Martin Luther Christian University

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Department of Information Technology, MLCU

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Department of Information Technology

Annexure A

CSC/BOS/2022-1: Curriculum for BCA Program (2022 – 2026 Batch)

The Department has adopted the guidelines laid down in the New Education Policy, 2019 of MHRD, Govt. of India. As such, the BCA program is of 4 years' duration, however the students may have an option of discontinuing the course after 3 years of their study. The credit distribution and the course outline is presented as following:

Semester	Core(LE)	Major	Minor	English & Communication	Research Methodology	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**

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Subject Outline for BCA (2022-2026 Batch)

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

FIRST SEMESTER

SN	Subject	Subject Code	Credits
1.	Concepts of Algorithms & Programming	BCA101	3
2.	Mathematical Aptitude	BCA104	1
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

SECOND SEMESTER

SN	Subject	Subject Code	Credits
1.	Digital Logic	BCA155	2
2.	Discrete Mathematics	BCA156	2
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**
Core offered –PC Assembling and Troubleshooting		CSC150	4

THIRD SEMESTER

SN	Subject	Subject Code	Credits
1.	Data Structure	BCA205	2
2.	Data Structure-Practical	BCA206	1
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
7	MOOC	BCAO200	1
		Total Credits	**16**
Core offered – Management in Information System		CSC200	4
Minor offer to other department- Office Automation systems I (Office Tools)		CSMN216	4

FOURTH SEMESTER

SN	Subject	Subject Code	Credits
1.	Programming with Java	BCA255	2
2.	Programming with Java-Practical	BCA256	1
3.	Fundamental of Operating System	BCA257	2
4.	Core 7 (from other department)		4
5.	English and Communication IV	ENGL250	2
6.	Minor-II (from other department)	BCAO250	4
7	MOOCSs		1
	Total Credits		**16**
Core offered – Web Designing		CSC250	4
Minor offer to other department- Office Automation		CSMN266	4

FIFTH SEMESTER

SN	Subject	Subject Code	Credits
1.	Database Management System	BCA305	2
2.	Database Management System-Practical	BCA306	1
3.	Computer Networks	BCA307	2
4.	Core 8 (from other department)		4
5.	English and Communication V	ENGL300	2
6.	Minor-III (from other department)		4
7	MOOCs	BCAO300	1
	Total Credits		**16**
	Core Offered -Introduction to Latex	CSC300	4
	Minor offer to other department- Office Automation	CSMN316	4

SIXTH SEMESTER

SN	Subject		Subject Code	Credits Per subject	Credits
1.	Software Engineering		BCA351		3
2.	*Elective: Web Technology*	Web Designing	BCAW350	1	
		PHP	BCAW351	3	8
		PHP (Practical)	BCAW352	3	
	Elective: Hardware	Basic Electronics	BCAH355	1	

	and Networking	Windows Server	BCAH356	3	
		Wireless Network Security	BCAH357	3	
	Elective: Mobile	Responsive Web Designing	BCAM350	3	
	Applications	Android Programming	BCAM351	4	
	Elective: Animation	Visual Design	BCAG350	3	
	and Multimedia	2D Animation	BCAG351	4	
	MOOCs		BCAO350	1	
3.	Project-I		BCA350		3
4.	Core 9 (from other department)				2
			Total Credits		**16**
	Core Offered-Data Analysis using SPSS		CSC350		2

SEVENTH SEMESTER

SN	Subject	Subject Code	Credits Per subject	Credits
	Web designing with Scripting Language	BCA400	3	
	Python Programming	BCA401	3	
	Web Services	BCA402	2	
	Router Configuration and Security	BCA403	3	
1.	Network Switching and Routing Technology	BCA404	3	8
	Linux Server Administration	BCA405	2	
	Advanced Android Development	BCA406	3	
	Mobile Application Security	BCA407	3	
	Visual Effects	BCA408	4	
	3D Animation	BCA409	4	
	MOOCs	BCAO400	2	2
2.	Project-II	BCA410	6	6
			Total Credits	**16**

EIGHT SEMESTER

SN	Subject	Subject Code	Credits
1.	Major Project/Research	BCA450	12
2.	MOOCs	BCAO450	4
		Total Credits	**16**

The members recommend the above course outline with the following suggestions:
   (i) *Students should be encouraged to enroll in government portals for MOOCs courses.*
   (ii) *Students should take up MOOCs courses based on current industry demands.*

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Syllabus for
Bachelor of Computer Applications
2022-2026Batch

FIRST SEMESTER

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
3. R.V. Praveen,"Quantitative Aptitude and Reasoning", PHI

SECOND SEMESTER

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,conf erencepresentationetc.,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

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THIRD SEMESTER

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

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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)
6. "LATEX for Beginners: Workbook" Document Reference: 3722-2014

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FOURTH SEMESTER

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

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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**.**

SOBJECTIVES: 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.

FIFTH SEMESTER

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
    Also enforce 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.

SIXTH SEMESTER

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>, <strong>, <i>, <em>, <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

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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.

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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

SEVENTH SEMESTER

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

> **OBJECTIVE:** To enable students designing web pages using scripting languages like Javascript

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

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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

Department of Information Technology, MLCU

Martin Luther Christian University

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

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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
TO BE OFFERED

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

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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

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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

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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

Martin Luther Christian University

CORE SUBJECTS
TO BE OFFERED

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 equalto 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. If all 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,o nemptied,onended,onerror,onfocus,oninput,oninvalid,onload,onmouseover,onmouseup,onmouse wheel,onpagehide,onpageshow,onplaying,onprogress,onratechange,onredo,onresize,onscroll,ons eeked,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: INTRODUCTION TO 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 Introductionto 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)

3. "LATEX for Beginners: Workbook" Document Reference: 3722-2014

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. Hari Shankar Asthana and BrajBhushan, "Statistics for Social Sciences (With SPSS Applications)"
3. Argyrous, G. "Statistics for Research: With a Guide to SPSS", SAGE UK, 2005, Second Edition.

Martin Luther Christian University

(Annexure-B)

CSC/BOS/2022-2: Curriculum for MCA Program (2022 – 2024 Batch)

The department provides 64 credits for MCA. The course outline is provided below:

Subject Outline for MCA

Total Credits: 64 (2yrs.)

