MARTIN LUTHER CHRISTIAN UNIVERSITY

CURRICULUM
2021-2022

DEPARTMENT OF INFORMATION TECHNOLOGY

MARTIN LUTHER CHRISTIAN UNIVERSITY

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CONTENTS

Introduction:

The course outline for BCA program for the academic 2021-22 will follow as per the recommendation of the 6th BOS meet held on Feb 25, 2020.The credit distribution for BCA program is as follows:

Semesters	Core (LE)	Major	Minor	English and Com	RM	Total credits
I	10	4	0	2	0	16
II	8	4	0	2	2	16
III	4	4	4	2	2	16
IV	4	6	4	2	0	16
V	4	6	4	2	0	16
VI	2	14	0	0	0	16
Total	**32**	**38**	**12**	**10**	**4**	**96**
Internship & Research						
VII	0	16	0	0	0	16
VIII	0	16	0	0	0	16
Grand Total	**32**	**70**	**12**	**10**	**4**	**128**

In order to accommodate students without mathematics or computer knowledge at 10+2 level, the Bridge Course on **Foundation Mathematics** and **Basics of Computer** for the BCA students, which was introduced in the academic year 2020-21, will be followed at 2021-22 academic year also. The course will be of 20 hrs. each and will be completed during the first month of commencement of BCA program

Bachelor of Computer Applications (BCA)
(2021-2022 Batch)

Total Credits: 96 (3 yrs.)/ 128(4 yrs.)

FIRST SEMESTER

SN	Subject	Subject Code	Credits	Page
1.	Concepts of Algorithms & Programming	BCA101	3	1
2.	Mathematical Aptitude	BCA104	1	2
3.	Core 1 (FS)		4	
4.	Core 2 (from other department)		3	
5.	Core 3 (from other department)		3	
6.	English and Communication I	ENGL100	2	
		Total Credits	**16**	
Core offered – Fundamentals of Computer		CSC100	3	44
** Bridge Course – Mathematical Foundation*				51
*** Bridge Course – Basics of Computer*				52

SECOND SEMESTER

SN	Subject	Subject Code	Credits	Page
1.	Digital Logic	BCA155	2	3
2.	Discrete Mathematics	BCA156	2	4
3.	Core 4 (FS)		4	
4.	Core 5 (from other department)		4	
5.	English and Communication II	ENGL150	2	
6.	Research Methodology-I	BCA157	2	
		Total Credits	**16**	**5**
Core offered –PC Assembling and Troubleshooting		CSC150	4	45

THIRD SEMESTER

SN	Subject	Subject Code	Credits	Page
1.	Data Structure	BCA205	2	6
2.	Data Structure-Practical	BCA206	2	7
3.	Core 6 (from other department)		4	
4.	English and Communication III	ENGL200	2	
5	Minor-I(from other department)		4	
6	Research Methodology-II	BCA207	2	8
		Total Credits	**16**	
Core offered – Management in Information		CSC200	4	46
Minor offer to other department- Office Automation systems I(Office Tools)		CSMN216	4	40

FOURTH SEMESTER

SN	Subject	Subject Code	Credits	Page
1.	Programming with Java	BCA255	2	9
2.	Programming with Java-Practical	BCA256	2	10
3.	Fundamental of Operating System	BCA257	2	11
4.	Core 7 (from other department)		4	
5.	English and Communication IV	ENGL250	2	
6.	Minor-II(from other department)		4	
		Total Credits	**16**	
Core offered – Web Designing		CSC250	4	47
Minor offer to other department- Office		CSMN266	4	41

FIFTH SEMESTER

SN	Subject	Subject Code	Credits	Page
1.	Database Management System	BCA305	2	12
2.	Database Management System-Practical	BCA306	1	13
3.	Computer Networks	BCA307	3	14
4.	Core 8 (from other department)		4	
5.	English and Communication V	ENGL300	2	
6.	Minor-III(from other department)		4	
		Total Credits	**16**	
	Core Offered –Documentation using Latex	CSC300	4	49
	Minor offer to other department- Office Automation systems III(Office Suites)	CSMN316	4	42

SIXTH SEMESTER

SN	Subject		Subject Code	Credit Per subject	Credits	Page
1.	Software Engineering		BCA351		3	15
2.	*Elective: Web Technology*	Web Designing	BCAW350	2	8	16
		PHP	BCAW351	3		17
		PHP (Practical)	BCAW352	3		18
	Elective: Hardware and Networking	Basic	BCAH355	2		19
		Windows Server	BCAH356	3		20
		Wireless Network	BCAH357	3		22
	Elective: Mobile	Responsive Web Designing	BCAM350	4		23

	Applications	Android Programming	BCAM351	4		24
	Elective: Animation and Multimedia	Visual Design	BCAG350	4		26
		2D Animation	BCAG351	4		27
3.	Project-I		BCA350		3	
4.	Core 9 (from other department)				2	
				Total Credits	**16**	
	Core Offered-Data Analysis using SPSS		CSC350		2	50

SEVENTH SEMESTER

SN	Subject	Subject Code	Credit Per subject	Credits	Page
1.	Web designing with Scripting Language	BCA400	3	10	28
	Python Programming	BCA401	4		29
	Web Services	BCA402	3		30
	Router Configuration and Security	BCA403	3		32
	Network Switching and Routing	BCA404	3		33
	Linux Server Administration	BCA405	4		34
	Advanced Android Development	BCA406	4		35
	Mobile Application Security	BCA407	3		36
	Visual Effects	BCA408	5		37
	3D Animation	BCA409	5		38
2.	Project-II	BCA410	6	6	
			Total Credits	**16**	

EIGHT SEMESTER

SN	Subject	Subject Code	Credits
1.	Major Project/Research	BCA450	16
		Total Credits	**16**

Master of Computer Applications (MCA)
(2021-2022 Batch)

Total Credits: 64 (2yrs.)

THIRD SEMESTER

SN	Subject	Subject Code	Credits	Page
1	Advanced Java Programming	MCA600	2	54
2	Advanced Java Programming-Practical	MCA601	3	55
3	Analysis and Design of Algorithms	MCA602	4	56
4	Advanced Database Management System	MCA603	2	57
5	Advanced Database Management System-Practical	MCA604	2	58
6	English and Communication-III	ENGL600	2	
		Total Credits	**15**	

FOURTH SEMESTER

SN	Subject	Subject Code	Credits	Page
1	Specialization I (Theory)		2	
	1. PHP -I	MCAS650		59
	2. .Net -I	MCAS652		60
	3. JEE -I	MCAS654		61
2	Specialization I -Practical		3	
	1. PHP-I Practical	MCAS651		62
	2. .Net-I Practical	MCAS653		63
	3. JEE-I Practical	MCAS655		64
3	Advanced Computer Networks	MCA650	4	64
4	Theory Of Computation	MCA651	4	65
5	**MOOCs**	MCA652	2	
6	Computer Graphics	MCA653	3	66
7	Human Values	HNVL600	1	
		Total Credits	**19**	

FIFTH SEMESTER

SN	Subject	Subject Code	Credits	Page
1	Software Project Management	MCA700	3	67
2	Elective I		3	
	1. Data Mining & Data Warehousing	MCAE700		68
	2. Distributed Database System	MCAE701		70
	3. Cloud Computing	MCAE702		71
3	Elective II		3	
	1. Client Server Architecture	MCAE703		72

SIXTH SEMESTER

Bachelor of Computer Applications (BCA)
2021-2022

Subject: CONCEPTS OF ALGORITHMS & PROGRAMMING
Code: BCA101
Credits: 3
Duration: 90 hrs.

OBJECTIVE: To provide fundamental computational concepts underlying in computer programming languages using C programming language

UNIT-I
Introduction to Programming-Computer Programming, Programming Technique, Procedural Programming ,Object Oriented Programming; Design of Algorithm- Definition ,Features of Algorithm, Development of Algorithm for simple problems; Flowcharts-Definition, Features of Flowchart, Basic Symbols used in Flowchart, Development of Flowchart for simple problem; Fundamentals of C Programming - character set, Keywords, identifier, Datatypes, statement, Symbolic constant; Input/ output statement- getchar, putchar, scanf, printf, gets, puts; Operators and expression – arithmetic, relational , unary, logical, assignment operator, conditional operator

UNIT-II
Control statement- if statement, if – else statement, nested if – else statement.. Loop control structure: while, do – while, for, switch, break, continue, goto. Array: single and multi-dimensional array, array declaration and initialization; Strings - declaration, initialization, standard library string functions

UNIT-III
Functions-Need and definition, user defined and library function, declaration and prototype, function arguments, return values and nesting of function, calling of function, recursion

UNIT-IV
Structures: Structure declaration, accessing structures elements, nested structures, array of structures, uses of structures. Unions, unions of structures; Pointers- Introduction to pointers, Dynamic memory allocation; Files- fopen(), fclose(), fseek()

UNIT- V
Graphics Programming:Library file- graphics.h, 2-D Coordinate system, Simple Graphics Functions(initgraph(), line(), circle(), arc(), rectangle(), ellipse(), drawpoly(), closegraph(), restorecrtmode(), setfillstyle(), putpixel(), getmaxx(), getmaxy(), outtextxy(), setcolor(), fillcolor(), settextstyle(), moveto(), lineto(), moverel(), linerel()) Pallete and color, Animation functions(imagesize(),getimage(),putimage())

REFERENCES:

1. E. Balagurusamy, “Programming in C”, TMH Publications
2. Peter Juliff , “Program design”, PPH Publications
3. E. Balagurusamy, “Programming in C++”, TMH Publications.

4. YashavantKanetkar, “Let Us C”, BPB publications
5. S.K Basandra, “Computers Today”, Galgotia Publication
6. Gottfried, B. S., **“**Theory and Problems of Programming with C”**,** New Delhi: Tata McGraw-Hill Publication, 1997

Subject: MATHEMATICAL APTITUDE
Code: BCA104
Credits: 1
Duration: 18 hrs.

OBJECTIVE: To provide foundation and concepts related to mathematical skills and knowledge for understanding the basic rules of mathematics.

UNIT-I

Arithmetic Ability – BODMAS rule, Number, LCM and HCF, Fraction, Simplification, Square and cube root, Average, Problem on ages, Surd and indices, Percentage, Profit and loss, Ratio and proportion, partnership, work and wages, Pipe and cistern, time and distance, Simple & compound interest, area, volume and surfaces, clock & calendar.
Statistics: Measure of dispersion; mean, median and mode.

UNIT-II

Permutations and Combinations: Fundamental principle of counting, Probability: Random experiments: outcomes, Probability of an event, probability of ‘not’, ‘and’, & ‘or’ events, Quadratic equations: splitting the middle terms, simple applications. Data interpretation: Tabulation, graph and chart.

UNIT-III

Mathematical Reasoning - Mathematically acceptable statements. Connecting words/phrases - consolidating the understanding of “if and only if (necessary and sufficient) condition”, “implies”, “and/or”, “implied by”, “and”, “or”, “there exists” and their use through variety of examples related to real life and Mathematics, Syllogism.

REFERENCES:

1. R. D Sharma, “Mathematics Vol. 1 & 2”, Dhanpat Rai Publications; 2017 edition
2. R.S Aggarwal, “Quantitative Aptitude, S Chand Publications; 20th edition

Subject: DIGITAL LOGIC
Code: BCA155
Credits: 2
Duration: 36 hrs.

OBJECTIVES:
(i) To provide basic knowledge for design of digital electronic circuits.
(ii) To provide understanding for the operation of digital computers and design associated with computer hardware.

UNIT- I
Binary Systems – Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers

UNIT-II
Logic Gates, Boolean algebra, Map Simplification: Two Map Method, Two and Three Variable Maps, Four-Variable Map, Product of Sums Simplification

UNIT-III
Combinational Circuits (Half -Adder, Full-Adder, Binary Parallel Adder, BCD Adder, Universal Property of NAND and NOR gates, Combinational Circuits using NAND and NOR gates); Flip flops (SR, D, JK, T, Master Slave, Edge-Triggered, Excitation Tables);

UNIT-IV
Sequential Circuits (Latches, Flip-Flop Input Equations, State Table, State Diagram, Design Example, Design Procedure), Integrated Circuits (Digital Logic Families and Integrated Circuits); Decoders (NAND Gate Decoder, Decoder Expansion, Encoders); Multiplexes (4 to 1 Line Multiplexer, Data Selector); Demultiplexer; Code Converter; Registers (Register with Parallel Load); Shift Registers (Bidirectional Shift Registers with Parallel Load, Serial Register); Binary Counters (Binary Counter with Parallel Load, Ripple Counter); Memory Unit (Random-Access Memory, Read-Only Memory, Types of ROMs)

REFERENCES:
1. M. Morris Mano, "Digital Logic and Computer Design", Prentice Hall of India Pvt. Ltd
2. P. Pal Choudhuri, "Computer Organization and Design", Prentice Hall of India Pvt. Ltd
3. M. Morris Mano, "Computer System Architecture", Prentice Hall of India Pvt. Ltd

Subject: DISCRETE MATHEMATICS
Code: BCA156
Credits: 2
Duration: 36 hrs.

OBJECTIVE: To make students understand the basic concepts of discrete mathematical structure like set, relations, functions, propositional logics.

UNIT-I
Sets – Brief review of basics in set theory such as ways of describing a set, Finite and Infinite Set, Set Operation, Union, Intersection of Set, Complement of Sets, Empty Set, Disjoint Set, De Morgan's Law, Power Sets Cartesian Product, Simple Applications

UNIT-II
Relations and functions-properties of relations, equivalence relation, partial order relation function: domain and range, onto, into and one to one functions, composite and inverse functions

UNIT-III
Boolean algebra-definition and properties of boolean algebra, a brief introduction to the application of boolean algebra to switching theory, conversion of complicated switching circuits to simple one, disjunctive and conjunctive normal forms

UNIT-IV
Functions- characteristic function, composition of functions, binary and n-ary operations, hashing function, recursive functions.Algebraic systems: semigroups and monoids, groups, subgroups, normal subgroups and quotient groups, cyclic groups, homomorphism and isomorphism

REFERENCES:

1. C.L.Liu, " Elements of Discrete Mathematics", McGraw Hill
2. Trembley, J.P & R. Manohar," Discrete Mathematical Structure with Application to Computer Science", TMH
3. Doerr Alan &Levasseur Kenneth, "Applied Discrete Structures for Computer Science", Galgotia Pub. Pvt. Ltd
4. SemyourLipschutz& Marc Lipson, "Discrete Mathematics", Second Edition, Schaum's Outlines, Tata McGraw-Hill Publishing

Subject: RESEARCH METHODOLOGY – I
Code: BCA157
Credit: 2
Duration: 36 hrs.

OBJECTIVE: To enable students understand the basic concepts of research and identify the overall process of designing a research study from its inception to its report

UNIT- I

Introduction Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, and Research approaches, Research Method versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, problem Encountered by Researchers in India. Defining the Research Problem: Definition of Research Problem, Selecting the Problem, Necessity of Defining the Problem Technique Involved in Defining a Problem.

UNIT -II

Measurement and Scaling Technique: Measurement in Research, Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling, Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques.

UNIT- III

Analysis of algorithm-The role of algorithm in computing, brute force concepts -Exhaustive Search – Travelling Salesman Problem – Knapsack Problem; divide and conquer concepts - Binary Search – Merge sort – Quick sort – Heap Sort

UNIT- IV

Typesofresearchreport:DissertationandThesis,researchpaper,reviewarticle,shortcommunication,conferencepresentationetc.,Referencingand referencingstyles,ResearchJournals,IndexingandcitationofJournals,Intellectualproperty,Plagiarism, software for plagiarism checking,

REFERENCES:

1. Kothari C.R., "Research Methodology–Methods and Techniques", New Age International
2. Montgomery, Douglas C., "Design and Analysis of Experiments", Willey.
3. Krishnaswamy, K.N. Sivkumar , AppaIyer and Mathiranjan M., "Management Research Methodology: Integration of Principles, Method and Techniques", Pearson Education
4. Ratan Khananabis and Suvasis Saha, "Research Methodology", Universities Press
5. Vijay Upagade and Aravind Shende, "Research Methodology", S. Chand & Company Ltd
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited

Subject: DATA STRUCTURE
Code: BCA205
Credits: 2
Duration: 36 hrs.

OBJECTIVES: To understand the implementations of algorithms, their efficiencies and to learn the fundamental components of problem solving by designing a method of organizing large amounts of data in an effectively solvable manner .

UNIT–I
Introduction – The concept of data structure, Abstract data type, Concept of list & array, Recursion Functions and its implementation; Introduction to Stack – Stack as an abstract data type, primitive operation on stack, Stacks application: Infix, post fix, prefix and recursion, multiple stack.

UNIT–II
LINKED LIST – Basic operations on linked list, Stacks and queues linked list, Header nodes, Doubly Linked List, Circular Linked List, Application of linked list.

UNIT-III
TREES – Basic Terminology, Binary Trees, Basic operation on Binary tree; Traversal of binary trees – In-order, Pre-order & Post-order, Binary Search Tree and its Applications. GRAPHS – Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, Minimum Spanning Tree, Shortest path algorithm;

UNIT–IV
SORTING – Insertion sort, Selection sort, Bubble sort, Quick sort, Merge Sort, Heap sort, Comparison of sorting methods, Hash Table; Collision resolution Techniques.

REFERENCES:

1. Seymour Lipschutz, “Data Structures”, TATA McGraw-Hill
2. A .A Puntambekar, “ Data structures Using 'C' “, Technical Publications
3. E. Balagurusamy, “ Data Structures Using C “, TATA McGraw-Hill
4. Yashavant Kanetka, “Data Structures Through C”, BPB Publication
5. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, “Data Structures Using C”, Pearson Education India

Subject: DATA STRUCTURE-PRACTICAL
Code: BCA206
Credits: 2
Duration: 72 hrs.

OBJECTIVES: To practice the implementations of algorithms, their efficiencies and to learn the fundamental components of problem solving by designing a method of organizing large amounts of data in an effectively solvable manner .

LIST OF PROGRAMS:

1. Implementation of Concatenation & length using for
2. Implementation of Comparison & length using for
3. WAP to Access substring
4. WAP to find the Factorial using recursion
5. WAP to find the GCD of a number using recursion
6. WAP to find the Tower of Hanoi using recursion
7. WAP to find the Fibonacci Series using recursion
8. WAP to implement Insertion in an Array
9. WAP to implement Deletion in an Array
10. WAP to perform Binary output
11. WAP to implement Linear Binary &Sort
12. WAP to implement Bubble sort
13. WAP to implement Insertion
14. WAP to implement Select
15. WAP to implement Merge
16. WAP to implement Quick
17. WAP to implement BST & Tracing
18. WAP to Create a Linked list
19. WAP to implement Insertion in a linked list
20. WAP to implement Deletion in a linked list
21. WAP to implement Searching in a linked list
22. WAP to implement Double Linked list
23. WAP to implement Circular Linked list
24. WAP to implement Stack push and pop array
25. WAP to implement Stack Linked list
26. WAP to implement Queue Array and Linked List
27. WAP to implement Double and circular Queue
28. WAP to implement Circular Stack

Subject: RESEARCH METHODOLOGY II
Code: BCA207
Credit: 2
Duration: 32 hrs.

OBJECTIVE: To enable students analysing, interpreting research report, documenting the report using Latex

UNIT-I
Methods of data collection-collection of primary data, collection of secondary data; Processing and analysis of data-processing operations, statistics in research; Sampling Fundamentals: Need for Sampling, Some Fundamental Definitions, Central Limit Theorem, Sampling Theorem, Sandler's A-test, Concept of Standard Error, Estimation, Estimating the Population Mean, Estimating the Population Proportion, Sample size and its Determination, Determination of Sample Size through the Approach, Based on Precision Rate and Confidence Level, Determination of Sample Size through the Approach basedon Bayesian Statistics.

UNIT-II
Interpretation and Report Writing-Meaning of Interpretation, Technique of Interpretation: Precaution in Interpretation, steps in writing report, types of report, Case study.

UNIT- III
Latex and its Advantages, Installation of Latex; LaTex input file, special characters, comments. Input files structure. Layout of the document: document classes, packages, splitting a big latex file.
Typesetting Text: Line and page breaking, ready-made strings for date, etc. more special characters and symbols, titles/chapters and sections, cross references, footnotes, etc. Environments: itemize, enumerate, quote, abstract, verbatim, tabular, including graphics and images, floating bodies.

UNIT-IV
Typesetting Mathematical Formulae: single equations, building blocks, multline single equations, multiple equations, arrays and matrices, Math fonts using \mathcal{}, theorems, lemmas, common mathematical symbols (greek letters),Bibliography, hypertext links. Creating Presentation using beamer;

REFERENCES:

1. KothariC.R.,"ResearchMethodology–MethodsandTechniques",NewAgeInternational
2. Y. P. Agarwal, "Statistical Methods: Concepts, Application and Computation", Sterling Publs., Pvt., Ltd
3. G. Nageswara Rao,"Research Methodology and Quantitative methods", BS Publications
4. Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl, "The Not So Short Introduction to LATEX 2e", Published by Free Software Foundation
5. E. Krishnan and G. S. Krishna, "LATEX Tutorials – A primer Indian TEX Users Group". (Online versions: http://www.tug.org.in/tutorials.html)

Subject: PROGRAMMING WITH JAVA
Code: BCA255
Credits: 2
Duration: 36 hrs.

OBJECTIVES:
1. To identify Java language components and how they work together in applications
2. To design and program stand-alone Java applications
3. To learn how to implement object-oriented designs with Java
4. To learn how to use exception handling in Java applications

UNIT-I
Basic concepts of OOP-Benefits and Applications of OOP; Java Evolution -Java History and Features, Difference of Java from C and C++, Java and Internet, Java and WWW, Web browsers, Hardware and Software requirements, Java Support systems, Java Environment; Overview of Java Language-Simple java Program, An application with two classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, JVM,
Command Line Arguments, JIT, Bytecodes

UNIT-II
Constants, Variables, Arrays and Data Types; Operators and Expressions- Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, bitwise Operators. Arithmetic Expression and Evaluation, Conversion and Casting Decision Making and Branching - If statement-If...Else statement-Nested If...Else statement- Switch Statement- Conditional Operator; Decision making and Looping-While, do, for Statements, Jumps in loops

UNIT-III
Classes, Objects, Methods ; Inheritance; basic swings; Interfaces: Multiple Inheritance; Packages-Putting Classes together; Introduction to Multithread Programming,, Multi threading, Thread Life cycle, Multi threading advantages and issues, Simple thread program, Thread synchronization.

UNIT-IV
Managing Errors and Exceptions; I/O Basics, Reading Console Input, writing Console Output; Networking

UNIT-V
GUI: Introduction to AWT programming, Layout and component managers, Event handling, Applet class; Applet life cycle, Passing parameters, embedding in HTML, Applet Basics and Applet Programming; Graphics programming; Swing components, JApplet, JButton, JFrame, etc. Sample swing programs, The Java Library: Strings

REFERENCES:
1. Herbert Schildt, "The Complete Reference Java 2", Fifth Edition, Tata McGraw Hills Publishing Company Limited.

2. E Balagurusamy, “Programming with Java- A Primer”, Third Edition, Tata McGraw Hill Publishing Company Limited.
3. John Hubbard, “Programming with Java”, Schaum’s Outlines, Tata McGraw Hill Publishing Company Limited.
4. Cay S. Horstmann, “Core Java, Volume I : Fundamentals (English)”, 9th Edition
5. Joyce Farrell, “Java Programming”, Seventh Edition

Subject: PROGRAMMING WITH JAVA-PRACTICAL
Code: BCA256
Credits: 2
Duration: 72 hrs**.**

OBJECTIVES: To adapt to changes in environment and to implement advances in the art of programming. Java also embodies changes in the way that people approach the writing of programs.

CONTENTS:
1. To implement simple program based on operator loop decision statements
2. To implement Program to define Class and instantiate Objects
1. Program to implement constructor and Method overloading and Method overriding
2. Program to create components using Swing
3. Program to implement Wrapper Class and command line argument
4. Program to demonstrate packages and interfaces
5. Program to demonstrate Single level and Multi level inheritance
6. Program to demonstrate Exception Handling
7. Program to demonstrate Multithreading and Synchronization
8. Program to implement Server and client using networking
9. Program s using Applet Class
10. Program to perform String Class and String Buffer Class

Subject: FUNDAMENTAL OF OPERATING SYSTEM
Code: BCA257
Credits: 2
Duration: 36 hrs.

OBJECTIVE: To describe the major workings of an operating system, their functions and purpose to achieve a knowledge foundation of system softwares’ functionings and behaviours.

UNIT-I
Introduction – Definition, Types of Operating System, Functions of the Operating System, Operating Systems Services, System Calls, Single User, Multi User and Multitasking Operating System

UNIT-II
Process Management – Process, Scheduling, CPU Scheduling Concepts, Process Synchronization, Semaphore, Classical Problems of Synchronization, Deadlocks, Deadlock Detection, Deadlock Recovery.

UNIT-III
Memory Management – Introduction, Logical address V/s Physical address, Swapping, Contiguous Allocation: Partitions, Fragmentation, Paging, Segmentation.Virtual Memory: Page Replacement, Page Replacement Algorithms.

UNIT-IV
File Management – File concepts, Access Methods, File System Mounting, File System Implementation, Partitions and Mounting.

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Eighth-Tenth Edition, Wiley-India Publication.
2. Stalling, W., "Operating system,"Sixth Edition, Prentice Hall (India).
3. SibsankarHaldar and Alex A. Aravind, "Operating Systems", Pearson Education.

Subject: DATABASE MANAGEMENT SYSTEM
Code: BCA305
Credits: 2
Duration: 36 hrs.

OBJECTIVES: The objective of this Course is to introduce to the students the fundamental concepts necessary for designing, using and implementing database systems and applications. The Course stresses on database modelling and design, physical file storage techniques and language facilities provided by database management systems.

