorithm along 1. X-axis, 2.Y-axis

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
IA-Viva/Report		20	
Total		100	

6th Semester

Semester	Paper Code	*E/C/L	Paper	Teaching Hours		Marks			Credits	
				Theory	Practical	IA	Exam	Total		
6	16BF21	C	Cloud Computing	4	-	20	80	100	4	
	16BF22	C	Computer Networks	4	-	20	80	100	4	
	16BF23	C	UNIX	5	-	20	80	100	5	
	16BF24	C	UNIX Lab	-	6	20	80	100	6	
	16BF25	E6.1		VB.NET Programming	5	-	20	80	100	5
		E6.2		Android Programming						
		E6.3		Network Programming with TCP/IP						
	16BF26	E6.1		VB.NET Programming Lab	-	6	20	80	100	6
		E6.2		Android Programming Lab						
		E6.3		Network Programming Lab						
16BF27	C	Project: Work	-	4	20	80	100	4		
		SDC	2	-	10	40	50	2		
						150	600	750	36	

BCA 6th Semester**Cloud Computing**

Subject Code :	16BF21	Total Teaching Hours :	52
IA Marks :	20	Teaching Hours/Week :	04
Exam Marks :	80	Examination Hours :	03
Credits:	4		

1. Cloud Computing Fundamentals, Introduction, Enabling Technologies, Cloud Computing Features, Cloud Computing Platforms, Example of Web Application Deployment, Cloud Computing Challenges. 10Hrs
2. Cloud Computing Technologies and Applications, Cloud Computing: IT as a Service, Cloud Computing Security, Cloud Computing Model Application Methodology, Cloud Computing in Development/Test, Cloud-Based High Performance Computing Clusters, Use Cases of Cloud Computing. 10Hrs
3. Key Enabling Technologies for Virtual Private Clouds: Virtual Private Clouds, Virtual Data Centers and Applications, Policy-Based Management 3Hrs
4. The Role of Networks in Cloud Computing, Cloud Deployment Models and the Network: Unique Opportunities and Requirements for Hybrid Cloud Networking 3Hrs
5. Data-Intensive Technologies for Cloud Computing: Characteristics of Data-Intensive Computing Systems, Data-Intensive System Architectures, Hadoop vs. HPC Comparison. 3Hrs
6. Survey of Storage and Fault Tolerance Strategies Used in Cloud Computing, xFS, Amazon S3, Dynamo, Google File System, Bigtable, Microsoft Azure 3Hrs

Text Book:

1. Handbook of Cloud Computing - Borko Furht Armando Escalante -Springer

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BCA 6 th Semester		Computer Networks	
Subject Code :	16BF22	Total Teaching Hours :	52
IA Marks :	20	Teaching Hours/Week :	04
Exam Marks :	80	Examination Hours :	03
Credits:	4		

1. **Introduction:** Uses of Computer Networks, Social Issues, Network Hardware, Network Software, Reference Models: OSI and TCP/IP, Comparison. 10Hrs
2. **The Network Layer:** Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, QOS, The Network Layer in the Internet. 12Hrs
3. **The Transport Layer:** The Transport Service, Elements of Transport Protocols, A Simple Transport Protocol, UDP, TCP 12Hrs.
4. **The Application Layer:** DNS, e-mail, WWW 8Hrs
5. **Network Security:** Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures. 10Hrs.

Text books:

1. Computer Networks, 4th edition, Pearson Education, Andrew S. Tanenbaum.

Reference books:

1. Data Communications and Networking- Behrouz A. Forouzan- 4th edition, Tata McGraw Hill, 2006
2. Computer Networks A Systems Approach- Larry L. Peterson and Bruce S. David- 4th edition, Elsevier, 2007

BCA 6 th Semester		UNIX	
Subject Code :	16BF23	Total Teaching Hours :	60
IA Marks :	20	Teaching Hours/Week :	05
Exam Marks :	80	Examination Hours :	03
Credits:	5		