FIRST SEMESTER

SN	Subject	Subject Code	Credits
1	Advanced Java Programming	MCA500	2
2	Advanced Java Programming-Practical	MCA501	2
3	Analysis and Design of Algorithms	MCA502	4
4	Advanced Database Management System	MCA503	2
5	Advanced Database Management System-Practical	MCA504	2
6	English and Communication-III	ENGL500	2
7	MOOCs	MCAO500	1
		Total Credits	**15**

SECOND SEMESTER

SN	Subject	Subject Code	Credits
1	Specialization I (Theory)		
	1. PHP -I	MCAS550	2
	2. .Net -I	MCAS552	
	3. JEE -I	MCAS554	
2	Specialization I -Practical		
	1. PHP-I Practical	MCAS551	3
	2. .Net-I Practical	MCAS553	
	3. JEE-I Practical	MCAS555	
3	Advanced Computer Networks	MCA550	4
4	Theory Of Computation	MCA551	3
5	Gender, reproductive health and life skills education	MCA552	4
6	Computer Graphics	MCA553	3
		Total Credits	**19**

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THIRD SEMESTER

SN	Subject	Subject Code	Credits
1	Software Project Management	MCA600	2
2	Elective I		
	1. Data Mining & Data Warehousing	MCAE600	3
	2. Distributed Database System	MCAE601	
	3. Cloud Computing	MCAE602	
3	Elective II		
	1. Client Server Architecture	MCAE603	3
	2. Artificial Intelligence	MCAE605	
	3. Fundamentals of RS and GIS	MCAE606	
4	Specialization II		
	1. PHP-II	MCAS600	2
	2. .Net -II	MCAS602	
	3. JEE-II	MCAS604	
5	Specialization II- Practical		
	1. PHP -II Practical	MCAS601	3
	2. .Net -II Practical	MCAS603	
	3. JEE -II Practical	MCAS605	
6	MOOCs/ NSS / Current Affairs	MCAO600	2
7	Project Work -I	MCA601	3
	Total Credits		**18**

FOURTH SEMESTER

SN	Subject	Subject Code	Credits
1	Project Work -II	MCA650	12
	Total Credits		**12**

The members recommend the above course outline with the following suggestions:
- (i) *The options for elective papers should be increased to ten instead of the three options currently being provided, so that the students and also the faculties will have more choices.*
- (ii) *Students should take up their major projects such that even after completing the minimal requirements of the University they can continue their further work in the same project.*

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Syllabus for
Master of Computer Applications
2022-2024 Batch

Subject: ADVANCED JAVA PROGRAMMING
Code: MCA600
Credits: 2
Duration: 36 hrs.

> **OBJECTIVES:** To enable students design and implement console based GUI and web applications using Java

UNIT-I

Java Overview: Genesis, Java Philosophy, Java & Internet, Object-Oriented Programming features, Java Applet and Application, Java Environment and Java Development Kit (JDK) & Java Standard Library (JSL), Java language fundamentals, The scope and lifetime of variable, Type conversion and casting, Control statements, Arrays classes and objects: The this keyword, Garbage collection, Overloading constructor, Using object as parameters, Argument passing, Returning objects, Recursion, Introducing Access control (public, private and protected), static**,** final, nested classes, String class, Command-line argument.

UNIT-II

Inheritance: Member access and inheritance, method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, the Object class; Packages, Interface, classpath, Exception handling: Fundamentals, Exception types, Java's built-in exceptions, user defined exceptions; Networking: Socket overview, Stream Sockets, Datagram sockets, Manipulating URLs, Establishing a simple Server/Client using Stream Sockets, Connectionless Client/Server Interaction with Datagrams; Images: File formats, image fundamentals, creating, loading and displaying images, ImageObserver, MediaTracker.

UNIT-III

String handling: **S**tring constructors, methods for character extraction, string searching &comparison, data conversion using valueof (), StringBuffer Exploring java.lang**:** Simple type wrappers, System class, class Class, Math functions; The utility classes: Vector, Stack , HashTable, StringTokenizer, Bitset, Date, Calendar, GregorianCalendar, Random, Observable Input/Output- Exploring java.io: The java.io classes and interface, File class and methods for creating, renaming, listing and deleting files and directories, I/O stream classes (FileInputSream, FileOutputStream, BufferedInputStream, BufferedOutputStream, PushBackInputStream, InputStreamReader, BufferedReader, BufferedWriter, PrintStream, RandomAccessFile).

UNIT-IV

The Applet class: applet architecture, passing parameters to applets, getDocumentBase, getCodeBase, and showDocument, AppletContext and AudioClip interfaces, Graphics class and methods for drawing

lines, rectangles, polygons and ovals; Swing: Component and Container classes, Layout managers (FlowLayout, GridLayout, BorderLayout), Handling events, Adapter classes, Anonymous inner classes Swing GUI components (JLabel, JTextField, JTextArea, JButton, JCheckBox, JRadioButton, JList, JComboBox, JScrollBar, JScrollPane, JToolTip, JPanel, JFrame); Menus: JmenuBar, JMenu, JMenuItem, JSeparator; Multithreaded Programming: The Java thread model (thread priorities, synchronization and inter-thread communication); Deadlock, ThreadGroup.

UNIT-V
Java Beans: Introducing JavaBeans Concepts and Bean Development Kit (BDK), Using the Bean Box, Writing a simple Bean, Bean Properties (simple properties), Manipulating events in the Bean Box, Java database connectivity (JDBC): Introduction to JDBC, type of JDBC connectivity, Establishing database connections, Accessing relational database from Java programs; Java Servlets: Servlet overview and architecture, Servlet Interface and Servlet life cycle, HttpServlet Class, HttpServletRequest Interface, HttpServletResponse Interface, Handling HTTP get Requests, Setting up the Apache Tomcat Server, Deploying a web application, Handling HTTP get requests containing data, Handling HTTP post requests.

REFERENCES:
1. Deitel, H. M.; P. J. Deitel, "Java : How To Program (Sixth Edition)", New Delhi: Prentice-Hall India
2. Schildt, H., "The Complete Reference Java", New Delhi: Tata McGraw-Hill
3. Moss, K., "Java Servlets (Second Edition)", New Delhi: Tata McGraw-Hill

Subject: ADVANCED JAVA PROGRAMMING-PRACTICAL
Code: MCA601
Credits: 3
Duration: 108 hrs.

> **OBJECTIVE:** To enable student implement the console based GUI and web applications using Java and put the theoretical knowledge into practice

LIST OF PROGRAMS:
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

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8. WAP that import the user define package and access the Member variable of classes that Contained by Package.
9. Program that show the partial implementation of Interface.
10. Program to Handle the user define Exception using throw keyword.
11. Program to create a thread that Implement the Runable interface.
12. Program to Implement Interthread communication.
13. Program to implement Server and client using networking
14. Program using Applet Class
15. Program to perform String Class and StringBuffer Class.
16. Program to implement all the Swing components
17. Designing an application using any IDE.
18. Creating a database Connection
19. Programs creating Simple Java Bean and Java Servlets.

Subject: ANALYSIS AND DESIGN OF ALGORITHMS
Code: MCA602
Credits: 4
Duration: 72 hrs.

OBJECTIVE: To analyze algorithm, its efficiency and the fundamental component of problem solving and to understand the importance of algorithm and finding its time and space complexity both theoretically and practically.