UNIT-I
Overview of the database management system[1]- Database systems , Need for Database ,Advantages of using a database, Characteristics of data in a database , Functions of DBMS, Data abstraction, Data independence, Overall Architecture of DBMS, Three level architecture; Data Models[1]- Relational Data Models, ER Model, Hierarchical models, Networking models, Advantages and Disadvantages of each models

UNIT-II
Entity Relationship model: Components, Symbols, Class and Objects, Attributes; Specialization – Aggregation; Relational Model[1]– Characteristics of Relational Database Model, CODD's rules, Tables, Rows, Columns, Domains, Attributes, Candidate Key, Primary Key, Foreign Key, Super Keys, Unique Keys, Constraints; Normalization[1] -Purpose of Normalization, Functional Dependence, Relational database Design, Normal forms, 1NF, 2NF, 3NF, BCNF, 4NF

UNIT-III
Introducing MySQL[2] –History, Role of MySQL in industry, Version of MySQL, Architecture, Engines; MySQL queries[2]- Data types, operators, functions; Working with Databases and Tables-Creating, Copying, Modifying Tables

UNIT-IV
MySQL Advance [2]-Show commands, Working with date and Time data types, Joins like Cross, Inner, Outer, Self, Unions, Subquery, Procedure, Triggers, Views,index, MySQL database export and import

UNIT-V
Database Backup and Recovery: Hardware Protection and Redundancy; Transaction Logs; Importance of Backups; Database recovery; Data storage; Causes of failures ; Concurrency Control; Database Security and Integrity

REFERENCES:

1. Abraham Silberschatz- Henry K. Korth- S. Sudarshan, "Database System Concepts", 4th edition, McGraw Hill International Edition
2. VikramVaswani,"MySQL (TM): The Complete Reference", McGraw Hill Education Publication
3. Madhilika Jain- Vineeta Pillai- Shashi Singh- Satish Jain, "A Level- Introduction to Database Management Systems", BPB Publications
4. R S Gill, "Database Management System", I K International
5. R Elmasri and S B Navathe, "Fundamentals of Database Systems", Pearson Publication
6. G. K. Gupta, "Database Management System", Tata McGraw Hill Publication

Subject: DATABASE MANAGEMENT SYSTEM-PRACTICAL
Code: BCA306
Credits: 1
Duration: 36 hrs.

OBJECTIVES: To implement database concepts using MySQL.

LIST OF PROGRAMS:
1. Working on MySQL DDL, DML, DTL Basic Data Types
2. Table Constraint definition Commands to create table
3. Commands for table handling Alter table, Drop table, Insert records
4. Commands for record handling Update, Delete Select with operators like arithmetic, comparison, logical Query Expression operators Ordering the records with orderby Grouping the records
5. MySQL functions Date, Numeric, Character, conversion Group functions avg, max, min, sum,count
6. Set operations Union, Union all, intersect, minus
7. Join concept Simple, equi, non equi, self, outer join
8. Query & sub queries

9. Working on View Intro, create, update, drop
10. Working with index
11. Primary introduction to User creation, granting privileges (Grant, Revoke, Commit, Rollback, savepoint)
12. Write a query in Mysql to create a table employee and department.
    Employee(empno,ename,deptno,job,hiredate)
    Department(deptno,dname,loc)
    Include the following constraints on column of emp table.
    a) to make the empno as primary key of the table and
    b) to ensure that the ename column does not contain NULL values and
    c) the job column to have only UPPERCASE entries and
    d) to put the current date as default date in hire date column in case data is not supplied for the column.
    Include the following constraints on column of dept table.
    a) to make deptno as primary key.
    b) to ensure dname, loccoloumns does not contain NULL values REFERENTIAL INTEGRITY, declare deptno field of dept table as primary key and deptno field of emp table as foreign key.

Subject: COMPUTER NETWORKS
Code: BCA307
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To understand state-of-the-art in network protocols, architectures and applications, process of networking.

UNIT-I

Introduction – Basic Communication Model, Data Communications, Computer Network Criteria, Types of connections; Network topology types – Bus Topology, Ring Topology, Star Topology, Mesh Topology and Tree Topology; Man, Wan, LAN; Goals and Applications of computer networks, Network Functions, Network Hardware, Designs Issues for layers, Interfaces and Services, Connection oriented and Connectionless Services; Introduction to OSI Model – Functions of each layers, The TCP/IP Reference Model, Comparison of OSI and TCP/IP Models, Physical Layer, Digital Signals, Data Transmission Concept; Types of transmission – Wired and Wireless Media and its types, Satellite Networks and its types; Packet Switching; Message Switching; Broadband ISDN;

UNIT-II

Introduction to Data Link Layer ;Services Provided by the Data Link Layer to the Network Layer; Framing; Farming Methods – Character Count and Bit Stuffing; Error Control; Introduction to Error Detection and Correction; Error Detection – Content Error and Flow Integrity Errors; Two Dimensional Parity Check; Cyclic Redundancy Check – CRC generator and CRC checker; Check Sum; Hamming Codes, Flow Control; Sliding Window Protocol; Automatic Repeat Request (ARQ) ARQ techniques – Stop and Wait ARQ, Go BACK –n ARQ and Selective Repeat Request;

UNIT-III
Medium Access Layer – CSMA , CSMA/CD, Collision – Free Protocols; IEEE 802 Standards; Token Bus – IEEE 802.4;Token Ring – IEEE 802.5;Introduction to Network Layer; Routing algorithm – Static Algorithm - Dijkstra's Algorithm, Bellman-Ford routing algorithm, Flooding, Flow Based Routing; Dynamic Algorithm - Distance Vector Routing Algorithm and , Count to Infinity Problem, Link State Routing Algorithm; Congestion - Open and Close Loop Control; Congestion control in Datagram Subnets; Traffic Shaping - Leaky bucket and Token Bucket; Fragmentation; Firewall; Tunneling; IP address and its classes; Unicast and Multicast Routing;

UNIT-IV
Transport Layer – Transport layer Services; Sockets and its types; Addressing in Transport Layer; Crash Recovery; TCP and UDP; TCP Protocols; TCP Segment Header; Check Sum; TCP transmission Policy – Silly Window Syndrome; TCP Congestion Protocol; Session Layer and Presentation Layer; Domain Name System; Electronic Mail; MIME; SMTP; Email- Gateways; FTP; TFMP; Caching; Mail Server

REFERENCES:
1. A.S. Tannenbaum, "Computer networks", Second Ed., Prentice Hall India.
2. Halsall, "Data Communication, Computer Networks", Pearson Education.

Subject: SOFTWARE ENGINEERING
Code: BCA351
Credits: 3
Duration: 54 hrs**.**

OBJECTIVE: To provide the students with the concept of software engineering fundamentals, principles and skills needed to develop and maintain high quality software products and to make the students to learn the processes and techniques of software engineering which include requirements specification, design, implementation, testing and management of software projects.

UNIT-I
Introduction –Evolution, software definition, S/W types, S/W characteristics, Software failures; Software engineering: definition, Terminology, Components, Application, Myths, Software Engineering Process and Product;

UNIT-II
Software Development Life Cycle (SDLC) Models; SRS and S/W Design – Role of SRS, IEEE Standards for SRS Documents, Requirement Engineering; Structured Information – DFD and Data Dictionary ; Requirements specification design fundamentals – characteristic of SRS, SRS Validation , Components of SRS, Entity-Relationship Diagram;

UNIT-III
Software Project Planning, management and Metrics–Project management process, Measuring software, LOC and function point metrics, metrics for software quality; Estimation – Scope,

resources, estimation technique, COCOMO model; Decomposition Technique – Empirical Models , automated tools; Design specification, design objectives and principles, structured design, Modularity, Coupling, Cohesion, Structured design Methodology, Most Abstract Input(MAI); OO design; verification;

UNIT-IV

Coding and Testing – Program Development, Verification, Monitoring and Control; Testing fundamentals; testing principles and objectives, Functional Testing; Structural testing; Testing Strategies, level of testing, test plan, test case design

SQA and Software Maintenance – SQA Plans; Formal technique reviews; Metrics; Corrective Maintenance; Adaptive Maintenance and Preventive Maintenance;

UNIT-V

IEEE-CS/ACM - Software Engineering Code of Ethics-Introduction, purpose, preamble, principles-public, client and employer, product, judgment, management, profession, colleagues, self; Plagiarism – What is it, types, Five levels or degrees of plagiarism, prevention, MLCU policy, IEEE plagiarism guidelines, citation-APA, IEEE;

REFERENCES:

1. B. B. Agarwal, S. P. Tayal, M. Gupta,"Software engineering & testing", Jones and Bartlett Publishers
2. Roger Pressman's, "Software Engineering: A Practitioner's Approach", Pearson Publication
3. R.E. Fairley, "Software Engineering Concepts", Courseback Edition, McGraw Hill
4. EEE-CS/ACM - Software Engineering Code of Ethics - Don Gotterbarn, Keith Miller, Simon Rogerson Executive Committee, IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices
5. Bruegge, Bernd and Allen H. Dutoit. "Object-Oriented Software Engineering: Using UML,Patterns and Java",Pearson: Prentice Hall Publishers
6. Schmuller, Joseph "SAMS Teach Yourself UML in 24 Hours", Sams Publishing

Elective: Web Technology

Subject: WEB DESIGNING
Code: BCAW350
Credits: 2
Duration: 72 hrs.

OBJECTIVE: To enable students to design websites using HTML, CSS

UNIT I:

Introduction to HTML, History of HTML,HTML tag: html, head, body, attributes: Id attributes, class attributes, class attribute, style attribute, elements <p>,heading element<h>,
, Formatting tag:

<u>, <b>, , <i>, , <mark>, <small>, <big>, <del>, <ins>, <sub>, <sup>, <strike>, <tt>, meta tag.

UNIT II:
Anchor tag: href attribute, <a> tag, HTML font tag: size, color, style, HTML imgtag,src attribute of IMG tag, video tag, alt attribute, border attribute, hspace attribute, vspace attribute, height and width, color, bgcolor, styles, alignment.

UNIT III:
HTML phrase tags: Emphasize, marked, strong, abbreviation, acronym, definition tag, quoting, short quote, code, keyboard, address.
Table tag, border attribute of table tag, border attribute, heading, colspan and rowspan attribute, cell-padding and cell-spacing attribute, table background and border color nesting tables.

UNIT IV:
HTML list tags: <ol>, <ul>, <dl>, <li>, <dt>, <dd>, textbox, button, HTML Form controls-form, text, password, textarea, button, checkbox, radio button, select box, label.

UNIT V:
Layout: <header>, <nav>, <section>, <article>, <aside>, <footer>, <details>, <summary>, CSS: selectors id, class selector, universal selector, grouping selector, external CSS, internal CSS and inline CSS, background-color, background-image, background-repeat, background-attachment, background-position, border styles, margin, padding, height/width, text fonts, outline, icon, links.

REFERENCES:

1. Julie C. Meloni, "Sams Teach Yourself HTML, CSS All In One", Pearson Publication
2. Head First HTML with CSS & XHTMLby Eric Freeman, Elisabeth Robson, O'Reilly Media, Inc.
3. Craig Grannell, "The Essential Guide to CSS and HTML Web Design", Apress Publication
4. Thomas Powell, "HTML & CSS: The Complete Reference", McGraw Hills Publication

Subject: PHP
Code: BCAW351
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To provide students with basic PHP technology with emphasis on program structure, language syntax, and its implementation.

UNIT-I
Essential PHP - Getting PHP, Creating your development Environment, Creating a first PHP Page, Mixing HTML and PHP, Printing some text, Printing some HTML, Echo power, Working with variables, Storing Data in variables, Interpolating Strings, Creating variable variables, Creating constant, Understanding PHP internal Data Types

UNIT-II
Operators and Flow Controls – PHP Math operators, Working with the assignment operators, Incrementing and decrementing values, String operators, Operator precedence, Using If statement, PHP Comparison operators, PHP Logical operators, Else statement, Elseif statement, Switch statement, Using For loops, Using While loops, Using Do…While loops, Using foreach loop, Terminating loops early, PHP alternate syntax

UNIT-III
Strings and Arrays – String functions, Converting to and from strings, Formating Text strings, Building yourself some arrays, Modifying the Data in arrays, Deleting arrays with loops (for loop, print_r function, for each loop, while loop), PHP array Functions, Extracting Data from arrays, Sorting arrays, Using PHP array operators, Comparing array with each other, Handling Multidimensional arrays in loops, Splitting and Merging arrays, other array functions

UNIT-IV
Creating Functions – Creating functions in PHP, Passing functions some Data, Passing arrays to functions, Passing by reference, Passing variable numbers to arguments, Returning Data from arrays, Returning arrays, Returning List, returning reference, Introducing variable Scope in PHP, Accessing Global Data, Working with Static variables, PHP conditional functions, PHP variable functions

UNIT-V
Reading Data in Web Pages – Setting up web pages to communicate with PHP, Handling Text fields, Handling Text areas, Handling Check boxes, Handling radio buttons, Handling List boxes, Handling Password controls, Handling Hidden controls, Handling image Maps, Handling Buttons(Making Button data Persist, using Submit Buttons as HTML buttons)

REFERENCES:

1. Peter MacIntyre , RasmusLerdorf , Kevin, "Programming PHP", O'Reilly
2. GSteven Holzner, "Php: The Complete Reference", Mcgraw Hill Education
3. VikramVaswani, "PHP 5.3: A Beginner's Guide : A Beginner's Guide", Mcgraw Hill Education
4. Janet Valade, "PHP and MySQL For Dummies, 4th Edition", John Wiley & Sons Inc

Subject: PHP-PRACTICAL
Code: BCAW352
Credits: 3
Duration: 108 hrs.

OBJECTIVE: To practice writing program using PHP on notepad++ and other IDE

1. WAP in PHP to print some text
2. WAP in PHP to store data in variables, Interpolating Strings, Creating variable variables, creating constant.

3. WAP in PHP using math operators, for Incrementing and decrementing values, String operators, Operator precedence.
4. WAP in PHP using If statement, PHP Comparison operators, PHP Logical operators, Else statement, Elseif statement, Switch statement, Using For loops, Using While loops, Using Do…While loops, Using foreach loop, Terminating loops early, PHP alternate syntax.
5. WAP in PHP using String functions, Modifying the Data in arrays, Deleting arrays with loops (for loop, print_r function, foreach loop, while loop), PHP array Functions, Extracting Data from arrays, Sorting arrays, Using PHP array operators, Comparing array with each other, Handling Multidimensional arrays in loops, Splitting and Merging arrays, other array functions
6. WAP in PHP using Creating functions in PHP, Passing functions some Data, Passing arrays to functions, Passing by reference, Passing variable numbers to arguments, Returning Data from arrays, Returning arrays, Returning List, returning reference, Introducing variable Scope in PHP, Accessing Global Data, Working with Static variables, PHP conditional functions, PHP variable functions.
7. WAP in PHP using Handling Text fields, Handling Text areas, Handling Check boxes, Handling radio buttons, Handling List boxes, Handling Password controls, Handling Hidden controls, Handling image Maps, Handling Buttons(Making Button data Persist, using Submit Buttons as HTML buttons)

Elective: Hardware and Networking

Subject: BASIC ELECTRONICS
Code: BCAH355
Credits: 2
Duration: 54 hrs.

OBJECTIVE: To make the students understand the efficacy of Electronic principles which are pervasive in engineering applications

UNIT-I

Basic Electricity and conducting Material: Introduction, Current, Voltage, emf, Power generation system, Switch- plug wiring, Analyzing Conductivity of elements, Types of Conductors, Semiconductors - Silicon, Germanium.

UNIT-II

Electronics Components: Resistors, Capacitors, Inductors, Transforms, Types, working and Properties, Voltage and current sources, Diode, Zener diode, Photo diode, Light emitting diode(LED), Transistors (NPN,PNP), their characteristics and uses, Field effect transistor, Phototransistor.

UNIT-III

Electronics Circuits: AC Fundamentals, Ohm's law, Series and Parallel connection of Registers and Capacitors, Half wave rectifier, Full wave rectifier and Bridge rectifier.

UNIT-IV

Regulated Power Supply: Basic regulated power supply using Zenerdiode; Block diagram of IC based Power supply;Basic Switch Mode Power Supply (SMPS); Basic uninterrupted Power Supply (UPS)

UNIT-V

Basic Measuring Instruments: Multimeters – Electronics and Digital, Cathode Ray Oscilloscope (CRO), Block diagram and basic working; Different uses of CRO, LCR – Q meter. Different tools used for practicals; Soldering and desoldering practice

REFERENCES:

1. B.L Theraja, "Basic Electronics", S.Chand
2. Albert Paul Malvino,"Digital computer Electronics, and Code", Tata McGraw-Hill Public
3. Malvino,"Electronics Principles", McGraw-Hill Publication

Subject: WINDOWS SERVER ADMINISTRATION
Code: BCAH356
Credits: 3
Duration: 108 hrs.

OBJECTIVE: The goal is to equip the students with the skills to Configure, administer and manage a Windows Server.

CONTENTS:

1. Installing and Configuring Windows Server 2008
2. Install Server Core; optimize resource utilization by using Features on Demand; migrate roles from previous versions of Windows Server
3. Configure Server Core; delegate administration; add and remove features in offline images; deploy roles on remote servers; convert Server Core to/from full GUI; configure services; configure NIC teaming
4. Configure local storage ;Design storage spaces; configure basic and dynamic disks; configure MBR and GPT disks; manage volumes; create and mount virtual hard disks (VHDs); configure storage; pools and disk pools
5. Configure server roles and features ;Configure file and share access; Create and configure shares; configure share permissions; configure offline files; configure NTFS permissions; configure access-based enumeration (ABE); configure Volume Shadow Copy Service (VSS); configure NTFS quotas ;Configure print and document services
6. Configure the Easy Print print driver; configure Enterprise Print Management; configure drivers; configure printer pooling; configure print priorities; configure printer; permissions
7. Configure servers for remote management; Configure WinRM; configure down-level server management; configure servers for day-to-day management tasks; configure multi-server management; configure Server Core;

8. Configure Windows Firewall ;Configure Hyper-V
9. Create and configure virtual machine settings ;Configure dynamic memory; configure smart paging; configure Resource Metering; Configure guest integration services
10. Create and configure virtual machine storage ;Create VHDs and VHDX; configure differencing drives; modify VHDs; configure pass-through disks; manage snapshots; implement a virtual Fibre Channel adapter
11. Create and configure virtual networks; Implement Hyper-V Network Virtualization; configure Hyper-V virtual switches; optimize network performance; configure MAC addresses; configure network isolation; configure synthetic and legacy virtual network adapters;
12. Deploy and configure core network services ;Configure IPv4 and IPv6 addressing Configure IP address options; configure subnetting; configure supernetting; configure interoperability between IPv4 and IPv6; configure ISATAP; configure Teredo
13. Deploy and configure Dynamic Host Configuration Protocol (DHCP) service; Create and configure scopes; configure a DHCP reservation; configure DHCP options; Configure client and server for PXE boot; configure DHCP relay agent; authorize DHCPserver
14. Deploy and configure DNS service; Configure Active Directory integration of primary zones; configure forwarders; configure Root Hints; manage DNS cache; create A and PTR resource records
15. Install and administer Active Directory; Install domain controllers; Add or remove a domain controller from a domain; upgrade a domain controller; install Active Directory Domain Services (AD DS) on a Server Core installation; install a domain controller from Install from Media (IFM); resolve DNS SRV record registration issues; configure a global catalog server
16. Create and manage Active Directory users and computers; Automate the creation of Active Directory accounts; create, copy, configure, and delete users and computers; configure templates; perform bulk Active Directory operations; configure user rights; offline domain join; manage inactive and disabled accounts
17. Create and manage Active Directory groups and organizational units (OUs) ;Configure group nesting; convert groups including security, distribution, universal, domain local, and domain global; manage group membership using Group Policy; enumerate group membership; delegate the creation and management of Active Directory objects; manage default Active Directory containers; create, copy, configure, and delete groups and OUs
18. Create and manage Group Policy ;Configure a Central Store; manage starter GPOs; configure GPO links; configure multiple local group policies; configure security filtering
19. Configure security policies; Configure User Rights Assignment; configure Security Options settings; configure ;Security templates; configure Audit Policy; configure Local Users and Groups; configure
20. User Account Control (UAC) ;Configure application restriction policies; Configure rule enforcement; configure Applocker rules; configure Software Restriction Policies
21. Configure Windows Firewall ;Configure rules for multiple profiles using Group Policy; configure connection security rules; configure Windows Firewall to allow or deny applications, scopes, ports, and users; configure authenticated firewall exceptions; import and export

REFERENCES:

1. Hassell J.," Learning Windows Server 2008", O'Reilly Media.
2. Hassell J., "Windows Server 2008: the definitive guide", O'Reilly Media
3. Tom Carpenter, "Microsoft Windows Server Administration Essentials Courseback", Pearson

4. MTA Windows Server Administration Fundamentals (Microsoft Official Academic Course) Courseback ;Microsoft Official Academic Course
5. Mark Minasi, Kevin Greene , Christian Booth, Robert Butler, John Mccabe, "Mastering Windows Server 2012 R2"

Subject: WIRELESS NETWORK SECURITY
Code: BCAH357
Credits: 3
Duration: 54 hrs.

OBJECTIVES: To enable students to acquire basic knowledge of fundamentals of wireless cellular, ad hoc and sensor networks, wireless communication fundamentals, medium access control, network and transport protocols, unicast and multicast routing algorithms, mobility and its impact on routing protocols, application performance, quality of service guarantees, and security.

UNIT-I
Introduction to wireless network architectures: cellular networks, wireless local area networks, multi-hop networks. Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA –TDMA – CDMA – Cellular Wireless Networks.

UNIT-II
Wireless LAN and Wireless Wans-IEEE 802.11 Standards – Architecture – Services, Physical Layer-MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard; Wireless wans-First Generation Analog, Second Generation TDMA – GSM, Short Messaging Service in GSM, Second Generation CDMA – IS-95, GPRS - Third Generation Systems (WCDMA/CDMA 2000).

UNIT-III
Wireless MANS AND PANS-Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

UNIT–IV
Adhoc and sensor networks-Characteristics of MANETs, Table-driven and Source- initiated On Demand routing, protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT–V
Services, mechanisms and attacks; Security architecture – security services, authentication, data confidentially, data integrity, nonrepudiation, availability; Security Mechanisms-attacks; Security network model.; Classical Encryption techniques-Symmetric cipher model, Cryptography, Cryptanalysis; Substitution techniques – Caesar Cipher, Monoalphabetic Cipher, Playfair Cipher, Transposition techniques. Authentication and key establishment ,Buffer overflow attacks ,Web

security, Internet worms, viruses, spyware, Spam, phishing, botnets, denial of service ,TCP/IP and DNS security ,Firewalls and intrusion detection systems Wireless security.

REFERENCES:

1. William Stallings, "Wireless Communications and networks", Pearson Education
2. Dharma Prakash Agrawal & Qing-An Zeng, "Introduction to Wireless and Mobile Systems", Thomson India Edition
3. Kaufman, Perlman, and Speciner," Network Security", Pearson Education

Elective: Mobile Applications

Subject: RESPONSIVE WEB DESIGNING
Code: BCAM350
Credits: 4
Duration: 108 hrs.

OBJECTIVES: To enable students designing responsive sites using a combination of fluid layouts, media queries, and fluid media; adopt a responsive workflow from the very start of a project.

UNIT-I

Foundation of responsive design-what is responsive design, why responsive design; Responsive content-content strategy, managing content, content governance, adaptive content

UNIT-II

HTML for responsive sites- working with HTML, basic page structure, viewport, structural elements, creating page, clean and semantic HTML;CSS for responsive sites-how CSS works, CSS version, using cascade, organizing your stylesheet, the box model, display, positioning, float and clear, basic styles; media queries-what is media query-structure-using media queries in stylesheet links, what we can query, browser support, breakpoints, design ranges; Images-way to display images, alt text, image file formats, optimizing images, content images, background images, responsive images

UNIT-III

Working responsively-responsive workflow, strategy and planning, content before layout, thinking about layout, prototypes, visual design, responsive design tools; Mobile and beyond-user experience, device agnostic design, focusing on mobile first, types of devices, touch, screen size, accessibility, deciding which devices to support, testing

UNIT-IV

Designing responsive websites-typography, start with HTML, typefaces, using fonts, sizing text, line length, whitespace, margins and padding, changing typeface for screen size; Navigation and header layout-responsive navigation, branding, navigation links, navigation patterns

UNIT-V
Performance-why performance matters, performance as design, how web pages are loaded and rendered, measuring performance, cleaning up code, minimizing HTTP requests, server stuff, Javascript, CSS, hosting, conditionally loading content, reflows and repaints, RESS

REFERENCES:

1. Clarissa Peterson, "Learning Responsive Web Design: A beginner's guide", O'Reilly Media, Inc
2. Brett Romero, "Responsive Web Design Overview : For Beginners", Createspace Publication
3. Benjamin LaGrone,"HTML5 and CSS3 Responsive Web Design Cookbook", Shroff / Packt Publication

Subject: ANDROID PROGRAMMING
Code: BCAM351
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable student understand the android application life cycle, Identity, analyze, choose tools and acquired skills for developing android applications

UNIT-I
Introduction to Android, Smartphone features, Installing the SDK, Creating Android Emulator, Installing Android development tools, Choosing which Android version to use, Android Life cycle, Android applications structure.

UNIT-II
Creating a project, Working with android manifest.XML,Various controls,Layouts,Text controls,Button controls Images,Supporting Multiple Screen,Andriod Activities, Application context,Intent WebView.