- 1. Introduction:** The operating System, The Unix OS, Knowing Your Machine, A Brief Session, Conclusion, Background: How It all Clicked, POSIX and the Single Unix Specification, Linux and GNU, The Unix Architecture, Features of Unix, Conclusion. 10Hrs
- 2. Understanding the Unix Command:** Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, man Understanding the man Documentation, Further Help with man -k, apropos and What is, When Things Go Wrong, Conclusion, **General Purpose Utilities:** cal, date, echo, printf, bc, script, passwd, who, uname, tty, sty, Conclusion. 12Hrs
- 3. The File System:** The File, What's a (File) name?, The Parent-Child Relationship, The HOME Variable, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, ls, The UNIX File System, Conclusion, **Handling Ordinary Files:** cat, cp, rm, mv, more, the lp subsystem, file, wc, od, cmp, comm., diff, dos2unix and unix2dos, Compressing and Archiving Files, gzip and gunzip, tar, zip and unzip, Conclusion. 10Hrs.
- 4. Basic File Attributes:** ls-l, The -d Option, File Ownership, File Permissions, chmod, Directory Permissions, Changing File Ownership, Conclusion. **The vi Editor:** vi Basics, I/P Mode, The ex mode, Navigation, Editing Text, Undoing Last Editing Instructions (U and u), Repeating the Last Command, Searching for a pattern, Substitution, Conclusion. 8Hrs
- 5. The Shell:** The Shell's Interpretive Cycle, Shell Offerings, Pattern Matching, Escaping and quoting, Redirection, /dev/null and /dev/tty, pipes, tee, Command Substitution, Shell Variables, Conclusion. 8Hrs
- 6. The Process:** Process Basics, Process Status, System Processes, Mechanism of Process Creation, Running Jobs in Background, Killing Processes with Signal, Job Control 4Hrs
- 7. Essential Shell Programming:** Shell Scripts, Making Scripts Interactive, Using Command Line Arguments, exit and exit Status of Command, The Logical Operators && and || -Conditional execution, The if Conditional, Using test and [] to evaluate Expressions, The case Conditional, expr: Computation and String Handling, Calling a Script by Different Names, while: Looping, for: Looping with a list, Manipulating the Positional Parameters, The here document (<<), trap: Interrupting a Program, Debugging Shell Scripts with set -x, Sample Validation and Data entry scripts, Conclusion. 10Hrs

Text book:

1. "UNIX Concepts and Applications" by Sumitabha Das Third Edition, Tata McGraw-Hill

Reference book:

1. Unix Complete Reference Ken Rosen, Rachel Klee.

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BCA 6th Semester

UNIX Lab

Subject Code :	12BF24	Total Teaching Hours :	72
IA Marks :	20	Teaching Hours/Week :	06
Exam Marks :	80	Examination Hours :	03
Credits:	6		

- Write Shell script program to read two numbers (start and ending endlimit) and display all the odd numbers between start and endlimit.
- Write Shell script program to verify whether string is palindrome or not.
- Write Shell script program to sort given list of numbers using bubble sort.
- Write Shell script program to change file name Extension.
- Write shell script to show various system configuration like
 - Currently logged user and his logname.
 - Your current shell.
 - Your home directory
 - Your operating system type.
 - Your current path setting.
 - Your current working directory.
 - Show currently logged number of users
 - About your os and version, release number, kernel version.
 - Show all available shells
 - Show mouse settings.
 - Show computer CPU information like processor type, speed etc
 - Show memory information
 - Show hard disk information like size of hard-disk, cache memory, model etc
- Write a shell script that adds, subtracts, multiplies and divides the given 2 integers (using case conditional).
- Write a shell script to reverse the rows and Columns of a matrix.
- Write Shell script program to find biggest of 3 numbers.
- Write a shell script that takes a command-line argument and reports on whether it is directory, a file, or something else.
- Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
- Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
- Write a shell script to compute gross salary of an employee according to the following rules:
 - If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic
 - If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic
 - The basic salary is entered interactively through the key board.
- Write an interactive file handling shell program. Let it offer the user the choice of copying, removing, renaming or linking files. Once the user has made a choice, have the program ask the user for necessary information, such as the file name, new name and so on.
- Develop an interactive script that asks for a word and file name and then tells how many times that word occurred in the file.
- Write a shell script to perform the following string operations. a) To extract a sub string from a given string b) To find the length of a given string
- To Count number of character, words, & blank in a given text
- Write a shell program to generate prime numbers up to given limit.
- write a shell script to convert decimal to binary and vice versa
- Write a shell script to lock terminal.
- Write a shell script which receives two files names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Examination:

- One Question has to be given from the above list (Carries 45 Marks)
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks). Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
IA-Viva/Report		20	
Total		100	

BSc 6 th Semester		Programming With Visual Basic.Net	
Subject Code :	16BF25.1	Elective	6.1
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	05
Credits:	5	Examination Hours :	03