UNIT–I
Introduction – Fundamentals of Algorithmic Problem Solving, Statement of the Problem, Design of an Algorithm, Correctness of an Algorithm, Analyzing an Algorithm, Implementation of Algorithm; Problem Types – Searching, Sorting, Graph Related Problems; Graph Representations – Adjacency matrix, Adjacency List, Path Matrix, Spanning Tree; Graph Properties – Bipartite Graph; Analysis of Algorithm Efficiency – Space Complexity, Analysis of Space Complexity, How to calculate Space Complexity, time complexity; Asymptotic Notations – Big Oh Notation, Omega Notation, Theta Notation, Little Oh Notation, Comparison of Asymptotic Notations.

UNIT–II
Mathematical Analysis Recursive – Backward Substitution Method, Important Recurrence Type, Fibonacci Numbers ,Recursion Tree; Brute Force Method – Bubble Sort, Implementation of bubble sort, Selection Sort, Implementation of Selection Sort; Exhaustive Search – Travelling Salesman Problem, Knapsack Problem, and Assignment Problem; Divide and Conquer – Merge sort, Analysis and Implementation of Merge Sort, Quick Sort, Analysis and Implementation, Binary Search, Analysis and Implementation; Multiplication of Large Integers; Strassen's Matrix Multiplication.

UNIT-III
Decrease and Conquer – Insertion sort: analysis of Insertion Sort and its implementation; DFS and BFS –Depth First Search, Breadth First Search; Topological Sort; Transform and Conquer – Balanced Search Tree, AVL Trees; Heap sort – Heaps, Initial Heap Construction, Inserting a Key into a Max

Heap, Deleting a key from Max Heap.

UNIT–IV

Space and Time Tradeoffs **–** Sorting by Counting; String Matching – Horspool Algorithm and its implementation; Hashing – hash Functions, Collision Resolution Techniques; Dynamic Programming – Warshall's Algorithm; Floyd's Algorithm; Knapsack problem.

UNIT–V

Greedy Technique **–** Prim's Algorithm, Krusakal's   Algorithm, Dijkstra's Algorithm, Huffman Codes and Tree; Backtracking & branch and bound, n – Queens Problem, Assignment Problem, Knapsack Problem, Travelling Salesman Problem; Limitation of Algorithm Power –P **,** NP and NP – Complete Problems – NP – Completeness, Polynomial Time, NP – completeness and reducibility.

REFERENCES:
1. Puntambekar, "Analysis and Design Of Algorithms", Technical Publications
2. Anany Levitin, "Introduction to Design of Analysis and Algorithm", Addison Welsey Edition
3. Robert Sedgewick and Phillippe Flajojet, "An Introduction to the Analysis of Algorithm (2nd Edition) ", Welsey Publication.
4. Sara Baase and Allen Van Gelder, "Computer Algorithm: Introduction to Design and Analysis of Algorithm (3rd Edition)".

Subject: ADVANCED DATABASE MANAGEMENT SYSTEM (ADBMS)
Code: MCA603
Credits: 2
Duration: 36 hrs.

> **OBJECTIVE:** To provide students with an understanding of the design, creation, maintenance and management of the open source relational database management system, MySQL.

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

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 and 5 NF.

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

UNIT-IV

MySQL Administration[2]- MySQL Access Control System,Create User, Grant Privileges to Account, Revoking Privileges from Users, Maintaining MySQL Database Tables, Backup ,Restoring Databases Using mysqldump Tool.

UNIT-IV

Introduction to Object-Oriented Databases, Distributed databases, Client-Server Architecture, Data Mining, Data Warehousing, Deductive databases, Databases on the World Wide Web, Multimedia Databases, Geographical Information Systems.

REFERENCES:
1. Sai Sumathi, "Fundamentals of Relational Database Management Systems", Springer (India) Pvt. Ltd
2. Vikram Vaswani,"MySQL(TM): The Complete Reference", Mc Graw Hill Education Publication
3. Ramez Elmasri, SHamkant B.Navatha,"Fundamentals of Database Systems", Pearson Education
4. Ivan Bayross,"Mastering Database Technologies", BPB Publications
5. Baron Schwartz, "High Performance MySQL", O'Reilly Publication
6. Luke Welling, Laura Thomson "MySQL Tutorial", Pearson Education Publication

Subject: ADVANCED DATABASE MANAGEMENT SYSTEM-PRACTICAL
Code: MCA604
Credits: 2
Duration: 72 hrs.

OBJECTIVE: To implement the different database designing techniques by using MySQL.

LIST OF PROGRAMS:
1. To write queries of Data Manipulation Statements.
2. To write queries of Data Definition language Statements.
3. To write queries of SELECT command with different clauses.
4. To write queries of aggregate functions (avg, count, max, min, Sum).
5. To write queries of various type of Integrity Constraints.
6. To write queries on the concept of Sub-Query.
7. To write queries to manipulate DATE and TIME data types.
8. To write queries of various type of JOINS.
9. To write queries implementing Transaction.
10. To write queries managing Existing Tables and other Database Objects: The ALTER TABLE

Statement, Adding a New Column in a Table, Modifying Existing Column, Dropping a Column, Renaming an Object, Truncating a Table, Dropping Views, Dropping Synonyms, Dropping Tables

11. Prepare case study explaining the the need for converting a large table to many smaller
12. tables using 1NF, 2NF, 3NF
13. Implement various triggers
14. Implement authorization, authentication, privileges on database
15. Create a table that contains at least one attribute of an audio. Add at least 10tuples in the table and write query to invoke a particular audio

SPECIALIZATION-I

Subject: PHP-I
Code: MCAS550
Credits: 2
Duration: 36 hrs.

> **OBJECTIVE:** To enable developing various web applications using PHP server side scripting language

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,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, foreach loop, while loop), PHP array Functions, Extracting Data from arrays, Sorting arrays, Using PHP array operators

UNIT-III
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; Setting up web pages to communicate with PHP, Handling Text fields, Text areas, Check box, radio buttons, Handling List box, Handling Password controls, Handling Hidden controls, Handling image Maps, Handling Buttons(Making Button data Persist, using Submit Buttons as HTML buttons)

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UNIT-IV

PHP browser-Handling Power – Using PHP's Server variables, Using HTTP Headers, Getting the User's browser type, Dumping form's Data all at once, Handling form data with custom arrays, Performing data Validation; Working with Database-connecting to mysql database, reading table, displaying table, updating record, deleting record, creating data grid of records, pagination; File upload and access; PHP sessions, cookies; Sending Email, Regular Expressions, Error handling

UNIT–V

Object-oriented programming-creating Classes, Creating objects, Setting Access to Properties and Methods(Public, Private, Protected Access), Using Constructors, Using Destructors, Basing one class on another with Inheritance(Protected access, Constructors and Inheritance, Calling Base class methods), Overriding methods, Overloading methods; Creating static methods (creating static methods, Passing data to a static method, Using properties in static methods), Static members and Inheritance, Creating Abstract classes, Creating Interfaces; Database in an OOP ways- Connecting with MySQLi, selecting, updating, deleting

REFERENCES:

1. Steven Holzner, "The Complete Reference PHP", McGraw Hill
2. Hasin Hayder,"Object-Oriented Programming with Php5", Packt Publishing Ltd
3. Peter Lavin,"Object-Oriented PHP: Concepts, Techniques, and Code", No Starch Press
4. David Powers,"PHP Solutions: Dynamic Web Design Made Easy",Apress
5. Luke Welling, Laura Thomson, "PHP and MySQL Web Development",5th Edition, Pearson Education

Subject: .NET –I
Code: MCAS552
Credits: 2
Duration: 36 hrs.