UNIT-III
List View,Spinner,AutoComplete Textview, MultiAutoComplete extview,Toast,Dialogue Notification, Statusbar Notification, Option Menu, Context Menu, contextual action mode, Popup menu,menu from xml, Linkify, Match Filter & Transform Filter

UNIT-IV
Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers, Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers,An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler

UNIT-V

Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities, Multimedia: Audio, Video, Camera, Playing Audio and Video, Recording Audio and Video, Using the Camera to take and Process Pictures

REFERENCES:

1. Warren Tim,"Android Programming For Beginners", Ingram Publishing
2. ZigurdMednieks, Laird Dornin, G. Blake Meike,"Programming Android",O'Reilly
3. Jason Wei,"Android Database Programming", Packt Publishers

Elective: Animation and Multimedia

Subject: VISUAL DESIGN
Code: BCAG350
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable students to design various documents using adobe flash, Photoshop. InDesign

CONTENTS:

1. Installing Flash software and familiar with flash workspace, flash document setup, run and publishing.
2. Working with text tool, transforming text, skew, break apart and color text, vertical text, rotate, zoom text
3. Working with graphic symbol, button symbol, movie clip symbol
4. Working with shape tween, mask, spotlight, motion guides, motion tween, motion presets
5. Working combine flash movies, add scenes, load movies
6. Working with graphic brightness, tint, alpha and remove background
7. Working with sound, video and desco drawing tool
8. Working with time line and produce different animation
9. Installing photoshop and familiarizing with its environment, raster and vector Graphics, Photoshop Environment Elements, Navigating in Photoshop, Sizing Images Image Size and Resolution
10. Working with image cropping, selecting Image Areas, rectangular and elliptical marquee tools, the lasso tools, saving selections, layers, floating versus fixed selections, undoing previous steps, copying selections, creating layers, transforming layers, copying layers between images, arranging layers
11. Working with magic wand tool, the magnetic lasso tool, modifying selections, blending and compositing, defringing, opacity and blending modes, feathering edges, image modes, mode characteristics, grayscale and bitmap modes, color modes, color and painting, selecting colors

12. Painting Tools, The Clone Stamp Tool, Text, Layer Effects, and Filters, Type Layers, Layer Effects, Filters, Merging and Flattening Layers, Adjusting Images, Brightness/Contrast, Levels Adjustment Layers, Toning Tools, Hue/Saturation
13. Working with Adobe Indesign-Getting to know tools, panels, and workspaces, Learning how to navigate and zoom in a document, Working with layers for efficiency and organization, Setting up master pages in a document, Building automatic page numbering and sections, Creating text and graphics placeholder frames
14. Understanding text and graphics frames, Grouping and transforming frame s, Formatting text using paragraph and character styles, Flowing, threading, and spell -checking text in text frames, Adding color: swatches, gradients and tints, shortcuts and techniques, Working with typography, including tracking and kerning, drop caps, rules, tabs, dot leaders and hanging indents, paragraph, character and object styles ;Nesting character styles, Working with clipping paths and alpha channel masks, Workflow tips for placing graphics into In Design, Using the Library panel

REFERENCES:

1. SandorBurkus,"Photoshop Cs5, Pro", Createspace
2. Todd Perkins, "Adobe Flash Professional",Wiley India Pvt Ltd
3. Deke McClelland,"Photoshop 7 Bible, Professional Edition",John Wiley & Sons
4. Adobe Creative Team, "Adobe Flash Professional", Pearson

Subject: 2D ANIMATION
Code: BCAG351
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To introduce the fundamental principles and basic techniques of 2D animation.

UNIT-I

Digital 2D Animation orientation, Basic factors affecting the illusion of motion,Impact of digital techniques on the craft of film and video animation, Professional animation practice and job description, Prevailing file format standards and other compatibility issues, History and future trends of computer animation application in the visual arts.

UNIT-II

2D animation application software interface, Default setting and user preferences,Document setup; Import and export formats, Document and timeline window feature, Tools and commands palettes, Media-selection tools and techniques, Asset-management features.

UNIT-III

2D graphics-creation features, Underlying data type-raster, vector, Raster painting and/or import features, Vector shapes, Vector free-form and control-point Placement tools, Features specific to the program in use.

UNIT–IV
2D graphics editing features-Basic geometric transformation, Boolean Operations on shapes, Object stroke attributes, Object fill attributes, Shading Techniques (blends-gradients), Packaged effects (extensions-Plug-ins), Features Specific to the program in use.

UNIT–V
2D animation frame-sequencing features, Straight-ahead animation, Key Frames animation, Motion paths, Applying geometric transformations over time, Intertwining options, Looping and motion, Features specific to the program in use.

REFERENCES:

1. Robert R, Snow D, "Flash CS4 Professional Bible", Wiley Publishing
2. Frank Thomas, Ollie Johnston, "Disney Animation ",Abbeville Press
3. Richard Williams, "The Animator's Survival Kit: A Manual of Methods, Principles, and Formulas for

Subject: WEB DESIGNING WITH SCRIPTING LANGUAGE
Code: BCA400
Credits: 3
Duration:

OBJECTIVE: To enable students understand python programming paradigm and develop applications using it

UNIT –I
Basics of style sheet: define CSS, use of CSS, types of CSS, syntax, margi, padding, text, font, links; Employing local styles & making use of ids and classes with Example, Using floating positioning and absolute positioning;
CSS3 new selection tools : attribute selection, not, nth-child,new pseudo-classes(link,visited,active,hover,focus,first-letter,first-line,first-child,before,after, language), @font-face, column support, text-stroke, text-shadow; Flexible Box layout Model : creating a flexible box layout, viewing a flexible box layout; New visual Elements: opacity, box-shadow, border-radius, Key Frames, Color values, gradients, image borders, reflections, rounded corners, shadows, transformations, transition animation, transparency; Medial Query –Responsive Design/Web page; implementation using appropriate programs

UNIT–II
Working with JavaScript-List data types, operators and control flow statements in JavaScript; JavaScript concept, Origin of JavaScript, Advantages of java script, Java script Variables, DataTypes, Operators, Literals, Array and Functions; JavaScript Control Statements; Java script document object model: Learning DOM , Introducing object in Model, Form object, Window object, Document object, Browser object, , Navigator object, The String Objects, Date and Math Object, use of Built in object,User defined object ; The Document Object: Basic,Writing to Documents, Dynamic Documents;

UNIT–III

Form Object -Forms and Forms-based Data; Form Object , Working With Form Elements and Their Properties, Button Object, Text Objects, Text Area Objects, Hidden Objects, Check Box Objects, Radio Button Objects, Selecting Objects; Form Validation : Form Validation: A Process , Testing Data , Preparing Data for Validation and Reporting Results, Trapping Empty Fields, Finding Invalid Values, Intercepting the Submit Button, Validating Non-text Form Objects; Window Object : The window object, Dialog Boxes, Status Bar Messages, Window Manipulations; Dates and Math Objects : The Date Object, Using and manipulating dates, Displaying the date and time, Time Zones, Extracting the Date, Extracting the Hrs., The Math Object and its constants; implementation using appropriate programs

UNIT–IV

Working with jQuery: Query Events: Define events4.2Mouse Events: Click, dblclick, hover; Keyboard Events : keypress, keydown,Keyup,Keyrelease; Form Events : submit ,Onload4.5Document/Window Events : load , resize , scroll, unload,bind() and Event Helper Methodwith Example

UNIT–V

Working with Ajax: the purpose of basic, the XML Http Web Application, Callback function, Traditional Application, Web page Application, Use of HTML and Xml in Ajax;Passing Data: XML-Creating child function, Dynamic Table, Object Literals –Array, Object, Array in Objects, Objects in Array, JSON Introduction –Syntax, Advantages, Disadvantages; Ajax Application:Login Form, Preloaded Data, Feedback from using validation, Live search, Dynamic Dependable Dropdown using Ajax-Country, state and city Examples

REFERENCES:

1. Powell Thomas,"HTML& CSS: The Complete Reference",McGraw Hill
2. DT Editorial Services,"HTML 5 Black Book",Dreamtech Press India Pvt. Ltd
3. Patel Sandeep Kumar,"Developing Responsive Web Applications with AJAX and jQuery", Packt

Subject: PYTHON PROGRAMMING
Code: BCA401
Credits: 4
Duration:

OBJECTIVE: To enable students understand python programming paradigm and develop applications using it

UNIT-I

Introduction to Python-Installation and Working with Python, variables, Operators understanding python blocks; Data types- Declaring and using Numeric data types: int, float, complex, Using string data type and string operations Defining list and list slicing, Use of Tuple data type, implement necessary program for the topics

UNIT- II

Python program flow control-Conditional blocks using if, else and elif, Simple for loops in python, For loop using ranges, string, list and dictionaries, Use of while loops in python Loop manipulation using pass, continue, break and else Programming using Python conditional and loops block, Functions, modules and packages-Organizing python codes using functions Organizing python projects into modules Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages, implement necessary program for the topics

UNIT- III

Python String, List and dictionary manipulations, building blocks of python programs Understanding string in build methods List manipulation using in build methods Dictionary manipulation Programming using string,list and dictionary in build functions, python fileoperation, Reading config files in python Writing log files in python, Understanding read functions, read(), readline() and readlines()Understanding write functions, write() and writelines()Manipulating file pointer using seek Programming using file operations, implement necessary program for the topics

UNIT-IV

Python object oriented programming–OOPs Concept of class, object and instances Constructor, class attributes and destructors Real time use of class in live projects Inheritance , overlapping and overloading operators Adding and retrieving dynamic attributes of classes Programming using Oops support8 : Python Regular Expression Powerful pattern matching and searching Power of pattern searching using regex in python Real time parsing of networking or system data using regex Password, email, url validation using regular expression Pattern finding programs using regular expression, Python Exception Handling Avoiding code break using exception handling safe guarding file operation using exception handling, handling and helping developer with error code, programming using Exception handling, implement necessary program for the topics

UNIT- V

Python database interaction-SQL Database connection using python, creating and searching tables Reading and storing config information on database Programming using database connections, implement necessary program for the topics

REFERENCES:

1. Martin C. Brown,“Python: The Complete Reference”,McGraw Hills
2. YashavantKanetkar,”Let us Python”, BPB Publications
3. R. NageswaraRao,“Core Python Programming”, Dreamtech Press
4. Bill Lubanovic,“Introducing Python”,Shroff Publishers

Subject: WEB SERVICES
Code: BCA402
Credits: 3
Duration:

OBJECTIVE: To provide knowledge on application-to-application interactions on the Web and integrate the existing network computer infrastructure into the Web.

UNIT-I
Introduction to web services- Fundamentals of XML, XML Syntax, XML Document Structure, Schema Languages; DTD,XML Schema; Presentation technologies –XSL,XFORMS,XHTML– Transformation –XSLT ,XLINK ,XPATH , Xquery; Developing Web services-Objectives, Web service standards, SOAP-The Processing model, Faults, Data representation and RPC, Protocol binding, WSDL-Interface Descriptions, Binding description, service description, UDDI-Descriptions ,Discovery

UNIT-II
Business motivations for web services – B2B, B2C,Technical motivations ,limitations of CORBA and DCOM , Service oriented Architecture (SOA), Architecting web services ,Implementation view ,web services technology stack, logical view, composition of web service, deployment view, process view

UNIT-III
Transport protocols for web services, messaging with web services protocols, SOAP, describing web services, WSDL – Anatomy of WSDL, manipulating WSDL; web service policy – Discovering web services, UDDI, Anatomy of UDDI, Web service inspection, Ad-Hoc Discovery, Securing web services

UNIT–IV
Implementing XML in E-business-B2B, B2C Application; Different types of B2B interaction, Components of e-business, XML systems – ebXML, Rosetta Net Applied XML in vertical industry, Web services for mobile devices

UNIT–V
XML and Content Management-Semantic Web, Role of Meta data in web content, Resource Description Framework, RDF schema, Architecture of semantic web, content management workflow, XLANG WSFL

REFERENCES:

1. Ron schmelzer et al, “XML and Web Services”, Pearson Education, 2002
2. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall, 2004
3. Frank P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002
4. Keith Ballinger, “.NET Web Services Architecture and Implementation”, Pearson Education, 2003

Subject: ROUTER CONFIGURATION AND SECURITY
Code: BCA403
Credits: 3
Duration:

OBJECTIVES: The objective is to develop an understanding of how a router learns about remote networks and determines the best path to those networks. This course includes both static routing and dynamic routing protocols.

UNIT-I
Introduction to Routing- Routers are computers, Router CPU and Memory, Router Boot-up Process, Router Interfaces; Routers and the Network layer.

UNIT-II
Configure a Router- CLI command models, Configuring a router name, Configuring router passwords, Examining the show commands, Configuring a serial interface, Configuring an Ethernet interface. Router Configuration Lab- Cabling a Network and Basic Router Configuration; Routing table principles and protocols (Distance Vector and Link State Protocols) IP Routing Technologies.

UNIT-III
Configure and verify operation status of a device interface, both serial and Ethernet; Verify router configuration and network connectivity; Configure and verify routing configuration for a static or default route given specific routing requirements; Differentiate methods of routing and routing protocols; OSPF ; EIGRP inter VLAN routing-Router on a stick; SVI interfaces.

UNIT-IV
Configure and verify DHCP ; Describe the types, features, and applications of ACLs; ACLs in a network environment; Identify the basic operation of NAT; NAT; NTP as a client; Recognize High availability (FHRP); Syslog; SNMP ; WAN Technologies; WAN serial connection; PPP; Frame Relay; PPPoE.

UNIT-V
Network Security- Introduction to Network Security, Why network security is important?, Common Security Threats, Types of Network Attacks, General Mitigation Techniques, The Network Security Wheel, The Enterprise Security Policy. Securing the Router; Network device security features; Switch Port Security features; ACLs; ACLs and SSH.

REFERENCES:

1. Chappell, “Advanced Cisco Router Configuration“, Techmedia
2. David Hucaby, Steve McQuerry, Andrew Whitaker,” Cisco Router Configuration Handbook (Networking Technologies)”, Cisco Systems
3. Walter J. Goralski,” Juniper and Cisco Routing: Policy and Protocols for Multivendor IP Networks “,John Wiley & Sons

Subject: NETWORK SWITCHING AND ROUTING TECHNOLOGY
Code: BCA404
Credits: 3
Duration: 72 hrs.

OBJECTIVE: To understand how a message manages to flow from source to destination i.e. to understand Network Switching and Routing Technologies.

UNIT-I
Introduction to Switched LAN architecture; The Hierarchical Network Model, Benefits of a hierarchical Network, Principles of a hierarchical network design; Matching Switches to specific LAN functions-Considerations for hierarchical network switches, Switch features, Switch features in a hierarchical network, Switches for Small and Medium Sized Business (SMB).

UNIT-II
Basic switch concepts ;Introduction to Ethernet/802.3 LANs- key elements of Ethernet/802.3 Networks- CSMA/CD, Ethernet Communications, Duplex Settings, Switch port settings, Switch MAC address table; Design considerations for Ethernet802.3 Networks- Bandwith and Throughput, Collision Domains, Broadcast Domains, Network Latency, Network Congestion, LAN segmentation; LAN Design Considerations- Forwarding Frames using a switch, Switch forwarding methods, Asymmetric and Symmetric Switching, Memory Buffering.

UNIT-III
Basic Switch Configuration; Prepare how to configure the switch, Management Interface, Default Gateway, Duplex and Speed; Verifying Switch Configuration- Configuring Password Options, Login Banners, Configure Telnet and SSH.

UNIT-IV
VLANs-Introducing VLANs- Defining VLANs, Benefits of VLANs, VLAN ID Ranges, Types of VLANs-data VLANs, the default VLAN, the black hole VLAN, native VLANs, management VLANs, and voice VLANs; VLAN Trunking- VLAN Trunks, configure VLANs, Managing VLANs, configure a Trunk.

UNIT-V
IP Addressing ;IPv4 ; IPv6; IPaddressing for LAN/WAN environment;IPv4 addressing scheme using VLSM ; Routers and Packet Forwarding; Static and Dynamic Routing; Distance Vector Routing Protocols; RIP; Routing Table; EIGRP; OSPF; Link State Routing.

REFERENCES:

1. Cisco, “Routing and Switching Essentials”, Pearson Education
2. Todd Lammle, “CCNA Routing And Switching Study Guide”, Wiley India Pvt Ltd
3. Radia P A, ”Interconnections: Bridges, Routers, Switches & Internetworking Protocols”, Wesley Professional

Subject: LINUX SERVER ADMINISTRATION
Code: BCA405
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable students to gain the knowledge of managing Linux Server and to have a hands-on a Linux Server Management.

UNIT-I
Configuring Your Computer on a LAN - Configuring your ifconfig, Configuring your arp, The Hostname Commands, Network Configuration Files, Configuring Private and Public Networks - Private IP Networks, Configuring a Network, Classless Inter-Domain Routing (CIDR),Creating Internet Connections - The Internet Configuration Wizard, Using minicom Troubleshooting your network - Checking Network Status, Checking connections with ping and traceroute.

UNIT-II
Configuring a dns server - packages, dns concepts, initial dns configuration, a dns slave server, a dns configuration files, starting dns; using dns client-setting up a dns server - packages, basic configuration, the configuration file: /etc/dhcpd. conf, starting the dhcp server, dhcp servers and remote networks, a lease database, working with dhcp and bootp clients; Using the Internet Print Protocol, Configuring the common Unix Print System - Graphical configuration, The lpadmin command, The lpstat command, Configuration files,/etc/cup/cupsd.conf, Printer management, Using the Line Print Deamon - The LPD Configuration files, Printer Management, Red Hat's Printer Tool.

UNIT-III
Using FTP as a client - Basic commands, Connecting to ftp.redhat.com, The GUI FTP Client The Secure FTP Server - Basic security features, Configuration files Creating an Anonymous FTP Server - Configuring vsFTP Server, Configuring WU-FTP, Anonymous directories, Configuring WU-FTP with Real Users - Configuration Files, Commands, Anonymous Uploads.

UNIT–IV
Bridging the gap between linux and windows - functioning on a microsoft network, licensing, definitions, packages; configuring samba as a client - shared samba directory, samba terminal mode, connecting to a printer; the samba configuration files - samba daemons, other samba configuration files, the main samba file: smb.conf, a samba troubleshooting checklist, the samba web administration tool (swat) - the home menu, samba configuration wizard, the globals menu, the shares menu, the printers menu, the view menu, the password menu, the server status menu, the red-config-samba alternative - server settings, user management, creating a new share

UNIT–V
Understanding best practices - physical setup, encryption, password security, firewall and dmzs, using pluggable authentication modules - basic configurations, module types, control flags, creating firewalls - data directories and iptables, firewalls as chains, format of iptables, options for iptables, patterns for iptables, actions for iptables, putting it all together, setting up ip masquerading - functionality, ip masquerading commands

detecting break-ins - sniffing with ethereal, checking logins, tripwire and suspicious activity, troubleshooting access issues - too much security, denial or rejection.

REFERENCES:

1. Micheal Jang, "Mastering Red Hat Linux 9", BPB Publications
2. Kurt Wall , Terry Collings , "Red Hat Linux Networking and System Administration", Broadway Books
3. Sander Van Vugt,"Red Hat Enterprise Linux 6 Administration: Real World Skills For Red Hat Administrators",Wiley India Pvt Ltd

Subject: ADVANCED ANDROID DEVELOPMENT
Code: BCA406
Credits: 4
Duration: 126 hrs.

OBJECTIVE: To provide the skills required for developing android applications and deploy them

UNIT-I

App Development Topics -Services: Services and Notifications –bound/unbound services, Starting and stopping services, Android Interface Definition Language, Handler and Messenger, Passing objects over IPC, Scheduling of services, Remote service communication, Running Background Jobs, Setting up notifications, Notification manager, Connecting Devices Wirelessly -using Network Service Discovery , P2P Connections with Wi-Fi P2P for Service Discovery, Networking Parsing XML Data

UNIT-II

Networking: Introduction Android networking capabilities, Android SDK networking packages, Android Socket programming, Proxy Settings, Broadcasting, SMS application using Broadcast Receiver. Android Xml remote procedure calls on android, what is XML-RPC, History, Data types, using web services on android phones. Integrating with Embedded Applications: Embedded Apps: Telephony, SMS, etc. implementation on necessary program for the topics

UNIT-III

Graphics & Multimedia–Introduction to Graphics, Frame Animations, Tweening, scale, rotate, translate, alpha, Interpolation, Canvas/Drawing into a view, Surface View/Surface Holder. Animation-Crossfading Two Views,ViewPager for Screen Slide, Card Flip, Zooming, Layout Changes. Bitmaps -Loading, Processing Bitmaps with thread, managing Bitmap Memory and UI, implementation on necessary program for the topics

UNIT-IV

Threads & Processes-Tasks & Processes: Tasks, Switching between Task, Process, Process lifecycle. Threads, Thread Life cycle, Worker Threads, Thread Handlers, Threads &Loopers and IPC;Web Applications-Web Apps & Web Services: Web Applications -Web View, ViewPort, Page navigation, Debugging web applications Web Services –Android Server Communication: communication protocols, interacting with server-side applications, developing clients for web services, Exchanging Data over the Internet data parsing using json and xml parsing. Cloud -Connectivity and Sync to the

Cloud, Google Services. Integrating with 3rdparty Apps using Web Services, implementation on necessary program for the topics

UNIT-V
Commercializing your application-Security, Performance-Kernel, Application level Security, Using permissions, designing for Performance & Designing for Performance. Security with HTTPS and SSL, Security with Device Management Policies

REFERENCES:

1. RetoMeier,"Professional Android 4 Development", Wiley
2. Ableson W. Frank,"Android in Action",Wiley
3. Wei-Meng Lee, "Android Application Development Cookbook", Wiley
4. Robbie Matthews,"Beginning Tablet Programming",Apress

Subject: MOBILE APPLICATION SECURITY
Code: BCA407
Credits: 3
Duration: 72 hrs.

OBJECTIVE: To enable students understand methodologies, tools, techniques necessary for testing mobile applications

UNIT-I
Testing Fundamentals -SDLC, SDLC Phases, need of Testing, methods of Testing: Functional, Black Box, White Box, Regression, Stress, Monkey etc., TestCase, Rules to write TestCase, Testsuite and Test Runner

UNIT-II
Introduction to Android testing framework-JUnit: JUnit Test Framework, Features of JUnit Test Framework, Testing Fundamentals-TestCase, TestSuite,TestRunners, JUnit classes, JUnit in Android, Android Testing Framework, Test Projects-Directory Structure, Android Testing API, Mock Objects, Activity Testing, what to Test, ContentProvider Testing, service Testing, choosing devices to test, Testing tools

UNIT-III
Mobile apps testing -Need of testing, Mobile applications testing landscape, Common types of testing, UI and functional testing strategies of mobile applications, compatibility testing need and methods, non-functional testing methods of mobile applications -Performance, security, types of operations testing for mobile applications -Installation, un-installation, upgrade, methods of testing the mobile application integration with phone features, challenges in testing, difference between testing mobile web and testing native app

UNIT-IV

Mobile testing tools-Testing lifecycle of mobile applications, alternatives of testing environments for mobile apps testing, Differentiate between testingon physical devices, cloud devices and emulators, different test automation tools for mobile applications, key features of monkey talk tool, installation and use of monkeytalk tool for a mobile application on emulator, installation and use of monkeytalktool for a mobile application on PC connected device, installation and use of monkeytalk tool for a mobile web, installation and use of monkeytalk tool for a mobile application for cloud device.

UNIT-V

UI and functional testing -Using monkey talk -creation of test project, test suite and test script, record and playback feature, different verification techniques, data driven testing methods, synchronization, script parameterization, reporting features. Using Robotium -creation of test project, test suite, Robotium Framework, data driven testing methods

REFERENCES:

1. Diego Torres Milano, "Android Application Testing Guide", Packt
2. Julian Harty,MahadevSatyanarayanan,"A Practical Guide to Testing Wireless Smartphone Applications",Morgan & Claypool Publishers
3. Michael Hackett, Bob Johnson, Hung Q. Nguyen,"Testing Applications on the Web: Test Planning for Mobile and Internet-Based Systems",Wiley
4. HrushikeshZadgaonkar,"Robotium Automated Testing for Android", Packt

Subject: VISUAL EFFECTS
Code: BCA408
Credits: 5
Duration: 162 hrs.

OBJECTIVE: To enable student design and execute composting in visual effects.

UNIT-I

Visual Effects, Description, Types, Particles, Analysis, Size, Sand Effects, Smoke Effects, Fire Effects, Cloud Effects, Snow Effects.

UNIT-II

Fluid Effects, Coloring, designing Clouds Background, Designing Fog Effects. Explosion Effects, Fire Effects with flames, Space Effects and designs, Designing Thick Smoke.

UNIT-III

Designing Paint Effects, Coloring paints, Designing Trees and green effects, Designing Weather and seasons, Effects on seasons, Designing Glass image, Designing Different glass reflection, Designing Glow Effects, Liquid Effects and Reflection design.

UNIT-IV

Designing Special Effects, Designing effects of Hair and shape, Designing Fur Effects, Designing Clothes and effects.

UNIT-V
Visual Effects Tool and advanced functions, Converting images from 2D to 3D Pictures. Creating 3D Effects, Differentiation 2D effects and 3D effects.

REFERENCES:
1. Antony Bolante, ”Adobe After effects”, Techmedia
2. Micheal J. McAlister,”The Language of Visual Effects”, Lone Eagle Publishing Co
3. Adobe Creative Team, “Adobe After Effects”, Pearson Education

Subject: 3D ANIMATION
Code: BCA409
Credits: 5
Duration: 162 hrs.

OBJECTIVE: To introduce students to the principles and techniques of 3D modeling and animation.

UNIT-I
An Introduction on how to make drawings for animation-Shapes and forms,3d drawings, Caricaturing – fundamentals, Exaggeration, Attitude, Silhouettes, Boundary- breaking exercises and warm ups, gesture drawing, Line drawing and quick sketches, Drawing from observation, memory and imagination.

UNIT-II
Modeling methods-modeling with primitives, planning a model, deforming lattices, wire or cluster, Extrusion-object duplication, pivots and CV surfaces, the production process, complex model hierarchy

UNIT-III
Complexities over various modeling techniques, purpose and modeler dependency, hardware and software consideration

UNIT-IV
Character Animation, Preparing to Animate, the Animation Process, Pose-to-Pose blocking, Establishing Timings, Refining Animation

UNIT-V
Non-Linear Animation – Creating Poses, Creating Clips, Modifying, blending and Sharing Clips, Animating with Maya’s new Body IK Setup

REFERENCES:
1. Adam Watkins, ”Maya A Professional Guide”, Dreamtech
2. Tom Meade and Shinsaka Anima, ”The Complete Reference Maya”, Tata MC.Graw – Hill

MINOR SUBJECTS

Subject: OFFICE AUTOMATION SYSTEMS I (OFFICE TOOLS)
Code: CSMN216
Credits: 4
Duration: 108 hrs.