- 1. Visual Basic .NET and the .NET Framework.** Introduction to .net framework -Features, Common Language Runtime (CLR) , Framework Class Library (FCL), Visual Studio.Net – IDE, Languages Supported, Components. Visual Programming, VB net- Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, ToolBox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window. **(4 Hours)**
- 2. Elements of Visual Basic .net** Properties, Events and Methods of Form, Label, TextBox, ListBox, Combo Box, Radio Button, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, HScrollbar, VScrollbar, Group Box, ToolTip, Timer. **(8 Hours)**
- 3. Programming in Visual basic .net** Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements- if- Then, If-Then-Else, Nested If, Select Case, Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays- Static and Dynamic. **(5 Hours)**
- 4. Functions, Built-In Dialog Boxes, Menus and Toolbar** Menus and toolbars- Menu Strip, Tool Strip, Status Strip Built-In Dialog Boxes – Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, InputBox, MsgBox, Interfacing With the user- Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures. **(6 Hours)**
- 5. Advanced Concepts in VB.Net** Object Oriented Programming- Creating Classes , Objects, Fields, Properties, Methods, Events, Constructors and Destructors, Exception Handling- Models, Statements, File Handling- Using File Stream Class, File Mode, File Share, File Access Enumerations, Opening or Creating Files with File Stream Class, Reading and Writing Text using StreamReader and StreamWriter Classes. **(10 Hours)**
- 6. Data Access with ADO.Net – Databases.** Data Access with ServerExplorer, Data Adapter and DataSets, ADO.NET Objects and Basic SQL. **(6 Hours)**

Text Books:

1. Visual Basic.Net Black Book by Steven Holzner Dreamtech Press
2. The Complete Reference Visual Basic .NET Jeffery R. Shapiro Tata McGraw Hills

Reference Books:

1. Murach's Beginning Visual basic .Net By Anne Bohem
2. Visual Basic .Net by Vijay Mukhi

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BSc 6 th Semester		Programming With Visual Basic.Net Lab	
Subject Code :	16BF26.1	Elective	6.1
IA Marks :	20	Total Teaching Hours :	72
Exam Marks :	80	Teaching Hours/Week :	06
Credits:	6	Examination Hours :	03

Practice Programs:

1. Write a program to convert a given temperature from Fahrenheit to Celsius and viceversa.
2. Write a program to accept roll number, name, marks in 2 subjects of a student and calculate total average and display the grade. (using nested if)
3. Write a program to generate n random numbers .(using rnd() function)
4. Write a program to find frequency of a given character in a string .(using for each loop)
5. Write a program to accept array elements and find the minimum and maximum among them.

Journal Programs:

1. Design an application to create a login form and validate it using msgbox.
2. Design an application to simulate the working of a font dialog box using combo box.
3. Design a reminder application to schedule a meeting using calendar and input box.
4. Design a screen saver application using timer control.
5. Design an application to create an MDI form having a menu with options- programs and exit. The program menu should have sub menu items that calls separate child forms such as Fibonacci and factorial.
6. Design an Pizza Order application using check box and radio buttons and also generate a bill for the same.
7. Design a color pallet application using scroll bars
8. Design an application which calculates EMI of a loan using functions.
9. Design an application to implement various string operations such as reversing, case conversion, length, concatenation.
10. Write a program to accept sides of a triangle and then find its area, perimeter and type of triangle using classes (OOP).
11. Design an application to open a text file, modify it and save the changes using built in dialog boxes
12. Write a program to perform various arithmetic operations and implement exception handling.
13. Design a Student Registration Application to store the student data in the database using ADO.Net.

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks). Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
IA-Viva/Report		20	
Total		100	

BSc 6 th Semester		Android Programming	
Subject Code :	16BF25.2	Elective	6.2
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	05
Credits:	5	Examination Hours :	03

- 1. Introduction:** History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture. 6Hrs
- 2. Overview of object oriented programming using Java:** OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine. 10Hrs
- 3. 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 World, run on emulator, Deploy it on USB-connected Android device. 16Hrs
- 4. User Interface Architecture:** Application context, intents, Activity life cycle, multiple screen sizes. 8Hrs
- 5. User Interface Design:** Form widgets, Text Fields, Layout, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog. 10Hrs
- 6. Database:** Understanding of SQLite database, connecting with the database. 10Hrs

Text Books:

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

BSc 6 th Semester		Android Programming Lab	
Subject Code :	16BF26.2	Elective	6.2
IA Marks :	20	Total Teaching Hours :	72
Exam Marks :	80	Teaching Hours/Week :	06
Credits:	6	Examination Hours :	03

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.