OBJECTIVE: To provide students with the knowledge and skills needed to develop web – based applications in ASP .NET for the Microsoft .NET platform. The Course focuses on user interfaces, program structure, language syntax, working with database and other requirements to build a website.

UNIT-I

Getting started with asp.net **-** Understanding the ASP.NET Programming Model, ASP.Net page, application lifecycle, Creating Our First ASP.NET Web Page, Postback property; Global.asax file, web.config file.

UNIT-II

Web form and web controls **-** Web Form Basics, Using Hyper link, picture box, List box, Text Boxes, etc.; Collecting Input Using Drop-Down Lists, Text box, Radio Buttons, Check boxes, etc; Validating User Input with Validation Controls, Implement event handlers by using code-behind files.

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UNIT-III
More web controls-File upload control, Hidden field, Calendar, Navigation controls: Menu, Treeview, sitemap; Adrotator with XML file.

UNIT-IV
Using Master Pages to Provide Site wide Page Templates; Themes; State Management: View state, session, Application state, cookies.

UNIT-V
Working with databases-An Introduction to Databases, Accessing Data with the Data Source Web Controls, Displaying Data with the Data Web Controls, Deleting, Inserting, and Editing Data; Working with Data-Bound controls Datagridview, DropDownLists, RadioButtons, Checkboxes etc.; Exploring Data Binding and Other Data-Related Topics.

REFERENCES:
1. Herbert Schildt, "C Sharp- The complete reference", McGraw-Hill/Osborne
2. ASP.NET The complete reference, McDonald, McGraw-Hill
3. Matthew MacDonald, Adam Freeman, "Pro ASP.NET 4 in C# 2010", Apress

Subject: JEE-I
Code: MCAS554
Credits: 2
Duration: 36 hrs.

> **OBJECTIVE:** To equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network

UNIT-I
Introduction to J2EE-J2EE Overview-Why J2EE?-J2EE Architecture- Overview on the Java2EE Architecture -1 tier- 2 tier -3 tier - N tier - JavaEE Key StandardJ2EE APIs-J2EE Containers.

UNIT-II
Java Database Connectivity-JDBC Product -Types of Drivers - Two-Tier Client/Server Model - Three-Tier Client/Server Model - Basic Steps of JDBC-Creating and Executing SQL Statement -The Result Set Object - Working with Database MetaData – Interface.

UNIT-III
Servlet API and Overview Servlet Model: Understanding the client-server model, Overview ofServlet and Common gateway interface, Servlet Life Cycle and Deployment descriptor, The javax.servlet and javax.servlet.http packages, Reading data from the client, Reading HTTP Request Header, Sending data to a client and writing to the HTTP response Header, Servlet interaction, Working with Cookies, Session management.

UNIT-IV

Java Server Pages(JSP): JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, Different JSP tags, Implicit Objects, Directive Elements, Declaring variables and methods, JSP Form Processing, Cookies Handling and JSP session management, Handling JSP errors: JSP Translation Time Error and JSP Request Time Error.

UNIT-V

RMI Architecture - Designing RMI application - Executing RMI application, EJB- Types of EnterpriseJava beans - Session Bean & Entity Bean - Features of Session Bean - Life-cycle of Stateful Seession Bean - Features of Entity Bean - Life-cycle of Entity Bean -Container-managed Transactions & Bean-managed Transactions o Implementing a container-managed Entity Bean, XML- XML- XML Syntax Rules.

REFERENCES:
1. Schildt, H., "J2EE: The Complete Reference", Mc Graw Hills
2. Moss, K., "Java Servlets (Second Edition)", New Delhi: Tata McGraw-Hill
3. Marty Hall, "Core Servlets & JavaServer Pages", 2nd Edition Vol 1

Subject: PHP – I PRACTICAL
Code: MCAS551
Credits: 3
Duration: 108 hrs.

> **OBJECTIVE:** To provide students with the basic skills of learning PHP, form, file handling and database connectivity using MySQL

LIST OF PROGRAMS:
1. Working with Basic PHP Syntax, Variables, PHP operators
2. Working on the different Control Structures (If else, switch, all loops), Arrays, For Each Loop, Functions, Strings.
3. Working with Form Handling, PHP $_GET,PHP $_POST,PHP $_REQUEST,PHP date() Function, PHP include File
4. Working on File Handling, File Uploading, PHP Sessions, Sending Emails, PHP Cookies
5. Working on MySQL database connection, MySQL DataTypes, MySQL Insert, MySQL Select, MySQL where clause, MySQL Delete, MySQL UpdateMySQL Aggregate Functions(sum,avg,count etc), MySQL order by and group by clause, MySQL Subqueries, MySQL Joins,PHP Connectivity with MySQL, PROJECT.
6. WAP for handling Check Boxes
7. WAP for handling Radio Buttons
8. WAP for handling List Boxes
9. WAP for handling Password Controls
10. WAP for handling Images
11. WAP for handling Buttons(Using JavaScript, HTML)
12. WAP for Dumping Form's Data

13. WAP for handling Form Data with Customs Arrays

14. WAP using Constructors to initialize Objects
15. WAP using Destructors to Clean Up after Objects
16. WAP using Constructors and Inheritance
17. WAP using (Overriding, Overloading and Autoloading) methods
18. WAP for passing data to a Static method
19. WAP for using Static members and Inheritance
20. WAP for reading Text from a file using fgets
21. WAP for reading a file Character by Character with fgets
22. WAP for copying and writing a file with copy
23. WAP for deleting a file

Subject: .NET –I PRACTICAL
Code: MCAS553
Credits: 3
Duration: 108 hrs.

OBJECTIVE: To equip the student with the skills needed to be an application developer in Microsoft .NET framework environment, enable them to developed window application, console application, class library, etc. The Course focuses on building user interfaces, program structure, language syntax, event driven programming and implementation of various framework class libraries.