OBJECTIVES:

i. To equip students with the skills to operate the information technology related tools and equipments used in our day-to-day work environment
ii. To be able to make efficient decisions on what are the best tools to use amongst the different tools available
iii. To enhance knowledge about the functionality of the different tools- (a) Printer Installation, Sharing and Troubleshooting, (b) Scanner , (c) Fax
iv. To learn about how to install software, firmware and hardware
v. To learn and apply the concept of LAN Configuration and troubleshooting

UNIT - I

Components Of Personal Computer - Parts of the computer: CPU-Motherboard, IO Cards, Graphics Cards, Cables, RAM, Hard Disk Drive, CD & DVD drives, Floppy Disk Drive, Pen Drive; Peripherals-Keyboard, Mouse, Speakers, Scanners, Printers, Monitor, Un-interruptible Power Supply (UPS)

UNIT- II

PC Assembling& Installation- Components of the computer, Assembling a CPU: Steps in installing Processor in CPU, Motherboard installation, RAM, SMPS, Drives installation, Installation of Video, Graphics Card, Sound Card, Modem and Adapter, Connectors-System Panel Connector; Software installation-OS installation, Driver Installation

UNIT- III

Working With Commonly Used Pc Tools- Printer-Types of Printers-Inkjet Printer, Daisy Wheel Printer, Laser Printer, Line Printer, Dot Matrix Printer,Step-by-Step Printer Installation & Sharing, Scanner-Types of Scanner, Connecting the Scanner, Scanner Software, Fax machine-Setting up & Configuring a Fax Machine, Sending & Receiving a Fax, Common Features- Print, Scan and Copy, Common Problems, Projector installation.

UNIT- IV

Troubleshooting Common Computer Issues- Hardware Troubleshooting- Motherboard Troubleshooting, RAM Troubleshooting, Hard Drive Troubleshooting, Processor Troubleshooting, Power On Self Test (POST);
Software Troubleshooting- Slow Computer, Hard Drive Problem, display problem, BSOD, overheating, Forgotten Password, Data Lost, Windows start-up problems, Booting problems, licensing of software

UNIT- V
Lan Configuration And Troubleshooting- Common terms used in computer networking-Device, Media, Network Adapter, Network Operating System, Protocol; Servers, Clients, Peers, Host Computers, Terminals; cable crimping, network troubleshooting commands

REFERENCES:

1. http://www.pcworld.com
2. http://www.in.techradar.com
3. https://www.microsoft.com
4. http://www.tomshardware.com/t/motherboards
5. www.computerhope.com

Subject: OFFICE AUTOMATION SYSTEMS II (WINDOWS AND LINUX OPERATING SYSTEM)
Code: CSMN266
Credit: 4
Duration: 108 hrs.

OBJECTIVE: To enable students installing, troubleshooting, maintaining and working with the most common operating system- Windows and Ubuntu and their application software

UNIT - I
Operating Systems- What is Operating System-Windows, Ubuntu; Requirements for installation of operating systems-space, processors, types of partitions, file system, types of drives, BIOS-types, settings; clean formatting, ; Formatting without losing data, Backup and Restoring of operating system, driver; Installation of dual operating system; System File repair,

UNIT- II
Windows Basics- Working with Windows Explorer, using the Taskbar, Managing Multiple Windows, Customize the Taskbar, Working with Desktop Gadgets; Working with Files and Folders-Viewing Folders, Exploring the Computer's Contents, Searching for Files and Folders, Creating and Renaming Folders, Selecting Files and Folders, Moving, Copying, and Deleting File, Using the Recycle Bin; Personalizing Windows-Control Panel, Personalizing the Desktop, Modifying the Color Scheme, Changing the Monitor Resolution, Selecting a Screen Saver, Personalizing Sound Effects, Fine-Tuning System Settings, Modifying Folder Options, Customizing the Startup Folder, Adding and Changing User Accounts

UNIT- III
Applications Softwares and the Internet- Application software installation, management; Different application proprietary/open source software and their purpose; Securing files and data using LastPass, BitLocker, VeraCrypt, 7Zip; Backup application software; Burning files to CD/DVD; Setting Up an Internet Connection; Sharing Drives, Files, Games; Video conferencing- using Teamviewer, Skype, HipChat

UNIT- IV

Working with Ubuntu Desktop- Main Menu, System Settings, Launcher , Various Applications (eg: Libre office, Video player, calculator etc), Changing the theme of the Desktop, Remove and add applications in the Launcher, Use multiple desktops, Internet connectivity, Sound settings Time and Date settings and switch to other user accounts, Working with Synaptic Package Manager,Working with Ubuntu Linux Software Center- Ubuntu-Software-Center, Installing softwares through Ubuntu Software Center, Linux basic commands- Command interpreter, Shell, Using man, Apropos, Whatis,

UNIT-V

General Purpose Utilities in Ubuntu-echo, uname, who, passwd, date, cal, pwd, ls, cat; Linux File system-file, directories, File node, types of file, home directories, current directories, change directories, mkdir, rmdir; regular file-cat, rm,cp,mv, cmp, wc; file attributes- chown, chmod, chmod -R, displaying files with ls –l, chmod u+, chmod a-w, chmod g+w, chmod -r, chgrp, inode, hard link, symbolic link, grep commands

REFERENCES:

1. Richard Petersen, “The Complete Reference Linux”, First Edition, Tata McGraw Hills Publishing Company Limited.
2. Keir Thomas, “Beginning Ubuntu Linux: From Novice to Professional”, Third Edition, APress Publication
3. Andy Rathbone, “Windows 7 for Dummies”, APress Publication
4. www.spokentutorial.org

Subject: OFFICE AUTOMATION SYSTEMS III (OFFICE SUITE)
Code: CSMN316
Credit: 4
Duration: 108 hrs.

OBJECTIVE: To enable student working with Microsoft Office package and Libre Office

UNIT- I

MS Word Basics-Introduction to MS Office; Features & area of use. Working with MS Word; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Creating a New Document; Different Page Views and layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print Options Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers ; Inserting – Page Numbers, Pictures, Files, Auto texts, Symbols etc.; Working with Columns, Tabs & Indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels. Importing and exporting to and from various formats.

UNIT- II

MS Excel-Introduction and & area of use; Working with MS excel.; concepts of Workbook &worksheets; User wizards; Various Data Types; Using different features with Data Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; working with Data & Ranges; Different Views & Worksheet column Freezing, Labels, Hiding, Spitting etc.; Using different features with Data and Tact, Use of Formulas, Calculations & Functions, Cell Formatting including Borders & Shading working with Different Chart Types; Printing of workbook & worksheets with various options

UNIT- III

Ms PowerPoint-Introduction & area or use working with Ms PowerPoint; Creating a New Presentation, working with Presentation; Using wizards; slides & its different views , Inserting, Deleting and Copying of slides; working with Notes, Handout, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide working with PowerPoint objects; Designing & Presentation of a slide Show; Printing Presentation, Notes, Handouts with print options

UNIT- IV

Introduction to Databases, Starting Access 2007, Working with Database Objects, Tour of a Table, Adding, Editing and Deleting Records, Tour of a Form, Tour of a Query, Tour of a Report, Previewing and Printing a Database Object, Selecting Data, Cutting, Copying and Pasting Data, Planning a Database, Creating a New Database, Creating a Table, Modifying a Table Creating a Query, Sorting a Query, Using AND and OR Operators in a Query, Creating a Form with the Form Wizard, Creating a Report with the Report Wizard, Creating Mailing Labels with the Label Wizard, Converting an Access Database

UNIT- V

Libre Office, Advantages of Libre Office, downloading, Installing, Starting LIbre Office, Creating new documents, Save, Open; Libre Office Writer-Introduction, Formatting text, Formatting pages, Tables, Working with Graphics, Printing, Mail merge, Linking to another part of a document; Libre Office Calc-Introduction, Spread sheet, Row, Column , Cell , Basic Calculation function: +,-,*,/ , Sub, Round, Percent, SQRT, POW, Trigonometric functions, Conditional Formatting, Filtering, Sorting; LIbre Office Impress-Introduction, Main Impress windows, Creating the new Presentation, Formatting the Presentation, Adding and Formatting the Text, Adding Picture, tables, charts and media, Run the slide show

REFERENCES:

1. Ron Mansfield, "Working in Microsoft Office", Tata McGraw Hill
2. Guy Hart Davis, " Microsoft Excel 2007", Tata McGraw Hill
3. Libreoffice Documentation Team,"LibreOffice 5.1 Getting Started Guide", 12th Media Services
4. Lalit Mali,"Libre Office 5.1 Writer, Calc, Math Formula Book- Vol 1: Introduction To Libre Office 5.1",Notion Press
5. Lalit Mali,"Libre office 5.1 Impress, Draw, Base book- Vol 2",Notion Press

CORE SUBJECTS

Subject: FUNDAMENTALS OF COMPUTER
Code CSC100
Credits: 3
Duration: 108 hrs.

OBJECTIVES:
(i) To enable students to acquire basic knowledge of computer and become familiar with the use of IT tools
(ii) To familiarize the students with the basic concept on the working of MS Office and its applications in the relevant fields

UNIT- I
Introduction to computer - Definition of computer, Characteristics of computers, Capabilities and Limitations; Generation of Computers – First, Second, Third, Fourth & Fifth generations, Types of computer and their characteristics – analog, digital, hybrid, micro, mini, mainframe and super computers; Types of PC's and their characteristics – Desktop, Laptop, Notebook and Palmtop; Basic components & Block diagram of computer system – Control Unit, ALU, Memory (RAM, ROM, EPROM, PROM)

UNIT-II
Input & Output Devices – Keyboard, Mouse, Trackball, Joystick, Scanner, MICR, OCR, Touch Screen; Monitor – Types – Digital, Analog, Characteristics- size, resolution, refresh rate, interlaced/non-interlaced, dot pitch, video standard- VGA, SGVA, XGA; Printer- Daisy wheel, dot matrix, inkjet, laser; Plotter; Storage devices- Storage fundamentals- Primary and Secondary; Data storage and retrieval method- sequential, direct and index sequential; Various storage devices- Magnetic tape, magnetic disk, cartridge tape, data drives, hard disk drives, floppy drive, pendrive; Number system- data representation in computers, number system of computers – binary, octal, decimal, hexadecimal- representation and their conversion

UNIT-III
Computer software- Need, types of software-system software and application software; System software-Operating system, assembler, compiler & interpreter; Operating Systems-functions, types-batch, single user, multi-user, multiprogramming, multiprocessing; Programming language-machine, assembly, high level, their merits and demerits

UNIT-IV
MS Word- Introduction to word processor & its area of use, components of the document window, creating and saving a document, opening an existing file, saving a file using a new name; Editing a document- inserting, overwriting and deleting text, cut, copy and paste, finding and replacing text; Basic keyboard shortcuts; MS PowerPoint - Introduction to powerpoint& its area of use, components of the powerpoint window, creating a new presentation, saving, closing and opening a presentation, inserting, deleting and copying slides, running powerpoint presentation; MS Excel – Introduction to Excel spreadsheet, workbook and worksheet, components of the excel window, understanding ranges,

cells, auto fill handle, entering, editing and deleting cell contents, saving a workbook, opening an existing workbook, inserting and deleting new rows and columns, merging cell contents.

REFERENCES:

1. P.K Sinha, "Fundamentals of Computer", bpb publications
2. AnuragSeetha, "Introduction to computer and information technology", Ram Prasad & Sons
3. Virginia Anderson, "The Complete Reference Microsoft Office 2007", Tata McGraw Hill

Subject: PC ASSEMBLING AND TROUBLESHOOTING
Code: CSC150
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable the student to understand all the parts of the computer, their relationship and their functionality and also he will be able to identify the problem associated with the computer.

UNIT-I

Introduction to pc-Architecture of the System (PC how does it work?); Understanding the function of a computer, the input device, output device, memory, storage device, CPU, system board, interfaces: parallel and serial, Power system: SMPS, power supply connector, UPS.

UNIT-II

PC assembly- Identification of the different physical parts of the computer -DVD/CD drives, Hard Disk Drive, processor, SMPS, RAM, motherboard, cmosetc; Different types of cable used in connecting the parts into the mother board; Mounting Motherboard in cabinet and installing different parts into the motherboard; connecting cables; PC Upgrade Options & Strategies for different usage of computer (professional, Gamer, ordinary)

UNIT-III

Installation and Upgradation-Operating system, devices drivers and other application softwares; Basic of networking, IP configuration, peer to peer connection

UNIT-IV

PC management and maintenance-Basic windows administration: task manager, control panel, disk management, device manager etc. case study on window XP,7,8, Antivirus; connecting PC with peripheral devices (projector, printer, etc)

UNIT-V

BIOS-Typical Motherboard BIOS, BIOS Features, BIOS & Boot Sequences, BIOS troubleshooting; Software troubleshooting: Windows troubleshooting; Hardware troubleshooting: POST (Power-on Self Test) routine, mother board problems, HDD problem, Peripherals problems, miscellaneous problems; Error Code: Beep Code, Post Code, Post Reader Card

REFERENCES:

1. K. L. James, "Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance"
2. David Groth, "A+ core module"
3. Balvir Singh, "PC Hardware"
4. Scott Mueller, "Upgrading and Repairing PCs"

Subject: MANAGEMENT IN INFORMATION SYSTEM
Code: CSC200
Credits: 4
Duration: 72 hrs.

OBJECTIVE: To enable student understand the technologies and methods used for effective decision making in an organization

UNIT-I

Introduction to System and its classification, System Approach, Information System Role of Information systems in business today, Contemporary Approaches to Information System; Information Systems Concept-Types of Information systems Information system impact on Organizations and Business Firms Using Information Systems to Achieve Competitive Advantage

UNIT-II

IT Infrastructure, Components, Data communication channels Types of Networks, Network topologiesOrganizing Data in a Traditional File Environment, Problems with the Traditional File Environment Database Management Systems, Capabilities of Database Management Systems, Designing Databases, Challenge of Big Data, Business Intelligence Infrastructure, Analytical Tools: Relationships, Patterns, Trends

UNIT-III

Systems Development Process, Structured and Object – Oriented Methodologies, Alternative Systems -Building Approaches-Prototyping, End -User Development Application Software Packages and Outsourcing, Rapid Application Development (RAD)

UNIT-IV

System Vulnerability and Abuse Malicious Software: Viruses, Worms, Trojan Horses, and Spyware, Hackers and Computer Crime Internal Threats: Employees, Software Vulnerability, Firewalls, Intrusion Detection Systems, and Antivirus Software, Securing Wireless Networks, Relevant Provisions of Information Technology Act, 2000

UNIT-V

Understanding Ethical and Social Issues Related to Systems Key Technology Trends that Raise Ethical Issues, Professional Codes of Conduct, Information Rights: Privacy and Freedom in the Internet Age, Internet challenges to privacy, Technical solutions Property Rights: Intellectual Property, Trade Secrets, Copyright, Patents, Challenges to Intellectual Property rights

REFERENCES:

1. Jawadekar, “Management Information Systems”, Tata McGraw Hill
2. Turban and Aronson, “Decision Support Systems and Intelligent Systems”, Pearson Education Asia

Subject: WEB DESIGNING
Code: CSC250
Credits: 4
Duration: 108 hrs.

OBJECTIVE: The students will learn about the various web designing techniques and build their own websites using different tools.

CONTENTS:

1. Creating web page using basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, subscript, font and image; different attributes like align, color, bgcolor, font face, border, size
2. Write HTML code to develop a Web page having the background in red and title "My First Page" in any other color
3. Create an HTML document giving details of your name, age, telephone number, address, TLC code & enrolment number aligned in proper order
4. Write an HTML code to design a page containing text, in form of paragraphs giving suitable heading style
5. Create a page to show different attributes of Font tag
6. Create a page to show different attributes: italics, bold, underline
7. Creating web page having navigation links using anchor tag, internal, external, mail and image links; lists-ordered, unordered
8. Creating web page having table tag; HTML Form controls-form, text, password, textarea, button, checkbox, radio button, select box, hidden controls, Frameset and frame
9. Write an HTML code to create a Web page of blue color and displaylinks in red colour
10. Create a Web page with appropriate content and insert an image towards the left hand side of the page. When user clicks on the image, it should open another Web page
11. Create a Web page, which should contain a table having two rows and two columns.
12. Write an HTML code to develop a Web page having two frames that divide the Web page into two equal rows.
13. Write an HTML code to develop a Web page having two frames that divide the Web page into two equal rows and then divide the second row into two equal columns.
14. Write an HTML code to develop a Web page having frames as described in the above question and then fill each frame with a different background color
15. Design a page with a text box called 'name' and a button with label 'Enter. When you click on the button another page should open with the message "Hello < name >", where name should be equal to the name entered in the first page
16. Writing programs implementing cascading style Sheet (CSS), CSS syntax, comments, id and class, background color, background image- text - text color, text alignment, text decoration, text transformation, text indentation; CSS font - font families, font style, font size - setting text size ,

using pixels and em; CSS lists - different list item markers, unordered list, ordered list, an image as the list item marker

17. Writing programs implementing CSS tables - table borders, collapse borders, table width and height, table text alignment, table padding, table color; CSS positioning - static positioning, fixed positioning, relative positioning, absolute positioning, overlapping elements, float, horizontal align, image gallery, image opacity/transparency
18. Writing program using Javascript tag, comments, variables, document methods-write and writeln methods, alert; operators-arithmetic, assignment, relational, logical, javascript functions, conditional Statements, loops, break and continue; events familiarization-onLoad, onClick, onBlur, onSubmit, onChange
19. Write a JavaScript code to create a pull down menu box.
20. Write a program to move a text with mouse pointer and to change colour of text randomly
21. Create a Web page using two image files, which switch b/w one another as the mouse pointer moves over the image. Use the On Mouse over and On Mouse out event handler
22. Create an HTML form that has a number of text boxes. The user fills the textboxes with data. Write a script that verifies that all textboxes have been filled. If a text box has been left empty pop up an alert message indicating the box that has been left empty. When OK button is clicked, set focus to that specific textbox. Ifall the textboxes are filled, display thank you.
23. Working HTML 5 events using javascript-offline,onabort, onafterprint, onbeforeonload, onbeforeprint, onblur, oncanplay, oncanplaythrough, onlclck, oncontextmenu, ondbclick, ondrag,ondragend,ondragcenter,ondragleave,ondragover,ondragstart,ondrop,ondurationchange,onemptied,onended,onerror,onfocus,oninput,oninvalid,onload,onmouseover,onmouseup,onmousewheel,onpagehide,onpageshow,onplaying,onprogress,onratechange,onredo,onresize,onscroll,onseeked,onseeking,onselect,onsubmit, onsuspend, onundo, onunload,onvolumchange, onwaiting
24. Working with scalable vector graphics-embeding SVG,SVG line, circle,rectangle, ellipse, polygon, gradients; Canvas element-using canvas to draw polygon,path, text, transformation
25. Working with web storage-session storage, local storage, delete web storage; web socket events-open, message, error, close;web socket methods-socket.send(),socket.close()
26. Working with Joomla 3.4 CMS-installation,work areas, control panel, -tootlbar;menu-content, component, extensions, help menu
27. Creating menus, adding menus items, modifying menu items, submenus
28. Working with Joomla modules-create module, breadcrumb module, feed display module, footer module, search module, random image module, whos is online module, syndicate module
29. Working with Joomla global setting-system setting, media setting, language manager, private messages, mass emailing, cache management, users setting
30. Working with Joomla template-template manager, customize template, adding template, creating, adding,customize logo, category management, adding content, formatting content, article metadata, adding banners, contacts adding news feed, adding forum, web links
31. Working with joomla plugins-plugin mangers, authentication plugins, content plugins, editor plugins, search plugins, users plugins, extension, system plugins
32. Working on Site Management-global configuration- site online and offline, metadata setting, change site url ,updating web site, updating extension, disabling and uninstalling extensions, back up site
33. Web hosting-www, web server, internet service provider, web hosting providers,domain names, web hosting email servers,web hosting technologies and types

34. Working with Cpanel-using file section tools, mange domains, manage email, manage security section, manage databases, manage software section tools

REFERENCES:

1. HTML5 and CSS3: Develop with Tomorrow's Standards Today, Hogan Brian P**,** Springer India Private Limited
2. HTML 5 Foundations, Matt West, Wiley India Pvt Ltd
3. Responsive Web Design with HTML5 and CSS3, Hogan Brian P., Shroff Publishers & Distributers Private Limited – Mumbai
4. HTML 5 and CSS 3 Made Simple, Ivan Bayross, BPB
5. Joomla Accessibility, Joshue O Conner, Shroff Publications

Subject: DOCUMENTATION USING LATEX
Code: CSC300
Credits: 4
Duration: 108 hrs.

OBJECTIVES: The aim of this course is to guide beginners to writing documents in LaTeX using TexWorks. It assumes no prior knowledge of LaTex, or any other Programming Language. The course is designed to introduce an absolute beginner to LaTex and teach the basic commands, so that they can create a simple document and presentations.

UNIT-I

A bit of History: Tex, LaTex, advantages and disadvantages over other word processors.
Installing and understanding LATEX, cross platform Editor: for macOS, Windows and Linux.

UNIT-II

LaTex input file, special characters, comments. Input file structure. Layout of the document: document classes, packages, splitting a big latex file.
Typesetting Text: Line and page breaking, ready-made strings for date, etc. more special characters and symbols, titles/chapters and sections, cross references, footnotes, etc. Environments: itemize, enumerate, quote, abstract, verbatim, tabular, including graphics and images, floating bodies.

UNIT-III

Typesetting Mathematical Formulae: single equations, building blocks, multline single equations, multiple equations, arrays and matrices, Math fonts using \mathcal{}, theorems, lemmas, common mathematical symbols (greek letters).

UNIT-IV

Bibliography, hypertext links. Creating Presentation using beamer.

REFERENCES:

1. Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl, “The Not So Short Introduction to LATEX 2e”, Published by Free Software Foundation.
2. Krishnan and G. S. Krishna, “LATEX Tutorials – A primer Indian TEX Users Group”. (Online versions: http://www.tug.org.in/tutorials.html)

Subject: DATA ANALYSIS USING SPSS
Code: CSC350
Credits: 2
Duration: 72 hrs.

OBJECTIVE:
The course is designed to provide students with transferable skills, to understand the uses of SPSS, as a tool to summarize and aid in the interpretation of research findings.

UNIT- I
Introduction to SPSS- Data analysis with SPSS: general aspects, workflow, critical issues; SPSS: general description, functions, menus, commands; SPSS file management

UNIT-II
Input and data cleaning- Defining variables ,Manual input of data ,Automated input of data and file import; Data manipulation, Data Transformation, Syntax files and scripts; Output management

UNIT-III
Descriptive analysis of data – Frequencies, Descriptive, Explore, Crosstabs, Charts

UNIT-IV
Statistical tests – Means, T-test, One-way ANOVA; Non parametric tests - Normality tests; Correlation and regression - Linear correlation and regression, Multiple regression (linear)

REFERENCES:
1. A. Rajathi , and P. Chandran, "SPSS (statistical Package for Social Sciences) ", MJP Publishers
2. Argyrous, G. "Statistics for Research: With a Guide to SPSS", SAGE UK, 2005, Second Edition.

Bachelor of Computer Applications (BCA)
2021-2022

Subject: CONCEPTS OF ALGORITHMS & PROGRAMMING
Code: BCA101
Credits: 3
Duration: 90 hrs.

OBJECTIVE: To provide fundamental computational concepts underlying in computer programming languages using C programming language

UNIT-I
Introduction to Programming-Computer Programming, Programming Technique, Procedural Programming ,Object Oriented Programming; Design of Algorithm- Definition ,Features of Algorithm, Development of Algorithm for simple problems; Flowcharts-Definition, Features of Flowchart, Basic Symbols used in Flowchart, Development of Flowchart for simple problem; Fundamentals of C Programming - character set, Keywords, identifier, Datatypes, statement, Symbolic constant; Input/ output statement- getchar, putchar, scanf, printf, gets, puts; Operators and expression – arithmetic, relational , unary, logical, assignment operator, conditional operator

UNIT-II
Control statement- if statement, if – else statement, nested if – else statement.. Loop control structure: while, do – while, for, switch, break, continue, goto. Array: single and multi-dimensional array, array declaration and initialization; Strings - declaration, initialization, standard library string functions

UNIT-III
Functions-Need and definition, user defined and library function, declaration and prototype, function arguments, return values and nesting of function, calling of function, recursion

UNIT-IV
Structures: Structure declaration, accessing structures elements, nested structures, array of structures, uses of structures. Unions, unions of structures; Pointers- Introduction to pointers, Dynamic memory allocation; Files- fopen(), fclose(), fseek()

UNIT- V
Graphics Programming:Library file- graphics.h, 2-D Coordinate system, Simple Graphics Functions(initgraph(), line(), circle(), arc(), rectangle(), ellipse(), drawpoly(), closegraph(), restorecrtmode(), setfillstyle(), putpixel(), getmaxx(), getmaxy(), outtextxy(), setcolor(), fillcolor(), settextstyle(), moveto(), lineto(), moverel(), linerel()) Pallete and color, Animation functions(imagesize(),getimage(),putimage())

REFERENCES:

1. E. Balagurusamy, “Programming in C”, TMH Publications
2. Peter Juliff , “Program design”, PPH Publications
3. E. Balagurusamy, “Programming in C++”, TMH Publications.

4. YashavantKanetkar, “Let Us C”, BPB publications
5. S.K Basandra, “Computers Today”, Galgotia Publication
6. Gottfried, B. S., **“**Theory and Problems of Programming with C”**,** New Delhi: Tata McGraw-Hill Publication, 1997

Subject: MATHEMATICAL APTITUDE
Code: BCA104
Credits: 1
Duration: 18 hrs.

OBJECTIVE: To provide foundation and concepts related to mathematical skills and knowledge for understanding the basic rules of mathematics.

UNIT-I

Arithmetic Ability – BODMAS rule, Number, LCM and HCF, Fraction, Simplification, Square and cube root, Average, Problem on ages, Surd and indices, Percentage, Profit and loss, Ratio and proportion, partnership, work and wages, Pipe and cistern, time and distance, Simple & compound interest, area, volume and surfaces, clock & calendar.
Statistics: Measure of dispersion; mean, median and mode.

UNIT-II

Permutations and Combinations: Fundamental principle of counting, Probability: Random experiments: outcomes, Probability of an event, probability of ‘not’, ‘and’, & ‘or’ events, Quadratic equations: splitting the middle terms, simple applications. Data interpretation: Tabulation, graph and chart.

UNIT-III

Mathematical Reasoning - Mathematically acceptable statements. Connecting words/phrases - consolidating the understanding of “if and only if (necessary and sufficient) condition”, “implies”, “and/or”, “implied by”, “and”, “or”, “there exists” and their use through variety of examples related to real life and Mathematics, Syllogism.

REFERENCES:

1. R. D Sharma, “Mathematics Vol. 1 & 2”, Dhanpat Rai Publications; 2017 edition
2. R.S Aggarwal, “Quantitative Aptitude, S Chand Publications; 20th edition

Subject: DIGITAL LOGIC
Code: BCA155
Credits: 2
Duration: 36 hrs.