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	25	20
	Execution	20	15
	Total	80	
Vva/ Report		20	
Total		100	

BSc 6 th Semester		Network Programming with TCP/IP	
Subject Code :	16BF25.3	Elective	6.3
IA Marks :	20	Total Teaching Hours :	60
Exam Marks :	80	Teaching Hours/Week :	05
Credits:	5	Examination Hours :	03

- 1. INTRODUCTION TO TCP/IP:** Origin of TCP/IP and Internet, Communication, Why do we Need the Internet, Need of Protocol on Communication, Problems in Computer Communication, Dealing with Incompatibility, A Brief History of the Internet, Architecture of the Internet, TCP/IP Layer and Protocols, Network Access Layer, Internet Layer, Need for IP Address, Classes of IP Address, Special Meanings, Who Decides the IP Addresses, Internet Protocol, Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Internet Control Message Protocol (ICMP), Transport Layer, Transmission Control Protocol, User Datagram Protocol (UDP), Application Layer, Electronic Mail, Domain Name System (DNS), How does the DNS Server Works? Simple Network Management Protocol (SNMP), Remote Login: TELNET, World Wide Web: HTTP, Networking Example. 10Hrs
- 2. INTERNET PROTOCOL:** Overview of Internet Protocol, IP Header, IP Address, IP Address Classes, Subnet Masks and CIDR Networks (Classless IP Addresses), Internet-Legal Versus Private Addressing, IP Routing, Routing Protocol, Routing Algorithms. 8Hrs
- 3. TRANSPORT LAYER PROTOCOLS:** Overview of TCP, Transmission Control Protocol (TCP), TCP Header, TCP Connection Establishment and Termination, TCP Connection Establishment, TCP Connection Termination, User Datagram Protocol (UDP). 8Hrs
- 4. APPLICATION LAYER PROTOCOLS:** Domain Name System (DNS), Hierarchical Name Space, Domain Servers, How does DNS Work in Internet, Domain Name Resolution, Messages Used in DNS, Dynamic DNS (DDNS), Electronic Mail, Simple Mail Transfer Protocol (SMTP), Message Transfer Agent, User Agent, Post Office Protocol (POP), Internet Mail Access Protocol (IMAP), Multipurpose Internet Mail Extension (MIME), Telnet, File Transfer Protocol (FTP). 8Hrs
- 5. TCP/IP PROGRAMMING CONCEPTS:** Client Server Communication, Designing Client/Server Programs, Socket Concepts, IP Address and Ports, Byte Ordering, Sketch of Networking Connection, Active and Passive Sockets, Socket Fundamentals, Networking Example. 8Hrs
- 6. SOCKET INTERFACE:** Elementary Socket System Calls, Socket System Call, Bind System Call, Connect System Call, Listen System Call, Accept System Call, Elementary Data Transfer Calls, Closing a Socket, TCP and UDP Architectures, Networking Example. 8Hrs
- 7. SOCKET PROGRAMMING:** Advanced System call, Data Transfer, Byte Operations and Addressing, Socket Options, Select System Call, Raw Socket, Multiple Recipients, Unicasting, Broadcasting, Multicasting, Quality of Service Issues. 10Hrs

Text Books:

1. Advance UNIX Programming Richard Stevens, Second Edition Pearson Education.
2. Advance UNIX Programming, N.B. Venkateswarlu, BS Publication.

BSc 6 th Semester		Network Programming with TCP/IP Lab	
Subject Code :	16BF26.3	Elective	6.3
IA Marks :	20	Total Teaching Hours :	72
Exam Marks :	80	Teaching Hours/Week :	06
Credits:	6	Examination Hours :	03

1. Working with system calls
2. Programs on Shell Programming using UNIX
3. Programs on Client/Server Model
4. Programs on Socket Programming
5. Programs on IPC

Examination:

- One Question has to be given from the above list (Carries 45 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions

Marks Distribution:

Criteria	Marks	
	Question from The List	Examiner's Question
Practical Proper	Writing Program	25
	Execution	20
Total		80
Viva/ Report		20
Total		100

BCA 6 th Semester		Project Work	
Subject Code :	16BF27		
IA Marks :	20	Total Teaching Hours :	52
Exam Marks :	80	Teaching Hours/Week :	04
Credits:	4	Examination Hours :	03

A Team of 1 to 4 students must develop the project. However, during the examination, each student must demonstrate the project individually.

The Team may implement a project of their choice

The team must submit a Project Report that must include the following: 1. Introduction, 2. Requirements, 3. Software Development Process Model Adopted, 4. Analysis and Design Models, 5. Implementation, 6. Testing and conclusion.

Examination:

- Student has to write description about his project based on the questions given by the examiner.
- Each individual team member has to demonstrate the project

Marks Distribution:

Exam	Marks
Write Up	40
Demonstration	40
IA- Report	20
Total	100

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