LIST OF PROGRAMS:
1. Short Story Game
2. Program implementing function and subroutine
3. Program implementing control flow statements,…
4. Program implementing overloading, overriding, etc
5. Mathematic Game
6. Age Calculator
7. Die roller using Random class
8. Program implementing timer, progress bar, etc.
9. Program implementing dialog boxes.
10. Program implementing menus, MDI.
11. Implementation of various Search algorithms, array, etc.
12. Working with data in database
13. Report generation program
14. Displaying data with data bound controls.

Subject: JEE –I PRACTICAL
Code: MCAS555
Credits: 3
Duration: 108 hrs.

OBJECTIVE: To implement the theoretical concepts of JEE into practice

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PROGRAMS:
1. Programs implementing JSP interface
2. Programs implementing JSP connecting to the database
3. Programs implementing JSP handling request
4. Programs implementing the concept of JSP scripting elements
5. Programs implementing the concept of JSP Actions, Custom Tag libraries, Directives and connecting pages
6. Programs implementing the concept of including and Forwarding from JSP Pages
7. Programs implementing the concepts of Custom Actions
8. Programs implementing the concept of servlets
9. Implementing a container-managed Entity Bean
10. Program using Servlet to display Visitor Count
11. Program using Servlet to Differentiate between Frequent visitor and a new visitor

Subject: ADVANCED COMPUTER NETWORKS
Code: MCA550
Credits: 4
Duration: 72 hrs.

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

UNIT-I
Introduction to Computer Network – Uses of Computer Network, Network hardware, Layered Architecture, function of the layers, Network standardization, OSI & TCP/IP Reference model, Physical layer services & hardware protocols;

UNIT-II
Data Link Control – Framing, Flow Control, Stop and wait Protocols, Sliding Window Protocols, Error Detection & Error Control, High Level Data Link Control (HDLC),Other Data Link Control Protocols, Pure ALOHA & Slotted ALOHA , Markov chain model for S-ALOHA and delay in S-ALOHA , IEEE, LAN Protocols, Ethernet, Ad Hoc network;

UNIT-III
Network Layer And Transport Layer – Network Layer Protocols, Design issues , Virtual Circuits and datagram's, Routing Algorithms, Optimality principle, Shortest path routing - Dijkstra's algorithms,

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Distance Vector routing, Link state routing, Flow and Congestion Control, packet discarding , Traffic shaping ,Choke packets, RSVP, IP fragment, RIP, OSPF, Inside router, Network layer performance model, Poisson model, M/M/1 Queue, Blocking probability, Little's formula, Transport Layer Protocols, Basic functions, Connection Management, Establishment and releases , Crash recovery, TCP & UDP, Reliability Models, AIMD Policy.

UNIT-IV

Upper Layers – Session Layer Protocols – Dialog Management, Synchronization; Presentation layer functions – translation, encryption, compression; Cryptography – substitution and Transposition Ciphers,

Data Encryption standards (DES), DES Chaining, Breaking DES, Public Key cryptography, Authentication protocols, Different compression coding techniques; Application layer protocols & services – Email, World Wide Web, file transfer protocol, remote file server, internet telephony & chatting;

UNIT-V

Special & High Speed Networks & Network Devices – FDDI – access method, addressing, electrical specification, frame format, comparison of FDDI-I & FDDI-II, DQDB & WAN implementation. ×
.25 networks its features; Frame Relay – operation, congestion control & frame format; SONET / SDH – layers, frame & application; Internet & related software's NETSCAPE & MOSAIC;

REFERENCES:
1. A.S. Tannenbaum, "Computer networks", Second Ed., Prentice Hall India
2. Halsall, "Data Communication, Computer Networks", Pearson Education
3. D. Bertsekas and R. Gailagher, "Data Networks", PHI Second Ed

Subject: THEORY OF COMPUTATION
Code: MCA551
Credits: 4
Duration: 72 hrs.

> **OBJECTIVE:** To introduce students the basic concepts in theoretical computer science and the formal relationship among machines, languages and grammars

UNIT-I

Strings, Alphabet, Language, Operations, Finite state machine, definitions, Finite automation model, Acceptance of strings and languages, Non-Deterministic Finite Automation, Deterministic Finite Automation, Equivalence between NFA and DFA. Conversion of NFA into DFA, Minimization of FSM, Equivalence between two FSM's. Moore and Melay machines

UNIT-II

Regular sets, Regular expressions, Identify rules, Manipulation of regular expressions. Equivalence between RE and FA, Inter conversion, Pumping lemma, Closure properties of regular sets (proofs not required), Regular grammars, Right linear and left linear grammars, Equivalence between regular

linear grammar and F. A. inter conversion between RE and RG.

UNIT-III

Context free grammar, Derivation trees, Chomsky Normal Form, Greibach Normal Form, PushDown Automata, Definition, Model, acceptance of CFL, Equivalence of CFL and PDA, Interconversion, enumeration of properties of CFL(proofs omitted).

UNIT-IV

Turing Machine, Definition, Model, Design of TM, Computable functions, Recursive ensumerable language, Church's hypothesis, Counter machine, Types of TM's (Proofs not required). Chomsky hierarchy of languages, Linear bounded automata and context sensitive language, Introduction of DCFL and DPDA, LR(0), grammar, Desidability of problems.

UNIT-V

Undecidability: Properties of recursive & non-recursive ensumarable languages, Universal Turing Machine, Post-correspondence problem, Introduction to recursive function theory.

REFERENCES:

1. Hopcraft H. E. & Ulman J, "Introduction to Automata Theory, Languages and Computation"
2. Peter Linz," An Introduction to formal Languages and Automata"
3. John C. Martin, "Introduction to Languages and the Theory of Automata"
4. Lewis H. P. and Papadimiton C. H, "Elements of Theory of Computation"
5. Mishra and Chandrashekharan, "Theory of Computation"

Subject: COMPUTER GRAPHICS
Code: MCA553
Credits: 3
Duration: 54 hrs.

> **OBJECTIVE:** To provide students with an understanding of the basic principles, techniques, and algorithms for generating and interacting with simple graphical objects on a display screen that form the basis of computer graphics and modeling.