OBJECTIVES:
(i) To provide basic knowledge for design of digital electronic circuits.
(ii) To provide understanding for the operation of digital computers and design associated with computer hardware.

UNIT- I
Binary Systems – Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers

UNIT-II
Logic Gates, Boolean algebra, Map Simplification: Two Map Method, Two and Three Variable Maps, Four-Variable Map, Product of Sums Simplification

UNIT-III
Combinational Circuits (Half -Adder, Full-Adder, Binary Parallel Adder, BCD Adder, Universal Property of NAND and NOR gates, Combinational Circuits using NAND and NOR gates); Flip flops (SR, D, JK, T, Master Slave, Edge-Triggered, Excitation Tables);

UNIT-IV
Sequential Circuits (Latches, Flip-Flop Input Equations, State Table, State Diagram, Design Example, Design Procedure), Integrated Circuits (Digital Logic Families and Integrated Circuits); Decoders (NAND Gate Decoder, Decoder Expansion, Encoders); Multiplexes (4 to 1 Line Multiplexer, Data Selector); Demultiplexer; Code Converter; Registers (Register with Parallel Load); Shift Registers (Bidirectional Shift Registers with Parallel Load, Serial Register); Binary Counters (Binary Counter with Parallel Load, Ripple Counter); Memory Unit (Random-Access Memory, Read-Only Memory, Types of ROMs)

REFERENCES:
1. M. Morris Mano, "Digital Logic and Computer Design", Prentice Hall of India Pvt. Ltd
2. P. Pal Choudhuri, "Computer Organization and Design", Prentice Hall of India Pvt. Ltd
3. M. Morris Mano, "Computer System Architecture", Prentice Hall of India Pvt. Ltd

Subject: DISCRETE MATHEMATICS
Code: BCA156
Credits: 2
Duration: 36 hrs.

OBJECTIVE: To make students understand the basic concepts of discrete mathematical structure like set, relations, functions, propositional logics.

UNIT-I
Sets – Brief review of basics in set theory such as ways of describing a set, Finite and Infinite Set, Set Operation, Union, Intersection of Set, Complement of Sets, Empty Set, Disjoint Set, De Morgan's Law, Power Sets Cartesian Product, Simple Applications

UNIT-II
Relations and functions-properties of relations, equivalence relation, partial order relation function: domain and range, onto, into and one to one functions, composite and inverse functions

UNIT-III
Boolean algebra-definition and properties of boolean algebra, a brief introduction to the application of boolean algebra to switching theory, conversion of complicated switching circuits to simple one, disjunctive and conjunctive normal forms

UNIT-IV
Functions- characteristic function, composition of functions, binary and n-ary operations, hashing function, recursive functions.Algebraic systems: semigroups and monoids, groups, subgroups, normal subgroups and quotient groups, cyclic groups, homomorphism and isomorphism

REFERENCES:

1. C.L.Liu, " Elements of Discrete Mathematics", McGraw Hill
2. Trembley, J.P & R. Manohar," Discrete Mathematical Structure with Application to Computer Science", TMH
3. Doerr Alan &Levasseur Kenneth, "Applied Discrete Structures for Computer Science", Galgotia Pub. Pvt. Ltd
4. SemyourLipschutz& Marc Lipson, "Discrete Mathematics", Second Edition, Schaum's Outlines, Tata McGraw-Hill Publishing

Subject: RESEARCH METHODOLOGY – I
Code: BCA157
Credit: 2
Duration: 36 hrs.

OBJECTIVE: To enable students understand the basic concepts of research and identify the overall process of designing a research study from its inception to its report

UNIT- I

Introduction Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, and Research approaches, Research Method versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, problem Encountered by Researchers in India. Defining the Research Problem: Definition of Research Problem, Selecting the Problem, Necessity of Defining the Problem Technique Involved in Defining a Problem.

UNIT -II

Measurement and Scaling Technique: Measurement in Research, Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling, Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques.

UNIT- III

Analysis of algorithm-The role of algorithm in computing, brute force concepts -Exhaustive Search – Travelling Salesman Problem – Knapsack Problem; divide and conquer concepts - Binary Search – Merge sort – Quick sort – Heap Sort

UNIT- IV

Typesofresearchreport:DissertationandThesis,researchpaper,reviewarticle,shortcommunication,conferencepresentationetc.,Referencingand referencingstyles,ResearchJournals,IndexingandcitationofJournals,Intellectualproperty,Plagiarism, software for plagiarism checking,

REFERENCES:

1. Kothari C.R., "Research Methodology–Methods and Techniques", New Age International
2. Montgomery, Douglas C., "Design and Analysis of Experiments", Willey.
3. Krishnaswamy, K.N. Sivkumar , AppaIyer and Mathiranjan M., "Management Research Methodology: Integration of Principles, Method and Techniques", Pearson Education
4. Ratan Khananabis and Suvasis Saha, "Research Methodology", Universities Press
5. Vijay Upagade and Aravind Shende, "Research Methodology", S. Chand & Company Ltd
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited

Subject: DATA STRUCTURE
Code: BCA205
Credits: 2
Duration: 36 hrs.

OBJECTIVES: To understand the implementations of algorithms, their efficiencies and to learn the fundamental components of problem solving by designing a method of organizing large amounts of data in an effectively solvable manner .

UNIT–I
Introduction – The concept of data structure, Abstract data type, Concept of list & array, Recursion Functions and its implementation; Introduction to Stack – Stack as an abstract data type, primitive operation on stack, Stacks application: Infix, post fix, prefix and recursion, multiple stack.

UNIT–II
LINKED LIST – Basic operations on linked list, Stacks and queues linked list, Header nodes, Doubly Linked List, Circular Linked List, Application of linked list.

UNIT-III
TREES – Basic Terminology, Binary Trees, Basic operation on Binary tree; Traversal of binary trees – In-order, Pre-order & Post-order, Binary Search Tree and its Applications. GRAPHS – Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal-Depth first & Breadth first search, Spanning Trees, Minimum Spanning Tree, Shortest path algorithm;

UNIT–IV
SORTING – Insertion sort, Selection sort, Bubble sort, Quick sort, Merge Sort, Heap sort, Comparison of sorting methods, Hash Table; Collision resolution Techniques.

REFERENCES:

1. Seymour Lipschutz, “Data Structures”, TATA McGraw-Hill
2. A .A Puntambekar, “ Data structures Using 'C' “, Technical Publications
3. E. Balagurusamy, “ Data Structures Using C “, TATA McGraw-Hill
4. Yashavant Kanetka, “Data Structures Through C”, BPB Publication
5. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, “Data Structures Using C”, Pearson Education India

Subject: DATA STRUCTURE-PRACTICAL
Code: BCA206
Credits: 2
Duration: 72 hrs.

OBJECTIVES: To practice the implementations of algorithms, their efficiencies and to learn the fundamental components of problem solving by designing a method of organizing large amounts of data in an effectively solvable manner .

LIST OF PROGRAMS:

1. Implementation of Concatenation & length using for
2. Implementation of Comparison & length using for
3. WAP to Access substring
4. WAP to find the Factorial using recursion
5. WAP to find the GCD of a number using recursion
6. WAP to find the Tower of Hanoi using recursion
7. WAP to find the Fibonacci Series using recursion
8. WAP to implement Insertion in an Array
9. WAP to implement Deletion in an Array
10. WAP to perform Binary output
11. WAP to implement Linear Binary &Sort
12. WAP to implement Bubble sort
13. WAP to implement Insertion
14. WAP to implement Select
15. WAP to implement Merge
16. WAP to implement Quick
17. WAP to implement BST & Tracing
18. WAP to Create a Linked list
19. WAP to implement Insertion in a linked list
20. WAP to implement Deletion in a linked list
21. WAP to implement Searching in a linked list
22. WAP to implement Double Linked list
23. WAP to implement Circular Linked list
24. WAP to implement Stack push and pop array
25. WAP to implement Stack Linked list
26. WAP to implement Queue Array and Linked List
27. WAP to implement Double and circular Queue
28. WAP to implement Circular Stack

Subject: RESEARCH METHODOLOGY II
Code: BCA207
Credit: 2
Duration: 32 hrs.

OBJECTIVE: To enable students analysing, interpreting research report, documenting the report using Latex

UNIT-I
Methods of data collection-collection of primary data, collection of secondary data; Processing and analysis of data-processing operations, statistics in research; Sampling Fundamentals: Need for Sampling, Some Fundamental Definitions, Central Limit Theorem, Sampling Theorem, Sandler's A-test, Concept of Standard Error, Estimation, Estimating the Population Mean, Estimating the Population Proportion, Sample size and its Determination, Determination of Sample Size through the Approach, Based on Precision Rate and Confidence Level, Determination of Sample Size through the Approach basedon Bayesian Statistics.

UNIT-II
Interpretation and Report Writing-Meaning of Interpretation, Technique of Interpretation: Precaution in Interpretation, steps in writing report, types of report, Case study.

UNIT- III
Latex and its Advantages, Installation of Latex; LaTex input file, special characters, comments. Input files structure. Layout of the document: document classes, packages, splitting a big latex file.
Typesetting Text: Line and page breaking, ready-made strings for date, etc. more special characters and symbols, titles/chapters and sections, cross references, footnotes, etc. Environments: itemize, enumerate, quote, abstract, verbatim, tabular, including graphics and images, floating bodies.

UNIT-IV
Typesetting Mathematical Formulae: single equations, building blocks, multline single equations, multiple equations, arrays and matrices, Math fonts using \mathcal{}, theorems, lemmas, common mathematical symbols (greek letters),Bibliography, hypertext links. Creating Presentation using beamer;

REFERENCES:

1. KothariC.R.,"ResearchMethodology–MethodsandTechniques",NewAgeInternational
2. Y. P. Agarwal, "Statistical Methods: Concepts, Application and Computation", Sterling Publs., Pvt., Ltd
3. G. Nageswara Rao,"Research Methodology and Quantitative methods", BS Publications
4. Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl, "The Not So Short Introduction to LATEX 2e", Published by Free Software Foundation
5. E. Krishnan and G. S. Krishna, "LATEX Tutorials – A primer Indian TEX Users Group". (Online versions: http://www.tug.org.in/tutorials.html)

Subject: PROGRAMMING WITH JAVA
Code: BCA255
Credits: 2
Duration: 36 hrs.

OBJECTIVES:
1. To identify Java language components and how they work together in applications
2. To design and program stand-alone Java applications
3. To learn how to implement object-oriented designs with Java
4. To learn how to use exception handling in Java applications

UNIT-I
Basic concepts of OOP-Benefits and Applications of OOP; Java Evolution -Java History and Features, Difference of Java from C and C++, Java and Internet, Java and WWW, Web browsers, Hardware and Software requirements, Java Support systems, Java Environment; Overview of Java Language-Simple java Program, An application with two classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, JVM,
Command Line Arguments, JIT, Bytecodes

UNIT-II
Constants, Variables, Arrays and Data Types; Operators and Expressions- Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, bitwise Operators. Arithmetic Expression and Evaluation, Conversion and Casting Decision Making and Branching - If statement-If...Else statement-Nested If...Else statement- Switch Statement- Conditional Operator; Decision making and Looping-While, do, for Statements, Jumps in loops

UNIT-III
Classes, Objects, Methods ; Inheritance; basic swings; Interfaces: Multiple Inheritance; Packages-Putting Classes together; Introduction to Multithread Programming,, Multi threading, Thread Life cycle, Multi threading advantages and issues, Simple thread program, Thread synchronization.

UNIT-IV
Managing Errors and Exceptions; I/O Basics, Reading Console Input, writing Console Output; Networking

UNIT-V
GUI: Introduction to AWT programming, Layout and component managers, Event handling, Applet class; Applet life cycle, Passing parameters, embedding in HTML, Applet Basics and Applet Programming; Graphics programming; Swing components, JApplet, JButton, JFrame, etc. Sample swing programs, The Java Library: Strings

REFERENCES:
1. Herbert Schildt, "The Complete Reference Java 2", Fifth Edition, Tata McGraw Hills Publishing Company Limited.

2. E Balagurusamy, “Programming with Java- A Primer”, Third Edition, Tata McGraw Hill Publishing Company Limited.
3. John Hubbard, “Programming with Java”, Schaum’s Outlines, Tata McGraw Hill Publishing Company Limited.
4. Cay S. Horstmann, “Core Java, Volume I : Fundamentals (English)”, 9th Edition
5. Joyce Farrell, “Java Programming”, Seventh Edition

Subject: PROGRAMMING WITH JAVA-PRACTICAL
Code: BCA256
Credits: 2
Duration: 72 hrs**.**

OBJECTIVES: To adapt to changes in environment and to implement advances in the art of programming. Java also embodies changes in the way that people approach the writing of programs.

CONTENTS:
1. To implement simple program based on operator loop decision statements
2. To implement Program to define Class and instantiate Objects
1. Program to implement constructor and Method overloading and Method overriding
2. Program to create components using Swing
3. Program to implement Wrapper Class and command line argument
4. Program to demonstrate packages and interfaces
5. Program to demonstrate Single level and Multi level inheritance
6. Program to demonstrate Exception Handling
7. Program to demonstrate Multithreading and Synchronization
8. Program to implement Server and client using networking
9. Program s using Applet Class
10. Program to perform String Class and String Buffer Class

Subject: FUNDAMENTAL OF OPERATING SYSTEM
Code: BCA257
Credits: 2
Duration: 36 hrs.

OBJECTIVE: To describe the major workings of an operating system, their functions and purpose to achieve a knowledge foundation of system softwares’ functionings and behaviours.

UNIT-I
Introduction – Definition, Types of Operating System, Functions of the Operating System, Operating Systems Services, System Calls, Single User, Multi User and Multitasking Operating System

UNIT-II
Process Management – Process, Scheduling, CPU Scheduling Concepts, Process Synchronization, Semaphore, Classical Problems of Synchronization, Deadlocks, Deadlock Detection, Deadlock Recovery.

UNIT-III
Memory Management – Introduction, Logical address V/s Physical address, Swapping, Contiguous Allocation: Partitions, Fragmentation, Paging, Segmentation.Virtual Memory: Page Replacement, Page Replacement Algorithms.

UNIT-IV
File Management – File concepts, Access Methods, File System Mounting, File System Implementation, Partitions and Mounting.

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Eighth-Tenth Edition, Wiley-India Publication.
2. Stalling, W., "Operating system,"Sixth Edition, Prentice Hall (India).
3. SibsankarHaldar and Alex A. Aravind, "Operating Systems", Pearson Education.

Subject: DATABASE MANAGEMENT SYSTEM
Code: BCA305
Credits: 2
Duration: 36 hrs.

OBJECTIVES: The objective of this Course is to introduce to the students the fundamental concepts necessary for designing, using and implementing database systems and applications. The Course stresses on database modelling and design, physical file storage techniques and language facilities provided by database management systems.

UNIT-I
Overview of the database management system[1]- Database systems , Need for Database ,Advantages of using a database, Characteristics of data in a database , Functions of DBMS, Data abstraction, Data independence, Overall Architecture of DBMS, Three level architecture; Data Models[1]- Relational Data Models, ER Model, Hierarchical models, Networking models, Advantages and Disadvantages of each models

UNIT-II
Entity Relationship model: Components, Symbols, Class and Objects, Attributes; Specialization – Aggregation; Relational Model[1]– Characteristics of Relational Database Model, CODD's rules, Tables, Rows, Columns, Domains, Attributes, Candidate Key, Primary Key, Foreign Key, Super Keys, Unique Keys, Constraints; Normalization[1] -Purpose of Normalization, Functional Dependence, Relational database Design, Normal forms, 1NF, 2NF, 3NF, BCNF, 4NF

UNIT-III
Introducing MySQL[2] –History, Role of MySQL in industry, Version of MySQL, Architecture, Engines; MySQL queries[2]- Data types, operators, functions; Working with Databases and Tables-Creating, Copying, Modifying Tables

UNIT-IV
MySQL Advance [2]-Show commands, Working with date and Time data types, Joins like Cross, Inner, Outer, Self, Unions, Subquery, Procedure, Triggers, Views,index, MySQL database export and import

UNIT-V
Database Backup and Recovery: Hardware Protection and Redundancy; Transaction Logs; Importance of Backups; Database recovery; Data storage; Causes of failures ; Concurrency Control; Database Security and Integrity

REFERENCES:

1. Abraham Silberschatz- Henry K. Korth- S. Sudarshan, "Database System Concepts", 4th edition, McGraw Hill International Edition
2. VikramVaswani,"MySQL (TM): The Complete Reference", McGraw Hill Education Publication
3. Madhilika Jain- Vineeta Pillai- Shashi Singh- Satish Jain, "A Level- Introduction to Database Management Systems", BPB Publications
4. R S Gill, "Database Management System", I K International
5. R Elmasri and S B Navathe, "Fundamentals of Database Systems", Pearson Publication
6. G. K. Gupta, "Database Management System", Tata McGraw Hill Publication

Subject: DATABASE MANAGEMENT SYSTEM-PRACTICAL
Code: BCA306
Credits: 1
Duration: 36 hrs.

OBJECTIVES: To implement database concepts using MySQL.

LIST OF PROGRAMS:
1. Working on MySQL DDL, DML, DTL Basic Data Types
2. Table Constraint definition Commands to create table
3. Commands for table handling Alter table, Drop table, Insert records
4. Commands for record handling Update, Delete Select with operators like arithmetic, comparison, logical Query Expression operators Ordering the records with orderby Grouping the records
5. MySQL functions Date, Numeric, Character, conversion Group functions avg, max, min, sum,count
6. Set operations Union, Union all, intersect, minus
7. Join concept Simple, equi, non equi, self, outer join
8. Query & sub queries

9. Working on View Intro, create, update, drop
10. Working with index
11. Primary introduction to User creation, granting privileges (Grant, Revoke, Commit, Rollback, savepoint)
12. Write a query in Mysql to create a table employee and department.
    Employee(empno,ename,deptno,job,hiredate)
    Department(deptno,dname,loc)
    Include the following constraints on column of emp table.
    a) to make the empno as primary key of the table and
    b) to ensure that the ename column does not contain NULL values and
    c) the job column to have only UPPERCASE entries and
    d) to put the current date as default date in hire date column in case data is not supplied for the column.
    Include the following constraints on column of dept table.
    a) to make deptno as primary key.
    b) to ensure dname, loccoloumns does not contain NULL values REFERENTIAL INTEGRITY, declare deptno field of dept table as primary key and deptno field of emp table as foreign key.

Subject: COMPUTER NETWORKS
Code: BCA307
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To understand state-of-the-art in network protocols, architectures and applications, process of networking.

UNIT-I

Introduction – Basic Communication Model, Data Communications, Computer Network Criteria, Types of connections; Network topology types – Bus Topology, Ring Topology, Star Topology, Mesh Topology and Tree Topology; Man, Wan, LAN; Goals and Applications of computer networks, Network Functions, Network Hardware, Designs Issues for layers, Interfaces and Services, Connection oriented and Connectionless Services; Introduction to OSI Model – Functions of each layers, The TCP/IP Reference Model, Comparison of OSI and TCP/IP Models, Physical Layer, Digital Signals, Data Transmission Concept; Types of transmission – Wired and Wireless Media and its types, Satellite Networks and its types; Packet Switching; Message Switching; Broadband ISDN;

UNIT-II

Introduction to Data Link Layer ;Services Provided by the Data Link Layer to the Network Layer; Framing; Farming Methods – Character Count and Bit Stuffing; Error Control; Introduction to Error Detection and Correction; Error Detection – Content Error and Flow Integrity Errors; Two Dimensional Parity Check; Cyclic Redundancy Check – CRC generator and CRC checker; Check Sum; Hamming Codes, Flow Control; Sliding Window Protocol; Automatic Repeat Request (ARQ) ARQ techniques – Stop and Wait ARQ, Go BACK –n ARQ and Selective Repeat Request;

UNIT-III
Medium Access Layer – CSMA , CSMA/CD, Collision – Free Protocols; IEEE 802 Standards; Token Bus – IEEE 802.4;Token Ring – IEEE 802.5;Introduction to Network Layer; Routing algorithm – Static Algorithm - Dijkstra's Algorithm, Bellman-Ford routing algorithm, Flooding, Flow Based Routing; Dynamic Algorithm - Distance Vector Routing Algorithm and , Count to Infinity Problem, Link State Routing Algorithm; Congestion - Open and Close Loop Control; Congestion control in Datagram Subnets; Traffic Shaping - Leaky bucket and Token Bucket; Fragmentation; Firewall; Tunneling; IP address and its classes; Unicast and Multicast Routing;

UNIT-IV
Transport Layer – Transport layer Services; Sockets and its types; Addressing in Transport Layer; Crash Recovery; TCP and UDP; TCP Protocols; TCP Segment Header; Check Sum; TCP transmission Policy – Silly Window Syndrome; TCP Congestion Protocol; Session Layer and Presentation Layer; Domain Name System; Electronic Mail; MIME; SMTP; Email- Gateways; FTP; TFMP; Caching; Mail Server

REFERENCES:
1. A.S. Tannenbaum, "Computer networks", Second Ed., Prentice Hall India.
2. Halsall, "Data Communication, Computer Networks", Pearson Education.

Subject: SOFTWARE ENGINEERING
Code: BCA351
Credits: 3
Duration: 54 hrs**.**

OBJECTIVE: To provide the students with the concept of software engineering fundamentals, principles and skills needed to develop and maintain high quality software products and to make the students to learn the processes and techniques of software engineering which include requirements specification, design, implementation, testing and management of software projects.

UNIT-I
Introduction –Evolution, software definition, S/W types, S/W characteristics, Software failures; Software engineering: definition, Terminology, Components, Application, Myths, Software Engineering Process and Product;

UNIT-II
Software Development Life Cycle (SDLC) Models; SRS and S/W Design – Role of SRS, IEEE Standards for SRS Documents, Requirement Engineering; Structured Information – DFD and Data Dictionary ; Requirements specification design fundamentals – characteristic of SRS, SRS Validation , Components of SRS, Entity-Relationship Diagram;

UNIT-III
Software Project Planning, management and Metrics–Project management process, Measuring software, LOC and function point metrics, metrics for software quality; Estimation – Scope,

resources, estimation technique, COCOMO model; Decomposition Technique – Empirical Models , automated tools; Design specification, design objectives and principles, structured design, Modularity, Coupling, Cohesion, Structured design Methodology, Most Abstract Input(MAI); OO design; verification;

UNIT-IV

Coding and Testing – Program Development, Verification, Monitoring and Control; Testing fundamentals; testing principles and objectives, Functional Testing; Structural testing; Testing Strategies, level of testing, test plan, test case design

SQA and Software Maintenance – SQA Plans; Formal technique reviews; Metrics; Corrective Maintenance; Adaptive Maintenance and Preventive Maintenance;

UNIT-V

IEEE-CS/ACM - Software Engineering Code of Ethics-Introduction, purpose, preamble, principles-public, client and employer, product, judgment, management, profession, colleagues, self; Plagiarism – What is it, types, Five levels or degrees of plagiarism, prevention, MLCU policy, IEEE plagiarism guidelines, citation-APA, IEEE;

REFERENCES:

1. B. B. Agarwal, S. P. Tayal, M. Gupta,"Software engineering & testing", Jones and Bartlett Publishers
2. Roger Pressman's, "Software Engineering: A Practitioner's Approach", Pearson Publication
3. R.E. Fairley, "Software Engineering Concepts", Courseback Edition, McGraw Hill
4. EEE-CS/ACM - Software Engineering Code of Ethics - Don Gotterbarn, Keith Miller, Simon Rogerson Executive Committee, IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices
5. Bruegge, Bernd and Allen H. Dutoit. "Object-Oriented Software Engineering: Using UML,Patterns and Java",Pearson: Prentice Hall Publishers
6. Schmuller, Joseph "SAMS Teach Yourself UML in 24 Hours", Sams Publishing

Elective: Web Technology

Subject: WEB DESIGNING
Code: BCAW350
Credits: 2
Duration: 72 hrs.

OBJECTIVE: To enable students to design websites using HTML, CSS

UNIT I:

Introduction to HTML, History of HTML,HTML tag: html, head, body, attributes: Id attributes, class attributes, class attribute, style attribute, elements <p>,heading element<h>,
, Formatting tag:

<u>, <b>, , <i>, , <mark>, <small>, <big>, <del>, <ins>, <sub>, <sup>, <strike>, <tt>, meta tag.

UNIT II:
Anchor tag: href attribute, <a> tag, HTML font tag: size, color, style, HTML imgtag,src attribute of IMG tag, video tag, alt attribute, border attribute, hspace attribute, vspace attribute, height and width, color, bgcolor, styles, alignment.

UNIT III:
HTML phrase tags: Emphasize, marked, strong, abbreviation, acronym, definition tag, quoting, short quote, code, keyboard, address.
Table tag, border attribute of table tag, border attribute, heading, colspan and rowspan attribute, cell-padding and cell-spacing attribute, table background and border color nesting tables.

UNIT IV:
HTML list tags: <ol>, <ul>, <dl>, <li>, <dt>, <dd>, textbox, button, HTML Form controls-form, text, password, textarea, button, checkbox, radio button, select box, label.

UNIT V:
Layout: <header>, <nav>, <section>, <article>, <aside>, <footer>, <details>, <summary>, CSS: selectors id, class selector, universal selector, grouping selector, external CSS, internal CSS and inline CSS, background-color, background-image, background-repeat, background-attachment, background-position, border styles, margin, padding, height/width, text fonts, outline, icon, links.

REFERENCES:

1. Julie C. Meloni, "Sams Teach Yourself HTML, CSS All In One", Pearson Publication
2. Head First HTML with CSS & XHTMLby Eric Freeman, Elisabeth Robson, O'Reilly Media, Inc.
3. Craig Grannell, "The Essential Guide to CSS and HTML Web Design", Apress Publication
4. Thomas Powell, "HTML & CSS: The Complete Reference", McGraw Hills Publication

Subject: PHP
Code: BCAW351
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To provide students with basic PHP technology with emphasis on program structure, language syntax, and its implementation.

UNIT-I
Essential PHP - Getting PHP, Creating your development Environment, Creating a first PHP Page, Mixing HTML and PHP, Printing some text, Printing some HTML, Echo power, Working with variables, Storing Data in variables, Interpolating Strings, Creating variable variables, Creating constant, Understanding PHP internal Data Types

UNIT-II
Operators and Flow Controls – PHP Math operators, Working with the assignment operators, Incrementing and decrementing values, String operators, Operator precedence, Using If statement, PHP Comparison operators, PHP Logical operators, Else statement, Elseif statement, Switch statement, Using For loops, Using While loops, Using Do…While loops, Using foreach loop, Terminating loops early, PHP alternate syntax

UNIT-III
Strings and Arrays – String functions, Converting to and from strings, Formating Text strings, Building yourself some arrays, Modifying the Data in arrays, Deleting arrays with loops (for loop, print_r function, for each loop, while loop), PHP array Functions, Extracting Data from arrays, Sorting arrays, Using PHP array operators, Comparing array with each other, Handling Multidimensional arrays in loops, Splitting and Merging arrays, other array functions

UNIT-IV
Creating Functions – Creating functions in PHP, Passing functions some Data, Passing arrays to functions, Passing by reference, Passing variable numbers to arguments, Returning Data from arrays, Returning arrays, Returning List, returning reference, Introducing variable Scope in PHP, Accessing Global Data, Working with Static variables, PHP conditional functions, PHP variable functions

UNIT-V
Reading Data in Web Pages – Setting up web pages to communicate with PHP, Handling Text fields, Handling Text areas, Handling Check boxes, Handling radio buttons, Handling List boxes, Handling Password controls, Handling Hidden controls, Handling image Maps, Handling Buttons(Making Button data Persist, using Submit Buttons as HTML buttons)

REFERENCES:

1. Peter MacIntyre , RasmusLerdorf , Kevin, "Programming PHP", O'Reilly
2. GSteven Holzner, "Php: The Complete Reference", Mcgraw Hill Education
3. VikramVaswani, "PHP 5.3: A Beginner's Guide : A Beginner's Guide", Mcgraw Hill Education
4. Janet Valade, "PHP and MySQL For Dummies, 4th Edition", John Wiley & Sons Inc

Subject: PHP-PRACTICAL
Code: BCAW352
Credits: 3
Duration: 108 hrs.

OBJECTIVE: To practice writing program using PHP on notepad++ and other IDE

1. WAP in PHP to print some text
2. WAP in PHP to store data in variables, Interpolating Strings, Creating variable variables, creating constant.

3. WAP in PHP using math operators, for Incrementing and decrementing values, String operators, Operator precedence.
4. WAP in PHP using If statement, PHP Comparison operators, PHP Logical operators, Else statement, Elseif statement, Switch statement, Using For loops, Using While loops, Using Do…While loops, Using foreach loop, Terminating loops early, PHP alternate syntax.
5. WAP in PHP using String functions, Modifying the Data in arrays, Deleting arrays with loops (for loop, print_r function, foreach loop, while loop), PHP array Functions, Extracting Data from arrays, Sorting arrays, Using PHP array operators, Comparing array with each other, Handling Multidimensional arrays in loops, Splitting and Merging arrays, other array functions
6. WAP in PHP using Creating functions in PHP, Passing functions some Data, Passing arrays to functions, Passing by reference, Passing variable numbers to arguments, Returning Data from arrays, Returning arrays, Returning List, returning reference, Introducing variable Scope in PHP, Accessing Global Data, Working with Static variables, PHP conditional functions, PHP variable functions.
7. WAP in PHP using Handling Text fields, Handling Text areas, Handling Check boxes, Handling radio buttons, Handling List boxes, Handling Password controls, Handling Hidden controls, Handling image Maps, Handling Buttons(Making Button data Persist, using Submit Buttons as HTML buttons)

Elective: Hardware and Networking

Subject: BASIC ELECTRONICS
Code: BCAH355
Credits: 2
Duration: 54 hrs.

OBJECTIVE: To make the students understand the efficacy of Electronic principles which are pervasive in engineering applications

UNIT-I

Basic Electricity and conducting Material: Introduction, Current, Voltage, emf, Power generation system, Switch- plug wiring, Analyzing Conductivity of elements, Types of Conductors, Semiconductors - Silicon, Germanium.

UNIT-II

Electronics Components: Resistors, Capacitors, Inductors, Transforms, Types, working and Properties, Voltage and current sources, Diode, Zener diode, Photo diode, Light emitting diode(LED), Transistors (NPN,PNP), their characteristics and uses, Field effect transistor, Phototransistor.

UNIT-III

Electronics Circuits: AC Fundamentals, Ohm's law, Series and Parallel connection of Registers and Capacitors, Half wave rectifier, Full wave rectifier and Bridge rectifier.

UNIT-IV

Regulated Power Supply: Basic regulated power supply using Zenerdiode; Block diagram of IC based Power supply;Basic Switch Mode Power Supply (SMPS); Basic uninterrupted Power Supply (UPS)

UNIT-V

Basic Measuring Instruments: Multimeters – Electronics and Digital, Cathode Ray Oscilloscope (CRO), Block diagram and basic working; Different uses of CRO, LCR – Q meter. Different tools used for practicals; Soldering and desoldering practice

REFERENCES:

1. B.L Theraja, "Basic Electronics", S.Chand
2. Albert Paul Malvino,"Digital computer Electronics, and Code", Tata McGraw-Hill Public
3. Malvino,"Electronics Principles", McGraw-Hill Publication

Subject: WINDOWS SERVER ADMINISTRATION
Code: BCAH356
Credits: 3
Duration: 108 hrs.

OBJECTIVE: The goal is to equip the students with the skills to Configure, administer and manage a Windows Server.

CONTENTS:

1. Installing and Configuring Windows Server 2008
2. Install Server Core; optimize resource utilization by using Features on Demand; migrate roles from previous versions of Windows Server
3. Configure Server Core; delegate administration; add and remove features in offline images; deploy roles on remote servers; convert Server Core to/from full GUI; configure services; configure NIC teaming
4. Configure local storage ;Design storage spaces; configure basic and dynamic disks; configure MBR and GPT disks; manage volumes; create and mount virtual hard disks (VHDs); configure storage; pools and disk pools
5. Configure server roles and features ;Configure file and share access; Create and configure shares; configure share permissions; configure offline files; configure NTFS permissions; configure access-based enumeration (ABE); configure Volume Shadow Copy Service (VSS); configure NTFS quotas ;Configure print and document services
6. Configure the Easy Print print driver; configure Enterprise Print Management; configure drivers; configure printer pooling; configure print priorities; configure printer; permissions
7. Configure servers for remote management; Configure WinRM; configure down-level server management; configure servers for day-to-day management tasks; configure multi-server management; configure Server Core;

8. Configure Windows Firewall ;Configure Hyper-V
9. Create and configure virtual machine settings ;Configure dynamic memory; configure smart paging; configure Resource Metering; Configure guest integration services
10. Create and configure virtual machine storage ;Create VHDs and VHDX; configure differencing drives; modify VHDs; configure pass-through disks; manage snapshots; implement a virtual Fibre Channel adapter
11. Create and configure virtual networks; Implement Hyper-V Network Virtualization; configure Hyper-V virtual switches; optimize network performance; configure MAC addresses; configure network isolation; configure synthetic and legacy virtual network adapters;
12. Deploy and configure core network services ;Configure IPv4 and IPv6 addressing Configure IP address options; configure subnetting; configure supernetting; configure interoperability between IPv4 and IPv6; configure ISATAP; configure Teredo
13. Deploy and configure Dynamic Host Configuration Protocol (DHCP) service; Create and configure scopes; configure a DHCP reservation; configure DHCP options; Configure client and server for PXE boot; configure DHCP relay agent; authorize DHCPserver
14. Deploy and configure DNS service; Configure Active Directory integration of primary zones; configure forwarders; configure Root Hints; manage DNS cache; create A and PTR resource records
15. Install and administer Active Directory; Install domain controllers; Add or remove a domain controller from a domain; upgrade a domain controller; install Active Directory Domain Services (AD DS) on a Server Core installation; install a domain controller from Install from Media (IFM); resolve DNS SRV record registration issues; configure a global catalog server
16. Create and manage Active Directory users and computers; Automate the creation of Active Directory accounts; create, copy, configure, and delete users and computers; configure templates; perform bulk Active Directory operations; configure user rights; offline domain join; manage inactive and disabled accounts
17. Create and manage Active Directory groups and organizational units (OUs) ;Configure group nesting; convert groups including security, distribution, universal, domain local, and domain global; manage group membership using Group Policy; enumerate group membership; delegate the creation and management of Active Directory objects; manage default Active Directory containers; create, copy, configure, and delete groups and OUs
18. Create and manage Group Policy ;Configure a Central Store; manage starter GPOs; configure GPO links; configure multiple local group policies; configure security filtering
19. Configure security policies; Configure User Rights Assignment; configure Security Options settings; configure ;Security templates; configure Audit Policy; configure Local Users and Groups; configure
20. User Account Control (UAC) ;Configure application restriction policies; Configure rule enforcement; configure Applocker rules; configure Software Restriction Policies
21. Configure Windows Firewall ;Configure rules for multiple profiles using Group Policy; configure connection security rules; configure Windows Firewall to allow or deny applications, scopes, ports, and users; configure authenticated firewall exceptions; import and export

REFERENCES:

1. Hassell J.," Learning Windows Server 2008", O'Reilly Media.
2. Hassell J., "Windows Server 2008: the definitive guide", O'Reilly Media
3. Tom Carpenter, "Microsoft Windows Server Administration Essentials Courseback", Pearson

4. MTA Windows Server Administration Fundamentals (Microsoft Official Academic Course) Courseback ;Microsoft Official Academic Course
5. Mark Minasi, Kevin Greene , Christian Booth, Robert Butler, John Mccabe, "Mastering Windows Server 2012 R2"

Subject: WIRELESS NETWORK SECURITY
Code: BCAH357
Credits: 3
Duration: 54 hrs.

OBJECTIVES: To enable students to acquire basic knowledge of fundamentals of wireless cellular, ad hoc and sensor networks, wireless communication fundamentals, medium access control, network and transport protocols, unicast and multicast routing algorithms, mobility and its impact on routing protocols, application performance, quality of service guarantees, and security.

UNIT-I
Introduction to wireless network architectures: cellular networks, wireless local area networks, multi-hop networks. Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA –TDMA – CDMA – Cellular Wireless Networks.

UNIT-II
Wireless LAN and Wireless Wans-IEEE 802.11 Standards – Architecture – Services, Physical Layer-MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard; Wireless wans-First Generation Analog, Second Generation TDMA – GSM, Short Messaging Service in GSM, Second Generation CDMA – IS-95, GPRS - Third Generation Systems (WCDMA/CDMA 2000).

UNIT-III
Wireless MANS AND PANS-Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

UNIT–IV
Adhoc and sensor networks-Characteristics of MANETs, Table-driven and Source- initiated On Demand routing, protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT–V
Services, mechanisms and attacks; Security architecture – security services, authentication, data confidentially, data integrity, nonrepudiation, availability; Security Mechanisms-attacks; Security network model.; Classical Encryption techniques-Symmetric cipher model, Cryptography, Cryptanalysis; Substitution techniques – Caesar Cipher, Monoalphabetic Cipher, Playfair Cipher, Transposition techniques. Authentication and key establishment ,Buffer overflow attacks ,Web

security, Internet worms, viruses, spyware, Spam, phishing, botnets, denial of service ,TCP/IP and DNS security ,Firewalls and intrusion detection systems Wireless security.

REFERENCES:

1. William Stallings, "Wireless Communications and networks", Pearson Education
2. Dharma Prakash Agrawal & Qing-An Zeng, "Introduction to Wireless and Mobile Systems", Thomson India Edition
3. Kaufman, Perlman, and Speciner," Network Security", Pearson Education

Elective: Mobile Applications

Subject: RESPONSIVE WEB DESIGNING
Code: BCAM350
Credits: 4
Duration: 108 hrs.

OBJECTIVES: To enable students designing responsive sites using a combination of fluid layouts, media queries, and fluid media; adopt a responsive workflow from the very start of a project.

UNIT-I

Foundation of responsive design-what is responsive design, why responsive design; Responsive content-content strategy, managing content, content governance, adaptive content

UNIT-II

HTML for responsive sites- working with HTML, basic page structure, viewport, structural elements, creating page, clean and semantic HTML;CSS for responsive sites-how CSS works, CSS version, using cascade, organizing your stylesheet, the box model, display, positioning, float and clear, basic styles; media queries-what is media query-structure-using media queries in stylesheet links, what we can query, browser support, breakpoints, design ranges; Images-way to display images, alt text, image file formats, optimizing images, content images, background images, responsive images

UNIT-III

Working responsively-responsive workflow, strategy and planning, content before layout, thinking about layout, prototypes, visual design, responsive design tools; Mobile and beyond-user experience, device agnostic design, focusing on mobile first, types of devices, touch, screen size, accessibility, deciding which devices to support, testing

UNIT-IV

Designing responsive websites-typography, start with HTML, typefaces, using fonts, sizing text, line length, whitespace, margins and padding, changing typeface for screen size; Navigation and header layout-responsive navigation, branding, navigation links, navigation patterns

UNIT-V
Performance-why performance matters, performance as design, how web pages are loaded and rendered, measuring performance, cleaning up code, minimizing HTTP requests, server stuff, Javascript, CSS, hosting, conditionally loading content, reflows and repaints, RESS

REFERENCES:

1. Clarissa Peterson, "Learning Responsive Web Design: A beginner's guide", O'Reilly Media, Inc
2. Brett Romero, "Responsive Web Design Overview : For Beginners", Createspace Publication
3. Benjamin LaGrone,"HTML5 and CSS3 Responsive Web Design Cookbook", Shroff / Packt Publication

Subject: ANDROID PROGRAMMING
Code: BCAM351
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable student understand the android application life cycle, Identity, analyze, choose tools and acquired skills for developing android applications

UNIT-I
Introduction to Android, Smartphone features, Installing the SDK, Creating Android Emulator, Installing Android development tools, Choosing which Android version to use, Android Life cycle, Android applications structure.

UNIT-II
Creating a project, Working with android manifest.XML,Various controls,Layouts,Text controls,Button controls Images,Supporting Multiple Screen,Andriod Activities, Application context,Intent WebView.

UNIT-III
List View,Spinner,AutoComplete Textview, MultiAutoComplete extview,Toast,Dialogue Notification, Statusbar Notification, Option Menu, Context Menu, contextual action mode, Popup menu,menu from xml, Linkify, Match Filter & Transform Filter

UNIT-IV
Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers, Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers,An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler

UNIT-V

Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities, Multimedia: Audio, Video, Camera, Playing Audio and Video, Recording Audio and Video, Using the Camera to take and Process Pictures

REFERENCES:

1. Warren Tim,"Android Programming For Beginners", Ingram Publishing
2. ZigurdMednieks, Laird Dornin, G. Blake Meike,"Programming Android",O'Reilly
3. Jason Wei,"Android Database Programming", Packt Publishers

Elective: Animation and Multimedia

Subject: VISUAL DESIGN
Code: BCAG350
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable students to design various documents using adobe flash, Photoshop. InDesign

CONTENTS:

1. Installing Flash software and familiar with flash workspace, flash document setup, run and publishing.
2. Working with text tool, transforming text, skew, break apart and color text, vertical text, rotate, zoom text
3. Working with graphic symbol, button symbol, movie clip symbol
4. Working with shape tween, mask, spotlight, motion guides, motion tween, motion presets
5. Working combine flash movies, add scenes, load movies
6. Working with graphic brightness, tint, alpha and remove background
7. Working with sound, video and desco drawing tool
8. Working with time line and produce different animation
9. Installing photoshop and familiarizing with its environment, raster and vector Graphics, Photoshop Environment Elements, Navigating in Photoshop, Sizing Images Image Size and Resolution
10. Working with image cropping, selecting Image Areas, rectangular and elliptical marquee tools, the lasso tools, saving selections, layers, floating versus fixed selections, undoing previous steps, copying selections, creating layers, transforming layers, copying layers between images, arranging layers
11. Working with magic wand tool, the magnetic lasso tool, modifying selections, blending and compositing, defringing, opacity and blending modes, feathering edges, image modes, mode characteristics, grayscale and bitmap modes, color modes, color and painting, selecting colors

12. Painting Tools, The Clone Stamp Tool, Text, Layer Effects, and Filters, Type Layers, Layer Effects, Filters, Merging and Flattening Layers, Adjusting Images, Brightness/Contrast, Levels Adjustment Layers, Toning Tools, Hue/Saturation
13. Working with Adobe Indesign-Getting to know tools, panels, and workspaces, Learning how to navigate and zoom in a document, Working with layers for efficiency and organization, Setting up master pages in a document, Building automatic page numbering and sections, Creating text and graphics placeholder frames
14. Understanding text and graphics frames, Grouping and transforming frame s, Formatting text using paragraph and character styles, Flowing, threading, and spell -checking text in text frames, Adding color: swatches, gradients and tints, shortcuts and techniques, Working with typography, including tracking and kerning, drop caps, rules, tabs, dot leaders and hanging indents, paragraph, character and object styles ;Nesting character styles, Working with clipping paths and alpha channel masks, Workflow tips for placing graphics into In Design, Using the Library panel

REFERENCES:

1. SandorBurkus,"Photoshop Cs5, Pro", Createspace
2. Todd Perkins, "Adobe Flash Professional",Wiley India Pvt Ltd
3. Deke McClelland,"Photoshop 7 Bible, Professional Edition",John Wiley & Sons
4. Adobe Creative Team, "Adobe Flash Professional", Pearson

Subject: 2D ANIMATION
Code: BCAG351
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To introduce the fundamental principles and basic techniques of 2D animation.

UNIT-I

Digital 2D Animation orientation, Basic factors affecting the illusion of motion,Impact of digital techniques on the craft of film and video animation, Professional animation practice and job description, Prevailing file format standards and other compatibility issues, History and future trends of computer animation application in the visual arts.

UNIT-II

2D animation application software interface, Default setting and user preferences,Document setup; Import and export formats, Document and timeline window feature, Tools and commands palettes, Media-selection tools and techniques, Asset-management features.

UNIT-III

2D graphics-creation features, Underlying data type-raster, vector, Raster painting and/or import features, Vector shapes, Vector free-form and control-point Placement tools, Features specific to the program in use.

UNIT–IV
2D graphics editing features-Basic geometric transformation, Boolean Operations on shapes, Object stroke attributes, Object fill attributes, Shading Techniques (blends-gradients), Packaged effects (extensions-Plug-ins), Features Specific to the program in use.

UNIT–V
2D animation frame-sequencing features, Straight-ahead animation, Key Frames animation, Motion paths, Applying geometric transformations over time, Intertwining options, Looping and motion, Features specific to the program in use.

REFERENCES:

1. Robert R, Snow D, "Flash CS4 Professional Bible", Wiley Publishing
2. Frank Thomas, Ollie Johnston, "Disney Animation ",Abbeville Press
3. Richard Williams, "The Animator's Survival Kit: A Manual of Methods, Principles, and Formulas for

Subject: WEB DESIGNING WITH SCRIPTING LANGUAGE
Code: BCA400
Credits: 3
Duration:

OBJECTIVE: To enable students understand python programming paradigm and develop applications using it

UNIT –I
Basics of style sheet: define CSS, use of CSS, types of CSS, syntax, margi, padding, text, font, links; Employing local styles & making use of ids and classes with Example, Using floating positioning and absolute positioning;
CSS3 new selection tools : attribute selection, not, nth-child,new pseudo-classes(link,visited,active,hover,focus,first-letter,first-line,first-child,before,after, language), @font-face, column support, text-stroke, text-shadow; Flexible Box layout Model : creating a flexible box layout, viewing a flexible box layout; New visual Elements: opacity, box-shadow, border-radius, Key Frames, Color values, gradients, image borders, reflections, rounded corners, shadows, transformations, transition animation, transparency; Medial Query –Responsive Design/Web page; implementation using appropriate programs

UNIT–II
Working with JavaScript-List data types, operators and control flow statements in JavaScript; JavaScript concept, Origin of JavaScript, Advantages of java script, Java script Variables, DataTypes, Operators, Literals, Array and Functions; JavaScript Control Statements; Java script document object model: Learning DOM , Introducing object in Model, Form object, Window object, Document object, Browser object, , Navigator object, The String Objects, Date and Math Object, use of Built in object,User defined object ; The Document Object: Basic,Writing to Documents, Dynamic Documents;

UNIT–III

Form Object -Forms and Forms-based Data; Form Object , Working With Form Elements and Their Properties, Button Object, Text Objects, Text Area Objects, Hidden Objects, Check Box Objects, Radio Button Objects, Selecting Objects; Form Validation : Form Validation: A Process , Testing Data , Preparing Data for Validation and Reporting Results, Trapping Empty Fields, Finding Invalid Values, Intercepting the Submit Button, Validating Non-text Form Objects; Window Object : The window object, Dialog Boxes, Status Bar Messages, Window Manipulations; Dates and Math Objects : The Date Object, Using and manipulating dates, Displaying the date and time, Time Zones, Extracting the Date, Extracting the Hrs., The Math Object and its constants; implementation using appropriate programs

UNIT–IV

Working with jQuery: Query Events: Define events4.2Mouse Events: Click, dblclick, hover; Keyboard Events : keypress, keydown,Keyup,Keyrelease; Form Events : submit ,Onload4.5Document/Window Events : load , resize , scroll, unload,bind() and Event Helper Methodwith Example

UNIT–V

Working with Ajax: the purpose of basic, the XML Http Web Application, Callback function, Traditional Application, Web page Application, Use of HTML and Xml in Ajax;Passing Data: XML-Creating child function, Dynamic Table, Object Literals –Array, Object, Array in Objects, Objects in Array, JSON Introduction –Syntax, Advantages, Disadvantages; Ajax Application:Login Form, Preloaded Data, Feedback from using validation, Live search, Dynamic Dependable Dropdown using Ajax-Country, state and city Examples

REFERENCES:

1. Powell Thomas,"HTML& CSS: The Complete Reference",McGraw Hill
2. DT Editorial Services,"HTML 5 Black Book",Dreamtech Press India Pvt. Ltd
3. Patel Sandeep Kumar,"Developing Responsive Web Applications with AJAX and jQuery", Packt

Subject: PYTHON PROGRAMMING
Code: BCA401
Credits: 4
Duration:

OBJECTIVE: To enable students understand python programming paradigm and develop applications using it

UNIT-I

Introduction to Python-Installation and Working with Python, variables, Operators understanding python blocks; Data types- Declaring and using Numeric data types: int, float, complex, Using string data type and string operations Defining list and list slicing, Use of Tuple data type, implement necessary program for the topics

UNIT- II

Python program flow control-Conditional blocks using if, else and elif, Simple for loops in python, For loop using ranges, string, list and dictionaries, Use of while loops in python Loop manipulation using pass, continue, break and else Programming using Python conditional and loops block, Functions, modules and packages-Organizing python codes using functions Organizing python projects into modules Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages, implement necessary program for the topics

UNIT- III

Python String, List and dictionary manipulations, building blocks of python programs Understanding string in build methods List manipulation using in build methods Dictionary manipulation Programming using string,list and dictionary in build functions, python fileoperation, Reading config files in python Writing log files in python, Understanding read functions, read(), readline() and readlines()Understanding write functions, write() and writelines()Manipulating file pointer using seek Programming using file operations, implement necessary program for the topics

UNIT-IV

Python object oriented programming–OOPs Concept of class, object and instances Constructor, class attributes and destructors Real time use of class in live projects Inheritance , overlapping and overloading operators Adding and retrieving dynamic attributes of classes Programming using Oops support8 : Python Regular Expression Powerful pattern matching and searching Power of pattern searching using regex in python Real time parsing of networking or system data using regex Password, email, url validation using regular expression Pattern finding programs using regular expression, Python Exception Handling Avoiding code break using exception handling safe guarding file operation using exception handling, handling and helping developer with error code, programming using Exception handling, implement necessary program for the topics

UNIT- V

Python database interaction-SQL Database connection using python, creating and searching tables Reading and storing config information on database Programming using database connections, implement necessary program for the topics

REFERENCES:

1. Martin C. Brown,“Python: The Complete Reference”,McGraw Hills
2. YashavantKanetkar,”Let us Python”, BPB Publications
3. R. NageswaraRao,“Core Python Programming”, Dreamtech Press
4. Bill Lubanovic,“Introducing Python”,Shroff Publishers

Subject: WEB SERVICES
Code: BCA402
Credits: 3
Duration:

OBJECTIVE: To provide knowledge on application-to-application interactions on the Web and integrate the existing network computer infrastructure into the Web.

UNIT-I
Introduction to web services- Fundamentals of XML, XML Syntax, XML Document Structure, Schema Languages; DTD,XML Schema; Presentation technologies –XSL,XFORMS,XHTML– Transformation –XSLT ,XLINK ,XPATH , Xquery; Developing Web services-Objectives, Web service standards, SOAP-The Processing model, Faults, Data representation and RPC, Protocol binding, WSDL-Interface Descriptions, Binding description, service description, UDDI-Descriptions ,Discovery

UNIT-II
Business motivations for web services – B2B, B2C,Technical motivations ,limitations of CORBA and DCOM , Service oriented Architecture (SOA), Architecting web services ,Implementation view ,web services technology stack, logical view, composition of web service, deployment view, process view

UNIT-III
Transport protocols for web services, messaging with web services protocols, SOAP, describing web services, WSDL – Anatomy of WSDL, manipulating WSDL; web service policy – Discovering web services, UDDI, Anatomy of UDDI, Web service inspection, Ad-Hoc Discovery, Securing web services

UNIT–IV
Implementing XML in E-business-B2B, B2C Application; Different types of B2B interaction, Components of e-business, XML systems – ebXML, Rosetta Net Applied XML in vertical industry, Web services for mobile devices

UNIT–V
XML and Content Management-Semantic Web, Role of Meta data in web content, Resource Description Framework, RDF schema, Architecture of semantic web, content management workflow, XLANG WSFL

REFERENCES:

1. Ron schmelzer et al, “XML and Web Services”, Pearson Education, 2002
2. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall, 2004
3. Frank P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002
4. Keith Ballinger, “.NET Web Services Architecture and Implementation”, Pearson Education, 2003

Subject: ROUTER CONFIGURATION AND SECURITY
Code: BCA403
Credits: 3
Duration:

OBJECTIVES: The objective is to develop an understanding of how a router learns about remote networks and determines the best path to those networks. This course includes both static routing and dynamic routing protocols.

UNIT-I
Introduction to Routing- Routers are computers, Router CPU and Memory, Router Boot-up Process, Router Interfaces; Routers and the Network layer.