UNIT-I

Introduction to computer Graphics – Advantages of computer graphics, Applications and graphics software, Classifications of computer graphics; Video display Technologies- Raster scan systems, Random scan systems, CRT, Flat Panel Displays, Video controller, Graphics software

UNIT-II

Scan Conversion– attributes of output primitives, line drawing algorithms like Digital Differential Analyzer, Bresenham's algorithm, Mid-point algorithm , Circle generating algorithms, scan converting ellipse; Filling Polygons-Boundary Fill algorithm, Flood Fill algorithm

UNIT-III

2D geometrical transforms-Translation, scaling, rotation, reflection and shear transformations, matrix

representations and homogeneous coordinates, composite transforms, transformations between coordinate systems; Windowing and Clipping-Viewing pipeline, Viewing transformations, 2-D Clipping algorithms

UNIT-IV

3D geometrical transforms- Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems; Windowing and Clipping-Viewing pipeline, Viewing transformations, Projections, 3D Clipping algorithms

UNIT-V

Visible Surface Detection- Back-Face Detection, Depth – Buffer Method, Scan Line Method – A-Buffer Method, Properties of Light, Infinitive Color Concepts, RBG Color Models

REFERENCES:
1. Donald Hearn and M Pauline Baker, "Computer Graphics C Version", Pearson Education
2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", Pearson Education
3. William M. Newman, R.F. Sproull, "Principles of Interactive Computer Graphics", Tata McGraw Hill
4. Steven Harrington, "Computer Graphics: A Programming Approach", Tata McGraw Hill
5. David F. Rogers, "Procedural Elements for Computer Graphics", Tata McGraw Hill
6. David F. Rogers, J. Alan Adams, "Mathematical Elements of Computer Graphics", Tata McGraw Hill

Subject: SOFTWARE PROJECT MANAGEMENT
Code: MCA600
Credits: 4
Duration: 72 hrs.

> **OBJECTIVE:** To enable students to plan, manage a project and understand the different risk factor that may associate with a project.

UNIT-I

Introduction to Competencies - Product Development Techniques - Management Skills-The SEI CMM - International Organization for Standardization Formulation of a test case plan or test bed at the requirements stage: Ways to gather requirements and documentation.

UNIT-II

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project - Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

UNIT-III

Tasks and Activities - Software Size and Reuse Estimating: A Regression Model - COCOMO II - SLIM Organizational Planning - Project Roles and Skills Needed. Mode of good interface design-simple pleasant dialog boxes, non-interfering colors, non crowding of user controls on the interface panel.

UNIT-IV

Project Management Resource Activities - Organizational Form and Structure - SoftwareDevelopment Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

UNIT-V

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software

REFERENCES:
1. Bob Hughes, Mikecotterell, "Software Project Management", Third Edition, Tata McGraw Hill
2. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill
3. Royce, "Software Project Management", Pearson Education
4. Jalote, "Software Project Management in Practice", Pearson Education

ELECTIVE I Subject: DATA MINING AND DATA

WAREHOUSING
Code: MCAE600
Credits: 3

> **OBJECTIVE:** To enable the student to interpret the different kinds of database and to make use of the different types of data mining and data warehousing.

UNIT-I

Data warehousing Components–building a Data warehouse, Mapping the Data Warehouse to a Multiprocessor Architecture, DBMS Schemas for Decision Support, Data Extraction, Cleanup, and Transformation Tools, Metadata

UNIT-II

Business Analysis- reporting and query tools and applications, tool categories, the need for applications, Cognos Impromptu, Online Analytical Processing (OLAP), multidimensional data model, OLAP Guidelines, multidimensional versus multi-relational OLAP, categories of tools, OLAP Tools and the Internet

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UNIT-III

Introduction to data mining-data, types of data, data mining functionalities, interestingness of patterns, classification of data mining systems, data mining task primitives, integration of a data Mining System with a data warehouse, issues, data preprocessing

UNIT-IV

Association rule mining and classification-Mining Frequent Patterns, Associations and Correlations, mining methods, mining, various kinds of association rules, correlation analysis and constraint based association mining, classification and prediction, basic concepts, decision tree; Induction-Bayesian classification, rule based classification, classification by backpropagation, support Vector machines, Associative Classification

UNIT-V

Clustering and applications and trends in data mining-cluster analysis, types of data, categorization of Major Clustering Methods-K means, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model-Based Clustering Methods, Clustering High Dimensional Data, constraint, based cluster analysis, Outlier Analysis, Data Mining Applications

REFERENCES:
1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw, Hill Edition
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier
3. Pang Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining",Person Education
4. K.P. Soman, Shyam Diwakar & V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India
5. G. K. Gupta, " Introduction to Data Mining with Case Studies", Prentice Hall of India
6. Daniel T.Larose, "Data Mining Methods and Models", Wile Interscience

Subject: DISTRIBUTED DATABASE SYSTEM
Code: MCAE601
Credits: 3
Duration: 54 hrs.

> **OBJECTIVE:** To introduce basic principles and implementation techniques of distributed database systems.

UNIT-I

Introduction to distributed data processing- what is a DDBS, advantages and disadvantages of DDBS, problem areas, overview of database and computer network concepts; distributed database management system architecture-transparencies in a distributed DBMS; distributed DBMS architecture; global directory issues

UNIT-II
Distributed database design-alternative design strategies, distributed design issues, fragmentation; data allocation, semantics data control, view management, data security, semantic integrity control; query processing issues, objectives of query processing, characterization of query processors, layers of query processing, query decomposition, localization of distributed data

UNIT-III
Distributed query optimization-factors governing query optimization; centralized query optimization; ordering of fragment queries; Distributed query optimization algorithms; transaction management-the transaction concept; goals of transaction management; characteristics of transactions; taxonomy of transaction models

UNIT-IV
Concurrency control in centralized database systems, concurrency control in DDBSs, distributed concurrency control algorithms, deadlock management; reliability-reliability issues in DDBSs; types of failures; reliability techniques; commit protocols; recovery protocols

UNIT-V
Parallel database systems-parallel architectures, parallel query processing and optimization; load balancing; mobile Databases, distributed Object Management, Multi-databases

REFERENCES:
1. M. Tamer Ozsu, "Principles of Distributed Database Systems", Pearson Education
2. Stefano Ceri and Giuseppe Pelagatti, "Distributed Databases: Principles and Systems", McGraw Hill Education

Subject: CLOUD COMPUTING
Code: MCAE602
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To provide the knowledge of techniques and services of cloud.

UNIT-I
Cloud Computing Fundamentals- what cloud computing, essential characteristics, history of cloud computing – cloud architecture – cloud storage – why cloud computing matters – advantages of cloud computing – disadvantages of cloud computing

UNIT-II
Developing cloud services-Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development ,Software as a Service – Platform as a Service, Web Services – On Demand computing, Discovering Cloud Services Development Services and Tools – Amazon Ec2, Google App Engine , IBM Clouds

UNIT-III

Cloud computing for everyone-centralizing email communications – collaborating on schedules, collaborating on to-do lists, collaborating contact lists, cloud computing for the community, collaborating on group projects and events, cloud computing for the corporation

UNIT-IV

Using cloud services-collaborating on calendars, schedules and task management – exploring online scheduling applications ,exploring online planning and task management, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, collaborating on databases – storing and sharing files, evaluating web mail services, evaluating web conference tools – collaborating via social networks and groupware, collaborating via blogs and wikis.