UNIT-II
Configure a Router- CLI command models, Configuring a router name, Configuring router passwords, Examining the show commands, Configuring a serial interface, Configuring an Ethernet interface. Router Configuration Lab- Cabling a Network and Basic Router Configuration; Routing table principles and protocols (Distance Vector and Link State Protocols) IP Routing Technologies.

UNIT-III
Configure and verify operation status of a device interface, both serial and Ethernet; Verify router configuration and network connectivity; Configure and verify routing configuration for a static or default route given specific routing requirements; Differentiate methods of routing and routing protocols; OSPF ; EIGRP inter VLAN routing-Router on a stick; SVI interfaces.

UNIT-IV
Configure and verify DHCP ; Describe the types, features, and applications of ACLs; ACLs in a network environment; Identify the basic operation of NAT; NAT; NTP as a client; Recognize High availability (FHRP); Syslog; SNMP ; WAN Technologies; WAN serial connection; PPP; Frame Relay; PPPoE.

UNIT-V
Network Security- Introduction to Network Security, Why network security is important?, Common Security Threats, Types of Network Attacks, General Mitigation Techniques, The Network Security Wheel, The Enterprise Security Policy. Securing the Router; Network device security features; Switch Port Security features; ACLs; ACLs and SSH.

REFERENCES:

1. Chappell, “Advanced Cisco Router Configuration“, Techmedia
2. David Hucaby, Steve McQuerry, Andrew Whitaker,” Cisco Router Configuration Handbook (Networking Technologies)”, Cisco Systems
3. Walter J. Goralski,” Juniper and Cisco Routing: Policy and Protocols for Multivendor IP Networks “,John Wiley & Sons

Subject: NETWORK SWITCHING AND ROUTING TECHNOLOGY
Code: BCA404
Credits: 3
Duration: 72 hrs.

OBJECTIVE: To understand how a message manages to flow from source to destination i.e. to understand Network Switching and Routing Technologies.

UNIT-I
Introduction to Switched LAN architecture; The Hierarchical Network Model, Benefits of a hierarchical Network, Principles of a hierarchical network design; Matching Switches to specific LAN functions-Considerations for hierarchical network switches, Switch features, Switch features in a hierarchical network, Switches for Small and Medium Sized Business (SMB).

UNIT-II
Basic switch concepts ;Introduction to Ethernet/802.3 LANs- key elements of Ethernet/802.3 Networks- CSMA/CD, Ethernet Communications, Duplex Settings, Switch port settings, Switch MAC address table; Design considerations for Ethernet802.3 Networks- Bandwith and Throughput, Collision Domains, Broadcast Domains, Network Latency, Network Congestion, LAN segmentation; LAN Design Considerations- Forwarding Frames using a switch, Switch forwarding methods, Asymmetric and Symmetric Switching, Memory Buffering.

UNIT-III
Basic Switch Configuration; Prepare how to configure the switch, Management Interface, Default Gateway, Duplex and Speed; Verifying Switch Configuration- Configuring Password Options, Login Banners, Configure Telnet and SSH.

UNIT-IV
VLANs-Introducing VLANs- Defining VLANs, Benefits of VLANs, VLAN ID Ranges, Types of VLANs-data VLANs, the default VLAN, the black hole VLAN, native VLANs, management VLANs, and voice VLANs; VLAN Trunking- VLAN Trunks, configure VLANs, Managing VLANs, configure a Trunk.

UNIT-V
IP Addressing ;IPv4 ; IPv6; IPaddressing for LAN/WAN environment;IPv4 addressing scheme using VLSM ; Routers and Packet Forwarding; Static and Dynamic Routing; Distance Vector Routing Protocols; RIP; Routing Table; EIGRP; OSPF; Link State Routing.

REFERENCES:

1. Cisco, “Routing and Switching Essentials”, Pearson Education
2. Todd Lammle, “CCNA Routing And Switching Study Guide”, Wiley India Pvt Ltd
3. Radia P A, ”Interconnections: Bridges, Routers, Switches & Internetworking Protocols”, Wesley Professional

Subject: LINUX SERVER ADMINISTRATION
Code: BCA405
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable students to gain the knowledge of managing Linux Server and to have a hands-on a Linux Server Management.

UNIT-I
Configuring Your Computer on a LAN - Configuring your ifconfig, Configuring your arp, The Hostname Commands, Network Configuration Files, Configuring Private and Public Networks - Private IP Networks, Configuring a Network, Classless Inter-Domain Routing (CIDR),Creating Internet Connections - The Internet Configuration Wizard, Using minicom Troubleshooting your network - Checking Network Status, Checking connections with ping and traceroute.

UNIT-II
Configuring a dns server - packages, dns concepts, initial dns configuration, a dns slave server, a dns configuration files, starting dns; using dns client-setting up a dns server - packages, basic configuration, the configuration file: /etc/dhcpd. conf, starting the dhcp server, dhcp servers and remote networks, a lease database, working with dhcp and bootp clients; Using the Internet Print Protocol, Configuring the common Unix Print System - Graphical configuration, The lpadmin command, The lpstat command, Configuration files,/etc/cup/cupsd.conf, Printer management, Using the Line Print Deamon - The LPD Configuration files, Printer Management, Red Hat's Printer Tool.

UNIT-III
Using FTP as a client - Basic commands, Connecting to ftp.redhat.com, The GUI FTP Client The Secure FTP Server - Basic security features, Configuration files Creating an Anonymous FTP Server - Configuring vsFTP Server, Configuring WU-FTP, Anonymous directories, Configuring WU-FTP with Real Users - Configuration Files, Commands, Anonymous Uploads.

UNIT–IV
Bridging the gap between linux and windows - functioning on a microsoft network, licensing, definitions, packages; configuring samba as a client - shared samba directory, samba terminal mode, connecting to a printer; the samba configuration files - samba daemons, other samba configuration files, the main samba file: smb.conf, a samba troubleshooting checklist, the samba web administration tool (swat) - the home menu, samba configuration wizard, the globals menu, the shares menu, the printers menu, the view menu, the password menu, the server status menu, the red-config-samba alternative - server settings, user management, creating a new share

UNIT–V
Understanding best practices - physical setup, encryption, password security, firewall and dmzs, using pluggable authentication modules - basic configurations, module types, control flags, creating firewalls - data directories and iptables, firewalls as chains, format of iptables, options for iptables, patterns for iptables, actions for iptables, putting it all together, setting up ip masquerading - functionality, ip masquerading commands

detecting break-ins - sniffing with ethereal, checking logins, tripwire and suspicious activity, troubleshooting access issues - too much security, denial or rejection.

REFERENCES:

1. Micheal Jang, "Mastering Red Hat Linux 9", BPB Publications
2. Kurt Wall , Terry Collings , "Red Hat Linux Networking and System Administration", Broadway Books
3. Sander Van Vugt,"Red Hat Enterprise Linux 6 Administration: Real World Skills For Red Hat Administrators",Wiley India Pvt Ltd

Subject: ADVANCED ANDROID DEVELOPMENT
Code: BCA406
Credits: 4
Duration: 126 hrs.

OBJECTIVE: To provide the skills required for developing android applications and deploy them

UNIT-I

App Development Topics -Services: Services and Notifications –bound/unbound services, Starting and stopping services, Android Interface Definition Language, Handler and Messenger, Passing objects over IPC, Scheduling of services, Remote service communication, Running Background Jobs, Setting up notifications, Notification manager, Connecting Devices Wirelessly -using Network Service Discovery , P2P Connections with Wi-Fi P2P for Service Discovery, Networking Parsing XML Data

UNIT-II

Networking: Introduction Android networking capabilities, Android SDK networking packages, Android Socket programming, Proxy Settings, Broadcasting, SMS application using Broadcast Receiver. Android Xml remote procedure calls on android, what is XML-RPC, History, Data types, using web services on android phones. Integrating with Embedded Applications: Embedded Apps: Telephony, SMS, etc. implementation on necessary program for the topics

UNIT-III

Graphics & Multimedia–Introduction to Graphics, Frame Animations, Tweening, scale, rotate, translate, alpha, Interpolation, Canvas/Drawing into a view, Surface View/Surface Holder. Animation-Crossfading Two Views,ViewPager for Screen Slide, Card Flip, Zooming, Layout Changes. Bitmaps -Loading, Processing Bitmaps with thread, managing Bitmap Memory and UI, implementation on necessary program for the topics

UNIT-IV

Threads & Processes-Tasks & Processes: Tasks, Switching between Task, Process, Process lifecycle. Threads, Thread Life cycle, Worker Threads, Thread Handlers, Threads &Loopers and IPC;Web Applications-Web Apps & Web Services: Web Applications -Web View, ViewPort, Page navigation, Debugging web applications Web Services –Android Server Communication: communication protocols, interacting with server-side applications, developing clients for web services, Exchanging Data over the Internet data parsing using json and xml parsing. Cloud -Connectivity and Sync to the

Cloud, Google Services. Integrating with 3rdparty Apps using Web Services, implementation on necessary program for the topics

UNIT-V
Commercializing your application-Security, Performance-Kernel, Application level Security, Using permissions, designing for Performance & Designing for Performance. Security with HTTPS and SSL, Security with Device Management Policies

REFERENCES:

1. RetoMeier,"Professional Android 4 Development", Wiley
2. Ableson W. Frank,"Android in Action",Wiley
3. Wei-Meng Lee, "Android Application Development Cookbook", Wiley
4. Robbie Matthews,"Beginning Tablet Programming",Apress

Subject: MOBILE APPLICATION SECURITY
Code: BCA407
Credits: 3
Duration: 72 hrs.

OBJECTIVE: To enable students understand methodologies, tools, techniques necessary for testing mobile applications

UNIT-I
Testing Fundamentals -SDLC, SDLC Phases, need of Testing, methods of Testing: Functional, Black Box, White Box, Regression, Stress, Monkey etc., TestCase, Rules to write TestCase, Testsuite and Test Runner

UNIT-II
Introduction to Android testing framework-JUnit: JUnit Test Framework, Features of JUnit Test Framework, Testing Fundamentals-TestCase, TestSuite,TestRunners, JUnit classes, JUnit in Android, Android Testing Framework, Test Projects-Directory Structure, Android Testing API, Mock Objects, Activity Testing, what to Test, ContentProvider Testing, service Testing, choosing devices to test, Testing tools

UNIT-III
Mobile apps testing -Need of testing, Mobile applications testing landscape, Common types of testing, UI and functional testing strategies of mobile applications, compatibility testing need and methods, non-functional testing methods of mobile applications -Performance, security, types of operations testing for mobile applications -Installation, un-installation, upgrade, methods of testing the mobile application integration with phone features, challenges in testing, difference between testing mobile web and testing native app

UNIT-IV

Mobile testing tools-Testing lifecycle of mobile applications, alternatives of testing environments for mobile apps testing, Differentiate between testingon physical devices, cloud devices and emulators, different test automation tools for mobile applications, key features of monkey talk tool, installation and use of monkeytalk tool for a mobile application on emulator, installation and use of monkeytalktool for a mobile application on PC connected device, installation and use of monkeytalk tool for a mobile web, installation and use of monkeytalk tool for a mobile application for cloud device.

UNIT-V

UI and functional testing -Using monkey talk -creation of test project, test suite and test script, record and playback feature, different verification techniques, data driven testing methods, synchronization, script parameterization, reporting features. Using Robotium -creation of test project, test suite, Robotium Framework, data driven testing methods

REFERENCES:

1. Diego Torres Milano, "Android Application Testing Guide", Packt
2. Julian Harty,MahadevSatyanarayanan,"A Practical Guide to Testing Wireless Smartphone Applications",Morgan & Claypool Publishers
3. Michael Hackett, Bob Johnson, Hung Q. Nguyen,"Testing Applications on the Web: Test Planning for Mobile and Internet-Based Systems",Wiley
4. HrushikeshZadgaonkar,"Robotium Automated Testing for Android", Packt

Subject: VISUAL EFFECTS
Code: BCA408
Credits: 5
Duration: 162 hrs.

OBJECTIVE: To enable student design and execute composting in visual effects.

UNIT-I

Visual Effects, Description, Types, Particles, Analysis, Size, Sand Effects, Smoke Effects, Fire Effects, Cloud Effects, Snow Effects.

UNIT-II

Fluid Effects, Coloring, designing Clouds Background, Designing Fog Effects. Explosion Effects, Fire Effects with flames, Space Effects and designs, Designing Thick Smoke.

UNIT-III

Designing Paint Effects, Coloring paints, Designing Trees and green effects, Designing Weather and seasons, Effects on seasons, Designing Glass image, Designing Different glass reflection, Designing Glow Effects, Liquid Effects and Reflection design.

UNIT-IV

Designing Special Effects, Designing effects of Hair and shape, Designing Fur Effects, Designing Clothes and effects.

UNIT-V
Visual Effects Tool and advanced functions, Converting images from 2D to 3D Pictures. Creating 3D Effects, Differentiation 2D effects and 3D effects.

REFERENCES:
1. Antony Bolante, ”Adobe After effects”, Techmedia
2. Micheal J. McAlister,”The Language of Visual Effects”, Lone Eagle Publishing Co
3. Adobe Creative Team, “Adobe After Effects”, Pearson Education

Subject: 3D ANIMATION
Code: BCA409
Credits: 5
Duration: 162 hrs.

OBJECTIVE: To introduce students to the principles and techniques of 3D modeling and animation.

UNIT-I
An Introduction on how to make drawings for animation-Shapes and forms,3d drawings, Caricaturing – fundamentals, Exaggeration, Attitude, Silhouettes, Boundary- breaking exercises and warm ups, gesture drawing, Line drawing and quick sketches, Drawing from observation, memory and imagination.

UNIT-II
Modeling methods-modeling with primitives, planning a model, deforming lattices, wire or cluster, Extrusion-object duplication, pivots and CV surfaces, the production process, complex model hierarchy

UNIT-III
Complexities over various modeling techniques, purpose and modeler dependency, hardware and software consideration

UNIT-IV
Character Animation, Preparing to Animate, the Animation Process, Pose-to-Pose blocking, Establishing Timings, Refining Animation

UNIT-V
Non-Linear Animation – Creating Poses, Creating Clips, Modifying, blending and Sharing Clips, Animating with Maya’s new Body IK Setup

REFERENCES:
1. Adam Watkins, ”Maya A Professional Guide”, Dreamtech
2. Tom Meade and Shinsaka Anima, ”The Complete Reference Maya”, Tata MC.Graw – Hill

MINOR SUBJECTS

Subject: OFFICE AUTOMATION SYSTEMS I (OFFICE TOOLS)
Code: CSMN216
Credits: 4
Duration: 108 hrs.

OBJECTIVES:

i. To equip students with the skills to operate the information technology related tools and equipments used in our day-to-day work environment
ii. To be able to make efficient decisions on what are the best tools to use amongst the different tools available
iii. To enhance knowledge about the functionality of the different tools- (a) Printer Installation, Sharing and Troubleshooting, (b) Scanner , (c) Fax
iv. To learn about how to install software, firmware and hardware
v. To learn and apply the concept of LAN Configuration and troubleshooting

UNIT - I

Components Of Personal Computer - Parts of the computer: CPU-Motherboard, IO Cards, Graphics Cards, Cables, RAM, Hard Disk Drive, CD & DVD drives, Floppy Disk Drive, Pen Drive; Peripherals-Keyboard, Mouse, Speakers, Scanners, Printers, Monitor, Un-interruptible Power Supply (UPS)

UNIT- II

PC Assembling& Installation- Components of the computer, Assembling a CPU: Steps in installing Processor in CPU, Motherboard installation, RAM, SMPS, Drives installation, Installation of Video, Graphics Card, Sound Card, Modem and Adapter, Connectors-System Panel Connector; Software installation-OS installation, Driver Installation

UNIT- III

Working With Commonly Used Pc Tools- Printer-Types of Printers-Inkjet Printer, Daisy Wheel Printer, Laser Printer, Line Printer, Dot Matrix Printer,Step-by-Step Printer Installation & Sharing, Scanner-Types of Scanner, Connecting the Scanner, Scanner Software, Fax machine-Setting up & Configuring a Fax Machine, Sending & Receiving a Fax, Common Features- Print, Scan and Copy, Common Problems, Projector installation.

UNIT- IV

Troubleshooting Common Computer Issues- Hardware Troubleshooting- Motherboard Troubleshooting, RAM Troubleshooting, Hard Drive Troubleshooting, Processor Troubleshooting, Power On Self Test (POST);
Software Troubleshooting- Slow Computer, Hard Drive Problem, display problem, BSOD, overheating, Forgotten Password, Data Lost, Windows start-up problems, Booting problems, licensing of software

UNIT- V
Lan Configuration And Troubleshooting- Common terms used in computer networking-Device, Media, Network Adapter, Network Operating System, Protocol; Servers, Clients, Peers, Host Computers, Terminals; cable crimping, network troubleshooting commands

REFERENCES:

1. http://www.pcworld.com
2. http://www.in.techradar.com
3. https://www.microsoft.com
4. http://www.tomshardware.com/t/motherboards
5. www.computerhope.com

Subject: OFFICE AUTOMATION SYSTEMS II (WINDOWS AND LINUX OPERATING SYSTEM)
Code: CSMN266
Credit: 4
Duration: 108 hrs.

OBJECTIVE: To enable students installing, troubleshooting, maintaining and working with the most common operating system- Windows and Ubuntu and their application software

UNIT - I
Operating Systems- What is Operating System-Windows, Ubuntu; Requirements for installation of operating systems-space, processors, types of partitions, file system, types of drives, BIOS-types, settings; clean formatting, ; Formatting without losing data, Backup and Restoring of operating system, driver; Installation of dual operating system; System File repair,

UNIT- II
Windows Basics- Working with Windows Explorer, using the Taskbar, Managing Multiple Windows, Customize the Taskbar, Working with Desktop Gadgets; Working with Files and Folders-Viewing Folders, Exploring the Computer's Contents, Searching for Files and Folders, Creating and Renaming Folders, Selecting Files and Folders, Moving, Copying, and Deleting File, Using the Recycle Bin; Personalizing Windows-Control Panel, Personalizing the Desktop, Modifying the Color Scheme, Changing the Monitor Resolution, Selecting a Screen Saver, Personalizing Sound Effects, Fine-Tuning System Settings, Modifying Folder Options, Customizing the Startup Folder, Adding and Changing User Accounts

UNIT- III
Applications Softwares and the Internet- Application software installation, management; Different application proprietary/open source software and their purpose; Securing files and data using LastPass, BitLocker, VeraCrypt, 7Zip; Backup application software; Burning files to CD/DVD; Setting Up an Internet Connection; Sharing Drives, Files, Games; Video conferencing- using Teamviewer, Skype, HipChat

UNIT- IV

Working with Ubuntu Desktop- Main Menu, System Settings, Launcher , Various Applications (eg: Libre office, Video player, calculator etc), Changing the theme of the Desktop, Remove and add applications in the Launcher, Use multiple desktops, Internet connectivity, Sound settings Time and Date settings and switch to other user accounts, Working with Synaptic Package Manager,Working with Ubuntu Linux Software Center- Ubuntu-Software-Center, Installing softwares through Ubuntu Software Center, Linux basic commands- Command interpreter, Shell, Using man, Apropos, Whatis,

UNIT-V

General Purpose Utilities in Ubuntu-echo, uname, who, passwd, date, cal, pwd, ls, cat; Linux File system-file, directories, File node, types of file, home directories, current directories, change directories, mkdir, rmdir; regular file-cat, rm,cp,mv, cmp, wc; file attributes- chown, chmod, chmod -R, displaying files with ls –l, chmod u+, chmod a-w, chmod g+w, chmod -r, chgrp, inode, hard link, symbolic link, grep commands

REFERENCES:

1. Richard Petersen, “The Complete Reference Linux”, First Edition, Tata McGraw Hills Publishing Company Limited.
2. Keir Thomas, “Beginning Ubuntu Linux: From Novice to Professional”, Third Edition, APress Publication
3. Andy Rathbone, “Windows 7 for Dummies”, APress Publication
4. www.spokentutorial.org

Subject: OFFICE AUTOMATION SYSTEMS III (OFFICE SUITE)
Code: CSMN316
Credit: 4
Duration: 108 hrs.

OBJECTIVE: To enable student working with Microsoft Office package and Libre Office

UNIT- I

MS Word Basics-Introduction to MS Office; Features & area of use. Working with MS Word; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Creating a New Document; Different Page Views and layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print Options Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers ; Inserting – Page Numbers, Pictures, Files, Auto texts, Symbols etc.; Working with Columns, Tabs & Indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels. Importing and exporting to and from various formats.

UNIT- II

MS Excel-Introduction and & area of use; Working with MS excel.; concepts of Workbook &worksheets; User wizards; Various Data Types; Using different features with Data Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; working with Data & Ranges; Different Views & Worksheet column Freezing, Labels, Hiding, Spitting etc.; Using different features with Data and Tact, Use of Formulas, Calculations & Functions, Cell Formatting including Borders & Shading working with Different Chart Types; Printing of workbook & worksheets with various options

UNIT- III

Ms PowerPoint-Introduction & area or use working with Ms PowerPoint; Creating a New Presentation, working with Presentation; Using wizards; slides & its different views , Inserting, Deleting and Copying of slides; working with Notes, Handout, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide working with PowerPoint objects; Designing & Presentation of a slide Show; Printing Presentation, Notes, Handouts with print options

UNIT- IV

Introduction to Databases, Starting Access 2007, Working with Database Objects, Tour of a Table, Adding, Editing and Deleting Records, Tour of a Form, Tour of a Query, Tour of a Report, Previewing and Printing a Database Object, Selecting Data, Cutting, Copying and Pasting Data, Planning a Database, Creating a New Database, Creating a Table, Modifying a Table Creating a Query, Sorting a Query, Using AND and OR Operators in a Query, Creating a Form with the Form Wizard, Creating a Report with the Report Wizard, Creating Mailing Labels with the Label Wizard, Converting an Access Database

UNIT- V

Libre Office, Advantages of Libre Office, downloading, Installing, Starting LIbre Office, Creating new documents, Save, Open; Libre Office Writer-Introduction, Formatting text, Formatting pages, Tables, Working with Graphics, Printing, Mail merge, Linking to another part of a document; Libre Office Calc-Introduction, Spread sheet, Row, Column , Cell , Basic Calculation function: +,-,*,/ , Sub, Round, Percent, SQRT, POW, Trigonometric functions, Conditional Formatting, Filtering, Sorting; LIbre Office Impress-Introduction, Main Impress windows, Creating the new Presentation, Formatting the Presentation, Adding and Formatting the Text, Adding Picture, tables, charts and media, Run the slide show

REFERENCES:

1. Ron Mansfield, "Working in Microsoft Office", Tata McGraw Hill
2. Guy Hart Davis, " Microsoft Excel 2007", Tata McGraw Hill
3. Libreoffice Documentation Team,"LibreOffice 5.1 Getting Started Guide", 12th Media Services
4. Lalit Mali,"Libre Office 5.1 Writer, Calc, Math Formula Book- Vol 1: Introduction To Libre Office 5.1",Notion Press
5. Lalit Mali,"Libre office 5.1 Impress, Draw, Base book- Vol 2",Notion Press

CORE SUBJECTS

Subject: FUNDAMENTALS OF COMPUTER
Code CSC100
Credits: 3
Duration: 108 hrs.

OBJECTIVES:
(i) To enable students to acquire basic knowledge of computer and become familiar with the use of IT tools
(ii) To familiarize the students with the basic concept on the working of MS Office and its applications in the relevant fields

UNIT- I
Introduction to computer - Definition of computer, Characteristics of computers, Capabilities and Limitations; Generation of Computers – First, Second, Third, Fourth & Fifth generations, Types of computer and their characteristics – analog, digital, hybrid, micro, mini, mainframe and super computers; Types of PC's and their characteristics – Desktop, Laptop, Notebook and Palmtop; Basic components & Block diagram of computer system – Control Unit, ALU, Memory (RAM, ROM, EPROM, PROM)

UNIT-II
Input & Output Devices – Keyboard, Mouse, Trackball, Joystick, Scanner, MICR, OCR, Touch Screen; Monitor – Types – Digital, Analog, Characteristics- size, resolution, refresh rate, interlaced/non-interlaced, dot pitch, video standard- VGA, SGVA, XGA; Printer- Daisy wheel, dot matrix, inkjet, laser; Plotter; Storage devices- Storage fundamentals- Primary and Secondary; Data storage and retrieval method- sequential, direct and index sequential; Various storage devices- Magnetic tape, magnetic disk, cartridge tape, data drives, hard disk drives, floppy drive, pendrive; Number system- data representation in computers, number system of computers – binary, octal, decimal, hexadecimal- representation and their conversion

UNIT-III
Computer software- Need, types of software-system software and application software; System software-Operating system, assembler, compiler & interpreter; Operating Systems-functions, types-batch, single user, multi-user, multiprogramming, multiprocessing; Programming language-machine, assembly, high level, their merits and demerits

UNIT-IV
MS Word- Introduction to word processor & its area of use, components of the document window, creating and saving a document, opening an existing file, saving a file using a new name; Editing a document- inserting, overwriting and deleting text, cut, copy and paste, finding and replacing text; Basic keyboard shortcuts; MS PowerPoint - Introduction to powerpoint& its area of use, components of the powerpoint window, creating a new presentation, saving, closing and opening a presentation, inserting, deleting and copying slides, running powerpoint presentation; MS Excel – Introduction to Excel spreadsheet, workbook and worksheet, components of the excel window, understanding ranges,

cells, auto fill handle, entering, editing and deleting cell contents, saving a workbook, opening an existing workbook, inserting and deleting new rows and columns, merging cell contents.

REFERENCES:

1. P.K Sinha, "Fundamentals of Computer", bpb publications
2. AnuragSeetha, "Introduction to computer and information technology", Ram Prasad & Sons
3. Virginia Anderson, "The Complete Reference Microsoft Office 2007", Tata McGraw Hill

Subject: PC ASSEMBLING AND TROUBLESHOOTING
Code: CSC150
Credits: 4
Duration: 108 hrs.

OBJECTIVE: To enable the student to understand all the parts of the computer, their relationship and their functionality and also he will be able to identify the problem associated with the computer.

UNIT-I

Introduction to pc-Architecture of the System (PC how does it work?); Understanding the function of a computer, the input device, output device, memory, storage device, CPU, system board, interfaces: parallel and serial, Power system: SMPS, power supply connector, UPS.

UNIT-II

PC assembly- Identification of the different physical parts of the computer -DVD/CD drives, Hard Disk Drive, processor, SMPS, RAM, motherboard, cmosetc; Different types of cable used in connecting the parts into the mother board; Mounting Motherboard in cabinet and installing different parts into the motherboard; connecting cables; PC Upgrade Options & Strategies for different usage of computer (professional, Gamer, ordinary)

UNIT-III

Installation and Upgradation-Operating system, devices drivers and other application softwares; Basic of networking, IP configuration, peer to peer connection

UNIT-IV

PC management and maintenance-Basic windows administration: task manager, control panel, disk management, device manager etc. case study on window XP,7,8, Antivirus; connecting PC with peripheral devices (projector, printer, etc)

UNIT-V

BIOS-Typical Motherboard BIOS, BIOS Features, BIOS & Boot Sequences, BIOS troubleshooting; Software troubleshooting: Windows troubleshooting; Hardware troubleshooting: POST (Power-on Self Test) routine, mother board problems, HDD problem, Peripherals problems, miscellaneous problems; Error Code: Beep Code, Post Code, Post Reader Card

REFERENCES:

1. K. L. James, "Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance"
2. David Groth, "A+ core module"
3. Balvir Singh, "PC Hardware"
4. Scott Mueller, "Upgrading and Repairing PCs"

Subject: MANAGEMENT IN INFORMATION SYSTEM
Code: CSC200
Credits: 4
Duration: 72 hrs.

OBJECTIVE: To enable student understand the technologies and methods used for effective decision making in an organization

UNIT-I

Introduction to System and its classification, System Approach, Information System Role of Information systems in business today, Contemporary Approaches to Information System; Information Systems Concept-Types of Information systems Information system impact on Organizations and Business Firms Using Information Systems to Achieve Competitive Advantage

UNIT-II

IT Infrastructure, Components, Data communication channels Types of Networks, Network topologiesOrganizing Data in a Traditional File Environment, Problems with the Traditional File Environment Database Management Systems, Capabilities of Database Management Systems, Designing Databases, Challenge of Big Data, Business Intelligence Infrastructure, Analytical Tools: Relationships, Patterns, Trends

UNIT-III

Systems Development Process, Structured and Object – Oriented Methodologies, Alternative Systems -Building Approaches-Prototyping, End -User Development Application Software Packages and Outsourcing, Rapid Application Development (RAD)

UNIT-IV

System Vulnerability and Abuse Malicious Software: Viruses, Worms, Trojan Horses, and Spyware, Hackers and Computer Crime Internal Threats: Employees, Software Vulnerability, Firewalls, Intrusion Detection Systems, and Antivirus Software, Securing Wireless Networks, Relevant Provisions of Information Technology Act, 2000

UNIT-V

Understanding Ethical and Social Issues Related to Systems Key Technology Trends that Raise Ethical Issues, Professional Codes of Conduct, Information Rights: Privacy and Freedom in the Internet Age, Internet challenges to privacy, Technical solutions Property Rights: Intellectual Property, Trade Secrets, Copyright, Patents, Challenges to Intellectual Property rights

REFERENCES:

1. Jawadekar, “Management Information Systems”, Tata McGraw Hill
2. Turban and Aronson, “Decision Support Systems and Intelligent Systems”, Pearson Education Asia

Subject: WEB DESIGNING
Code: CSC250
Credits: 4
Duration: 108 hrs.

OBJECTIVE: The students will learn about the various web designing techniques and build their own websites using different tools.

CONTENTS:

1. Creating web page using basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, subscript, font and image; different attributes like align, color, bgcolor, font face, border, size
2. Write HTML code to develop a Web page having the background in red and title "My First Page" in any other color
3. Create an HTML document giving details of your name, age, telephone number, address, TLC code & enrolment number aligned in proper order
4. Write an HTML code to design a page containing text, in form of paragraphs giving suitable heading style
5. Create a page to show different attributes of Font tag
6. Create a page to show different attributes: italics, bold, underline
7. Creating web page having navigation links using anchor tag, internal, external, mail and image links; lists-ordered, unordered
8. Creating web page having table tag; HTML Form controls-form, text, password, textarea, button, checkbox, radio button, select box, hidden controls, Frameset and frame
9. Write an HTML code to create a Web page of blue color and displaylinks in red colour
10. Create a Web page with appropriate content and insert an image towards the left hand side of the page. When user clicks on the image, it should open another Web page
11. Create a Web page, which should contain a table having two rows and two columns.
12. Write an HTML code to develop a Web page having two frames that divide the Web page into two equal rows.
13. Write an HTML code to develop a Web page having two frames that divide the Web page into two equal rows and then divide the second row into two equal columns.
14. Write an HTML code to develop a Web page having frames as described in the above question and then fill each frame with a different background color
15. Design a page with a text box called 'name' and a button with label 'Enter. When you click on the button another page should open with the message "Hello < name >", where name should be equal to the name entered in the first page
16. Writing programs implementing cascading style Sheet (CSS), CSS syntax, comments, id and class, background color, background image- text - text color, text alignment, text decoration, text transformation, text indentation; CSS font - font families, font style, font size - setting text size ,

using pixels and em; CSS lists - different list item markers, unordered list, ordered list, an image as the list item marker

17. Writing programs implementing CSS tables - table borders, collapse borders, table width and height, table text alignment, table padding, table color; CSS positioning - static positioning, fixed positioning, relative positioning, absolute positioning, overlapping elements, float, horizontal align, image gallery, image opacity/transparency
18. Writing program using Javascript tag, comments, variables, document methods-write and writeln methods, alert; operators-arithmetic, assignment, relational, logical, javascript functions, conditional Statements, loops, break and continue; events familiarization-onLoad, onClick, onBlur, onSubmit, onChange
19. Write a JavaScript code to create a pull down menu box.
20. Write a program to move a text with mouse pointer and to change colour of text randomly
21. Create a Web page using two image files, which switch b/w one another as the mouse pointer moves over the image. Use the On Mouse over and On Mouse out event handler
22. Create an HTML form that has a number of text boxes. The user fills the textboxes with data. Write a script that verifies that all textboxes have been filled. If a text box has been left empty pop up an alert message indicating the box that has been left empty. When OK button is clicked, set focus to that specific textbox. Ifall the textboxes are filled, display thank you.
23. Working HTML 5 events using javascript-offline,onabort, onafterprint, onbeforeonload, onbeforeprint, onblur, oncanplay, oncanplaythrough, onlclck, oncontextmenu, ondbclick, ondrag,ondragend,ondragcenter,ondragleave,ondragover,ondragstart,ondrop,ondurationchange,onemptied,onended,onerror,onfocus,oninput,oninvalid,onload,onmouseover,onmouseup,onmousewheel,onpagehide,onpageshow,onplaying,onprogress,onratechange,onredo,onresize,onscroll,onseeked,onseeking,onselect,onsubmit, onsuspend, onundo, onunload,onvolumchange, onwaiting
24. Working with scalable vector graphics-embeding SVG,SVG line, circle,rectangle, ellipse, polygon, gradients; Canvas element-using canvas to draw polygon,path, text, transformation
25. Working with web storage-session storage, local storage, delete web storage; web socket events-open, message, error, close;web socket methods-socket.send(),socket.close()
26. Working with Joomla 3.4 CMS-installation,work areas, control panel, -tootlbar;menu-content, component, extensions, help menu
27. Creating menus, adding menus items, modifying menu items, submenus
28. Working with Joomla modules-create module, breadcrumb module, feed display module, footer module, search module, random image module, whos is online module, syndicate module
29. Working with Joomla global setting-system setting, media setting, language manager, private messages, mass emailing, cache management, users setting
30. Working with Joomla template-template manager, customize template, adding template, creating, adding,customize logo, category management, adding content, formatting content, article metadata, adding banners, contacts adding news feed, adding forum, web links
31. Working with joomla plugins-plugin mangers, authentication plugins, content plugins, editor plugins, search plugins, users plugins, extension, system plugins
32. Working on Site Management-global configuration- site online and offline, metadata setting, change site url ,updating web site, updating extension, disabling and uninstalling extensions, back up site
33. Web hosting-www, web server, internet service provider, web hosting providers,domain names, web hosting email servers,web hosting technologies and types

34. Working with Cpanel-using file section tools, mange domains, manage email, manage security section, manage databases, manage software section tools

REFERENCES:

1. HTML5 and CSS3: Develop with Tomorrow's Standards Today, Hogan Brian P**,** Springer India Private Limited
2. HTML 5 Foundations, Matt West, Wiley India Pvt Ltd
3. Responsive Web Design with HTML5 and CSS3, Hogan Brian P., Shroff Publishers & Distributers Private Limited – Mumbai
4. HTML 5 and CSS 3 Made Simple, Ivan Bayross, BPB
5. Joomla Accessibility, Joshue O Conner, Shroff Publications

Subject: DOCUMENTATION USING LATEX
Code: CSC300
Credits: 4
Duration: 108 hrs.

OBJECTIVES: The aim of this course is to guide beginners to writing documents in LaTeX using TexWorks. It assumes no prior knowledge of LaTex, or any other Programming Language. The course is designed to introduce an absolute beginner to LaTex and teach the basic commands, so that they can create a simple document and presentations.

UNIT-I

A bit of History: Tex, LaTex, advantages and disadvantages over other word processors.
Installing and understanding LATEX, cross platform Editor: for macOS, Windows and Linux.

UNIT-II

LaTex input file, special characters, comments. Input file structure. Layout of the document: document classes, packages, splitting a big latex file.
Typesetting Text: Line and page breaking, ready-made strings for date, etc. more special characters and symbols, titles/chapters and sections, cross references, footnotes, etc. Environments: itemize, enumerate, quote, abstract, verbatim, tabular, including graphics and images, floating bodies.

UNIT-III

Typesetting Mathematical Formulae: single equations, building blocks, multline single equations, multiple equations, arrays and matrices, Math fonts using \mathcal{}, theorems, lemmas, common mathematical symbols (greek letters).

UNIT-IV

Bibliography, hypertext links. Creating Presentation using beamer.

REFERENCES:

1. Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl, “The Not So Short Introduction to LATEX 2e”, Published by Free Software Foundation.
2. Krishnan and G. S. Krishna, “LATEX Tutorials – A primer Indian TEX Users Group”. (Online versions: http://www.tug.org.in/tutorials.html)

Subject: DATA ANALYSIS USING SPSS
Code: CSC350
Credits: 2
Duration: 72 hrs.

OBJECTIVE:
The course is designed to provide students with transferable skills, to understand the uses of SPSS, as a tool to summarize and aid in the interpretation of research findings.

UNIT- I
Introduction to SPSS- Data analysis with SPSS: general aspects, workflow, critical issues; SPSS: general description, functions, menus, commands; SPSS file management

UNIT-II
Input and data cleaning- Defining variables ,Manual input of data ,Automated input of data and file import; Data manipulation, Data Transformation, Syntax files and scripts; Output management

UNIT-III
Descriptive analysis of data – Frequencies, Descriptive, Explore, Crosstabs, Charts

UNIT-IV
Statistical tests – Means, T-test, One-way ANOVA; Non parametric tests - Normality tests; Correlation and regression - Linear correlation and regression, Multiple regression (linear)

REFERENCES:
1. A. Rajathi , and P. Chandran, "SPSS (statistical Package for Social Sciences) ", MJP Publishers
2. Argyrous, G. "Statistics for Research: With a Guide to SPSS", SAGE UK, 2005, Second Edition.

MARTIN LUTHER CHRISTIAN UNIVERSITY

PROJECT GUIDELINES

DEPARTMENT OF COMPUTER SCIENCES
BLOCK-1, DONGKTIEH, NONGRAH
SHILLONG-793006

I. Introduction:

These guidelines are intended to give both students and faculty members at the Department of Computer Sciences a set of procedures and expectations that will make the project evaluation process easier, more predictable, and more successful. These guidelines should also be interpreted as the minimum requirements of MCA degree awarded by Martin Luther Christian University.

The Real time application (Project Work) will give an opportunity to the students to get a hand on experience in developing quality software applications. During the development of the project a student should involve himself in all the stages of the software development life cycle (SDLC) like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. Students are encouraged to take up projects from the organizations in their locality that are unable to implement, develop and introduce software/automated system in daily functioning of the organization. Students should take the project work seriously and must choose projects which can be justified as MCA project.

The students are encouraged to work on a real time project of some industry/ Organization/Software Company etc. This type of project may be referred to as Software Development Project. Software Development project aims at designing and developing some kind of product/software.

Students may also take up research oriented projects dealing with some latest research area/technology. This type of Project may be referred to as Research Oriented Project. A research oriented project would aim to gain knowledge about some new technology/area. The project should be genuine and original in nature and should avoid any kind of plagiarism.

II. Subject Code, Credit and Duration:

The major project of MCA/BCA program will be for a minimum duration of 6 months or a semester. The subject code for MCA and BCA are respectively MCA750 and BCA450. While MCA major project will be of 12 credits, the credits for BCA is 16 (8^{th} Sem) / 3 (6^{th} Sem).

III. Objective:

The objective of the major project work is to enable the students to apply the theoretical and practical techniques that they learnt during in the University to solve real time problem related to computer science and technology.

IV. Eligibility:

Students who have completed fifth semester of MCA course **without any back subject** of the Department of Computer Sciences can submission the proposal for undertaking the major project. Students are encouraged to take up the project *individually* however depending on the complexity and time constraint they may take up in a group subjected to the approval of the Project In-charge.

V. Selection of Organization and Project criteria:

1. The students are mandatory to work on a real life project of some industry/ Organisation /Educational Institution/Software Company etc
2. The students are mandatory to work on a real life project of some industry/ Organisation /Educational Institution/Software Company etc
3. The project work should be one which can be justified as a major project.
4. The Project work may be paid or unpaid. Irrespective of payment, the project should provide the opportunity to experience the full breadth of work experience.
5. Students are allotted by the department or university or are given the choice to approach the organisation they want to undertake project of their area of interests followed by HOD verbal confirmation on acceptance.
6. Formal letter of seeking permission to take up project from the organization by the student will be issued by Registrar. The letter will be known as Project Trainee Letter.
7. Acceptance letter from the organization should be submitted to Computer Sciences Dept to confirm undertaking of project.
8. Any expenses incurred will be borne by the student concerned.

Students interested to take up research oriented project may take up such research in the Department of Computer Sciences itself subjected to the approval of the Project In-charge/HOD and may not necessarily be conducted in an industry/organization/software company etc.

Whenever a student takes up a project outside the Department of Computer Sciences, a project approval letter from the organization/software company/industry has to be submitted.

VI. People Involved:

1. Project In-charge assigned by HOD
2. Organization Supervisor assigned by host organization
3. Department Guide assigned by HOD/Project In-charge
4. Student

VII. Roles and responsibilities of the host organisation:

1. The organisation will provide necessary information, technology that may be required for the project.
2. The organisation will appoint a supervisor for the project. The supervisor may be referred as Organization Supervisor.
3. The organisation may appoint additional guide to help the student in completing the project.

VIII. Responsibilities of the people involved:

1. Head of the Department of Computer Sciences may assign one faculty as Project In-charge or himself act as Project In-charge. The project in-charge will be responsible for

    i. Assigning Dept guide for the student
    ii. Conducting project reviews
    iii. Evaluating the project and the progress of the project
    iv. Maintaining record of the project review

v. Coordinate with the Organization Supervisor and the Department Guide
vi. Collection of log book and feedback from the Organization
i. Maintaining periodic contact with the organization regarding the performance and conduct of the student and the project
ii. Reporting to HOD regarding the Project

2. The Organization Supervisor will have the following functions and responsibilities:
   i. General coordination and supervision of the project.
   ii. Provide in formations that are required by the student for the completion of the project.
   iii. Sign the logbook and other reports of the project work.
   iv. Maintain the attendance and leave records and discipline of the student.
   v. Maintain liaison with MLCU.
   vi. Arrange financial support or stipends from the organisation (if applicable) for the students
   i. Evaluate and supervise the student in compiling the Project Report
   ii. Arrangement for the Project completion Certificate at the end of the project.
   iii. To give feedback of the student at the end of the project.

3. The following are the responsibilities of the Department guide:
   i. The main responsibility of the Department Guide is to give technical help to the student
   ii. Coordinate with the Organization Supervisor related to the technical issues
   iii. Help in documenting the project work

4. Responsibilities of the student:
   i. Collecting Project acceptance letter from the organization
   ii. Submitting the project acceptance letter to the Department
   iii. Student is responsible for complying with assigned work and work schedule as prescribed by the host organisation. They are expected to maintain professional decorum and approach to their work, adhering to the professional work standards and behaviour expected by the host organisation.
   iv. Students are responsible for to get the log book signed by the organization Supervisor
   v. Attending the project reviews and submission of required documents
   vi. During the period of the project, any leave of absence should be notified to the in-charge of the organisation as well as to the Department Project In-Charge or to the Head of Computer Sciences Department

IX. Calendar for the Project

1st Week Nov	Issuing of Project Trainee Letter
2nd Week Dec	Submission of Project Acceptance Letter
2rd Week Jan	Project Review-I (Project Title, Synopsis, Requirement Analysis/SDLC Model)
2nd Week Feb	Project Review-II (System Design/Architectural Design/Module Design)
1st Week March	Project Review-III (Coding, Implementation)
1st Week April	Project Review-IV (Coding, Implementation)
1st Week May	Project Review-V (Coding, Implementation)
1stWeek June	Submission of Documentation (3 Hard Copies)
2nd Week June	Project Demonstration

X. Points to remember while preparing the project proposal

1. Students are encouraged to consult the Organization Supervisor and the Guide while preparing the project proposal. The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken.

2. The project proposal should contain Organization name from whom the project is undertaking and the name and designation of the Supervisor

3. Synopsis of the project proposal (15-20 pages) covering the following aspects:
   i. Title of the Project
   ii. Objectives of the Project
   iii. Tools/Platform, Hardware and Software Requirement specifications.
   iv. Problem Definition, Requirement Specifications (Detailed functional Requirements and Technical Specifications)
   v. Project Planning and Scheduling (Gantt chart and PERT chart)

4. A project proposal, once approved, **is valid for one year**. However the project submission is allowed only in the month May and November. In case, a student is unable to submit her/his project report within one year, a fresh synopsis approval is needed

XI. Points to remember while preparing the project report

The project report **should** contain the following:

i. Certificate signed by Head of Department/ Project In-charge
ii. Project Completion Certificate from the Organization/Institute
iii. Self Declaration certificate of originality
iv. Project documentation.
v. A CD consisting of the executable file(s) of the complete project should be attached on the last page of the project report. If the executable file is unable to submit due to copyright or confidentiality of the organization or any other reason, an approval from the Project In charge/Head of the Department should be obtained. The student needs to retain the identical copy of the CD that should be carried while appearing for the final Project Demonstration along with the project report.

XII. Project Report Specification

The project report may be about 80 to 100 pages in the following specifications:

1. The report should be of the format with 1.5 line spacing, 1.25 inches margin on either side, printed on A4 size papers, alignment - justify
2. Font type- Times New Roman, Font size- Heading-16 pts Bold, sub heading-14 pts bold and content-12 pts.
3. Margin- top- 1 inch, bottom- 1 inch
4. It must contain the following certificates/document :
   a) Certificate (HOD or In-charge, Examiner Name and Signature)
   b) University Certificate (collect from the department)
   c) Completion Certificate from respective Organization/Company
   d) Self-declaration certificate
   e) Acknowledgement
   f) Content index
   g) Header containing name of the project & a footer containing the page number right aligned
   h) Project Outline
      i. Introduction
      ii. Abstract
      iii. Title of Project
      iv. Aim of the Project
      v. Drawbacks of the existing system
   i) Feasibility study
      i. Introduction
      ii. Technical Feasibility
      iii. Economic Feasibility
      iv. Behavioural Feasibility
   j) Project Planning and Schedule
      i. Software Process Model (e.g. Waterfall, spiral, prototype, iterative, evolutionary, etc.)
      ii. Gantt Chart, PERT

   k) Software Requirements Specifications (SRS) Specific requirements
      i. Hardware requirements
      ii. Software requirements
   l) Software Design Description (SDD)

i. System architecture Design-Data Flow Diagram or Universal Modeling Language
ii. Database Design - ER Diagram (Entity Relationship), Table Structure and Dictionary
iii. User interface design- Description of the user interface - Screen images

m) Software Test Documentation
i. Test approach -Unit testing, System or integration Testing
ii. Test Cases

l) Source Code snippets of two modules
m)Conclusion
n) Bibliography
o) Appendices (if any)
p) Glossary
q) Should attach a copy of the CD containing the executable file(s) of the complete project

XIII. Project Assessment guidelines

1. Project Review should be conducted by a panel of minimum 2 faculty members The panel can be constituted by Project In-charge or Head, Department of Computer Sciences

2. Each project review may consider the following criteria and allocate marks accordingly

Review	Requirement	Marks(300)
First	Title, Synopsis, Requirement analysis, SDLC, Tools to be used, Project Planning & Schedule	40
Second	System design/Architectural Design/Module Design (ER diagram, Table/Database schema)	40
Third	Module Analysis I (GUI design, Coding)	40
Fourth	Module Analysis II (GUI design, Coding, Testing)	40
Fifth	Module Analysis III (GUI design, Coding, Testing)	50
Final	(i)Presentation skill and Knowledge of Tools/ Project	30
	(ii)Implementation	40
	(iii)Documentation	20

For the research oriented project, the following criteria may be followed.

Review	Requirement	Marks(300)
First	Title, Abstract, Introduction, Statement of the problem, Research Questions	40
Second	Literature Review, Research Gap, Objective of the project, Problem definition, Gantt Chart	40
Third	Methodology	40
Fourth	Implementation	40
Fifth	Comprehensive Analysis, Results, Performance Evaluation and Future scope	30
Final	(i) Presentation skill, Contribution of the Candidate	30
	(ii) Conclusion and Future Work, Communicating in Research Journals if any	30
	(iii) Documentation	50
	Total	**300**

3. Student has to bring the project log book signed by the Organization Supervisor on every Project review. Marks should be deducted for not bringing or not getting the Supervisor signature

4. A photocopy of the project report is not acceptable for submission. Photocopied report will be rejected

5. If more than one student have been allowed to work on a project, the project synopsis and project reports by them must include only different modules undertaken/worked upon individually. Each student must submit a separate project proposal and a separate project reports related to her/his modules. Completely identical project synopsis and/or project reports are not allowed. Only introductory and possibly concluding remarks may be similar or common. Each student has to undergo all the phases/stages of the software project development life cycle. A single copy of the project synopsis and/or project report comprising of work of two or more students shall not be entertained. Violation of these project guidelines may lead to the rejection of the project

6. Student should be involved in each and every phase of Project Development. If it is found that student is not involved in any phase for example coding phase, it may lead to the rejection/disqualifying of the project at any stage.

7. Project may be rejected if it violates Plagiarism policy of the MLCU which will be informed to the students from time to time. Department of Computer Sciences will also evaluate the projects using anti-plagiarism software and minimum allowable plagiarism will be informed from time to time.

8. Students are not encouraged to change the project title. Project Title can NOT be changed after the Third Project Review.

9. Student has to submit in three copies (one copy for the host organisation, one copy for the Department and one copy for the University Library) of duly signed report and marks can be awarded for every copy.

PROJECT TRAINEE LETTER

To Whom It May Concern

This is to certify that **Ms/Mr** _____bearing registration no. _____ is a final year student of Master of Computer Applications (MCA) in the Department of Computer Sciences, Martin Luther Christian University, and is required to undertake a five months MCA project work in her/his final year starting from February session. Her/His project must be undertaken in an Organization under the supervision of a guide, preferably from the same organization. During her/his course of study, the student has studied and gained knowledge on various Computer Science papers. She/He may please be given a chance to work in your esteemed organization and complete her/his project work. The experience gained by this project work, not only benefit the student to partially fulfill the requirements of the MCA course of Martin Luther Christian University, but also lay a foundation for her/his future career.

Looking forward to your positive response, support and cooperation

Signature

Date:

MARTIN LUTHER CHRISTIAN UNIVERSITY

NONGRAH, DONGKTIEH, BLOCK-1, SHILLONG, MEGHALAYA
DEPARTMENT OF COMPUTER SCIENCES

CERTIFICATE

This is to certify that the project entitled
"Project Title"

Submitted in partial fulfilment of the requirement for the award of the degree of

MASTER OF COMPUTER APPLICATIONS
of
MARTIN LUTHER CHRISTIAN UNIVERSITY
is bonafide work carried out by

Name
Regd No:

During the academic year (201_-201_)

(Signature)
Head,
Computer Sciences Department

Examiners
1. Signature
(Name of the examiner)

2. Signature
(Name of the examiner)

MARTIN LUTHER CHRISTIAN UNIVERSITY

TITLE OF THE PROJECT

By

Student's Full Name
Enrolment No:

Project work submitted to

Computer Sciences Department, MLCU

in partial fulfilment of the requirements

for the award of the degree

Master of Computer Applications (MCA)

Year of Submission

MARTIN LUTHER CHRISTIAN UNIVERSITY

NONGRAH, DONGKTIEH, BLOCK-1, SHILLONG, MEGHALAYA

Project Log Book

Students Name:	
Regd. No:	
Course:	
Batch:	

Name of the Organization:	
Address:	
Contact No:	

Name of the Supervisor/Guide:	
Designation:	
Contact No:	

Regd. No:		Date:
Project Title:		
Task Assigned		
Problem Encountered		
Task Status		
Comments		

SUPERVISOR/GUIDE EVALUATION FORM

ORGANIZATION/INSTITUTE INFORMATION	STUDENT INFORMATION
Name:_____ Address:_____ Mobile #:_____ Landline #_____ Email:_____	Full Name (in block letter): _____ University Regd. No:_____ Course:_____ Batch:_____ Project/Internship starts on:_____and ends on:_____

Please fill in this questionnaire as complete as possible.

Evaluation	Excellent	Very	Good	Sufficient	Insufficient
Level of knowledge					
Technical insight					
Critical judgment					
Creativity					
Self-reliance					
Initiative of the task					
Flexibility regarding problems and criticism					
Co-operation with colleagues					
Communication skills, ORAL					
Communication skills, WRITTEN					
Punctuality					
Total Impression					

REMARKS:

_____

_____

Would you like to admit more students from the Computer Sciences Dept, MLCU in future? If No please give reason

_____

_____

Name of the Supervisor/Guide:_____
Signature:_____

Place:_____
Date:_____