UNIT-V

Cloud computing risk issues: privacy and compliance risks, threats to infrastructure, data, and access control, cloud service provider risks, cloud computing security challenges- security policy implementation, virtualization security management, vm security recommendations, vm-specific security techniques

REFERENCES:
1. Zaigham Mahmood , Thomas Erl , Ricardo Puttini , "Cloud Computing - Concepts, Technology & Architecture", Pearson Education
2. Broberg J, "Cloud Computing: Principles And Paradigms", Wiley India Pvt Ltd
   a. Bloor Robin, Kaufman Marcia, Hurwit Judith ,"Cloud Computing For Dummies", Wiley India Pvt Ltd

ELECTIVE II

Subject: CLIENT SERVER ARCHITECTURE
Code: MCAE603
Credits: 3
Duration: 54 hrs.

> **OBJECTIVE:** To enable students to comprehend the importance of Client/Server Computing, its important aspects and current technology used for the subject matter. Important Components and Architecture of Client/Server Computing and the relationship between workstations and servers will also be covered in this course

UNIT-I

What is Client/Server Computing, Introduction to Client/Server, Types of Servers , Fat or Thin Server/Clients, Stateless or Statefull, Mainframe, Client/Server Functions, Client/Server Topologies, Characteristics of the Client And the Server, Merits and Demerits of the Client Server

UNIT-II
Classification of Client Server Systems, Advantage and Disadvantage of Client Server Computing, Client/Server Building Blocks, Development Tools and Development Phases
Client Server/Security, Improving Performance of Client Server Applications, Downsizing and Rightsizing

UNIT-III
Architectures of Client/Server Systems, Principle behind Client/ Server Systems, Client Components, Server Components, Architecture for Business Information, Distribution Pattern, Existing Client/Server Architecture

UNIT-IV
Client/Server and Databases, Storing Data and the Database, Client/Server in respect of databases, Client Server Database Architecture, Database Middle ware components, Access to multiple database, Distributed Database, Client/Server Application Components, Categories of Client/Server Application, Client Services , Server Services.

UNIT-V
Application development management issues, Training and Testing, Client/Server Testing Technologies, Client/Server Technology and Web Services, Future of the Client/Server Computing

REFERENCES:
1. Subhash Chandra Yadav , Sanjay Kumar Singh, "An Introduction to Client Server Computing", New Age International Limited Publishers
2. Doug Lowe ," Client/Server Computing For Dummies",3rd Edition, IDG books
3. Eric Johnson, "The Complete Guide to Client/Server Computing", Prentice Hall

Subject: ARTIFICIAL INTELLIGENCE
Code: MCAE605
Credits: 3
Duration: 54 hrs.

OBJECTIVE: To provide basic knowledge necessary to understand how to programmachines to behave and act like humans.

UNIT-I
Introduction – Agents, Problem formulation, uninformed search strategies, heuristic, informed search Strategies, constraint satisfaction

UNIT-II
Logical Reasoning-Logical agents, propositional logic, inferences, first-order logic, inferences in firstorder logic, forward chaining, backward chaining, unification, resolution

UNIT-III

Planning-Planning with state-space search, partial-order planning, planning graphs, planning and acting in the real world

UNIT-IV

Uncertain knowledge and reasoning-Uncertainty, review of probability, probabilistic Reasoning,Bayesian networks, inferences in Bayesian networks,Temporal models, Hidden Markov models

UNIT-V

Learning-learning from observation, Inductive learning, Decision trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning

REFERENCES:
1. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education
2. William David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education

Subject: FUNDAMENTALS OF RS AND GIS
Code: MCAE606
Credits: 3
Duration: 54 hrs.

> **Objective:**
> To explore the fundamental principles of remote sensing and geographical information systems as they relate to engineering and environmental problems.

UNIT- I

Introduction to Remote Sensing– Remote Sensing - Definition, Scopes, Requirements and Stages. Source of Energy, Electromagnetic Radiation, Radiation laws, Reaction with atmosphere. Recording of Energy by sensors, Application of Remote sensing, Real and Ideal Remote Sensing System, Advantages and Limitations of Remote Sensing techniques.

UNIT-II

Remote Sensing Platforms and Sensors: Characteristics of Images, Remote Sensing platforms- Ground based, Aierial and Satellites. Historical development of Satellites, Lunch Vehicle, Payload, Orbital Characteristics of Remote Sensing Satellite, Types of Sensors, Resolution of Sensors – Spectral, Spatial, Radiometric & Temporal. Commonly used Satellites and Sensors - LANDSAT series, SPOT, IRS, IKONOS, ESA, RADARSAT, NOAA.

UNIT-III

Digital Imaging and Information Extraction: Digital Imaging, Image Processing Systems, Image pre-

processing, Radiometric corrections, Geometric correction, Geo-referencing methods including radiometric re-sampling, Concept of Image Enhancement- Special and Frequency domain, Classification Techniques-supervised and Unsupervised classifications,Maximum likelihood classifiers, Change Detection, Ground truth.

UNIT-IV

Introduction and Overview of Geographic Information Systems: Definition of a GIS, Features and Functions of GIS, Importance & Applications of GIS; GIS and cartography; GIS data feeds; Cartography versus GIS; Map projections - coordinate systems; precision and error.

UNIT-V

Data Sources, Data Input , Data Quality and Database Concepts: Major data feeds to GIS and their characteristics: maps, Basic concepts of geo-positioning, GPS, Measurement for accuracyof GPS data, images, databases, commercial data; locating and evaluating data; data formats; data quality; metadata.

UNIT-VI

Spatial Analysis : Spatial, Thematic, and Temporal dimensions of geographic data; GIS analytical functions; vector analysis including topological overlay; raster analysis; statistics; integrated spatial analysis, process of GIS- data capture, data source, encoding methods.

REFERENCES:

1. Jensen JR, 2000: Remote Sensing of the Environment: An earth resource perspective, Prentice Hall
2. David JM, Michael FG & David WR 1991: Geographical Information Systems, Prentice Hall.
3. Bhatta B, 2008: Remote Sensing and GIS.
4. Canada Centre for Remote Sensing : Tutorials on RS
5. Campbell JB 1996: Introduction to Remote Sensing, Ed2, Taylor & Francis, UK
6. Chrisman NR 1977: Exploring Geographic Information Systems, John Wiley

SPECIALIZATION-II

Subject: PHP-II
Code: MCAS600
Credit: 2
Duration: 36 hrs.

> **OBJECTIVE:** To enable students developing real world applications using MVC PHP framework

UNIT–I

Ajax Basics- HTTP Request and Response Fundamentals ,The XMLHttpRequest Object, Methods, Properties,Sending a Request to the Server; PHP and Ajax- Why PHP and Ajax, Client-Driven Communication, Server-Side Processing; Database-Driven Ajax- Putting Ajax-Based Database

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Querying to Work; Forms- Bringing in the Ajax: GET vs. POST; working with Images

UNIT–II

Ajax Basics- HTTP Request and Response Fundamentals ,The XMLHttpRequest Object, Methods, Properties,Sending a Request to the Server; PHP and Ajax- Why PHP and Ajax, Client-Driven Communication, Server-Side Processing; Database-Driven Ajax- Putting Ajax-Based Database Querying to Work; Forms- Bringing in the Ajax: GET vs. POST; working with Images

UNIT –III

Introduction to PHP framework-MVC, working with a PHP framework

REFERENCES:

1. R. Rajesh Jeba Anbiah, Milan Sedliak, Roshan Bhattarai, "PHP Ajax Cookbook", Packt Publishing Ltd
2. David Upton," CodeIgniter for Rapid PHP Application Development", Packt Publishing Ltd
3. Matt Stauffer," Laravel: Up and Running", Shroff Publishers & Distributors Pvt. Ltd.
4. Ahsanul Bari, Anupom Syam,"CakePHP Application Development", Packt Publishing Ltd
5. Wojciech Bancer,"Symfony2 Essentials", Packt Publishing Ltd

Subject: .Net -II
Code: MCAS602
Credits: 2
Duration: 36 hrs.

> **OBJECTIVES:** To provide students with the skills needed to develop web – based applicationsin ASP .NET for the Microsoft .NET platform. The Course focuses on user management, event driven programming, state management, page validation, website navigation, state management, user profile, working with database and dataset.

UNIT-I

ASP.NET essentials-Overview of .Net Framework, What's new in ASP.Net, Introduction to Visual Web Developer; Introducing ASP.Net Pages, application lifecycle;Provider Models ,Coding Models, Code Sharing Compiling Application,Global. asax file, Web.config file; State management.

UNIT-II

Standard Controls-The Control Class, Web Control Class: Buttons, Labels, Literal, Place Holders, Hidden field control, File Upload Control, List Boxes etc. and studying their classes; Image: Image Control, Image Button ,Image Map and studying their classes.

UNIT-III

Navigation Control: Tree View Control, Menu Control, Site Map Control; Wizard Control and studying their classes; Validation Controls, Validation Group; Calendar and Ad Rotators; Master Pages and Themes.

UNIT-IV

Authorization and authentication: User management- Login Controls: Login Control,Login View,Login Status,Logon Name,Password Recovery,Create User control Wizard, Change Password control; User Profiles: Using Profiles,Anonymous Profiles,Authenticated Profiles.

UNIT-V

Working With Database **-** Server Explorer; Working with ADO.Net: connection object, Command object, datareader class, dataadapter class, Dataset: datatable class, datarow etc.;Data provider: OLEDB, SQLClient, Mysql and others; Access data source: using Object Data Source;Base Data List Class, list view, form view,Grid View,Details View Class,DataList Class,Repeater Class.

REFERENCES:
1. ASP.Net, "Black Book", Dream Tech Press Publications.
2. ASP.NET "The complete reference", McDonald, McGraw-Hill
3. Beginning ASP.NET 2.0, Chris Hart, John Kauffman and Chris Ullman, Wiley Publications.
4. Matthew MacDonald, Adam Freeman,"Pro ASP.NET 4 in C# 2010", Apress
5. ASP.NET Bible MridulaPariharet al., Published by Hungry Minds, Inc

Subject: JEE -II
Code: MCAS604
Credits: 2

OBJECTIVES:
(i) To provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business
(ii) To enable students develop applications using J2EE

UNIT-I

JDBC Product -Types of Drivers - Two-Tier Client/Server Model - Three-Tier Client/Sever Model - Basic Steps of JDBC -Creating and Executing SQL Statement -The Result Set Object - Working withDatabase MetaData - Interface

UNIT-II

Servlet Interaction & Advanced Servlets - Life cycle of Servlet -Java Servlet Development Kit - Javax. servlet package - Reading Servlet Parameters -Reading Initialization Parameters - The javax.servlet. http Package - Handling HTTP

UNIT-III

JSP Technologies -Understanding the Client-Server Model - Understanding Web server software - Configuring the JSP Server - Handling JSP Errors - JSP Translation Time Errors - JSP Request Time Errors - Creating a JSP Error Page

UNIT-IV

RMI Architecture - Designing RMI application - Executing RMI application

EJB-Types of Enterprise Java beans - Session Bean & Entity Bean - Features of Session Bean - Life- cycle of Stateful Session Bean - Features of Entity Bean - Life-cycle of Entity Bean - Container- managed Transactions & Bean-managed Transactions implementing a container-managed EntityBean XML-XML- XML Syntax Rules

UNIT-V

Introduction to the Apache Struts -MVC Architecture o Struts Architecture - How Struts Works? - Introduction to the Struts Controller - Introduction to the Struts Action Class - Using Struts Action From Class - Using Struts HTML Tags - Introduction to Struts Validator Framework - Client Side Address Validation in Struts - Custom Validators Example - Developing Application with Struts Tiles, Hibernate- Introduction to Hibernate 3.0 - Hibernate Architecture - First Hibernate Application

REFERENCES:
1. Schildt, H., "J2ee: The Complete Reference"
2. Moss, K., "Java Servlets (Second Edition)", New Delhi: Tata McGraw-Hill
3. Marty Hall, "Core Servlets & JavaServer Pages", 2nd Edition Vol 1

Subject: PHP TECHNOLOGY –II PRACTICAL
Code: MCAS601
Credits: 3
Duration: 108 hrs.

OBJECTIVE: To Design, Debug and deploy feature – rich Web Applications

LIST OF PROGRAMS:
1. WAP for handling Check Boxes
2. WAP for handling Radio Buttons
3. WAP for handling List Boxes
4. WAP for handling Password Controls
5. WAP for handling Images
6. WAP for handling Buttons(Using JavaScript, HTML)
7. WAP for Dumping Form's Data
8. WAP for handling Form Data with Customs Arrays
9. WAP using Constructors to initialize Objects
10. WAP using Destructors to Clean Up after Objects
11. WAP using Constructors and Inheritance
12. WAP using (Overriding, Overloading and Autoloading) methods
13. WAP for passing data to a Static method
14. WAP for using Static members and Inheritance
15. WAP for reading Text from a file using fgets
16. WAP for reading a file Character by Character with fgets

17. WAP for copying a file with copy
18. WAP for deleting a files
19. WAP for writing to a file with fwrite

Subject: .Net TECHNOLOGY-II PRACTICAL
Code: MCAS603
Credits: 3
Duration: 108 hrs.

OBJECTIVES: To provide students with the skills needed to develop web – based applications in ASP .NET for the Microsoft .NET platform. The Course focuses on user interfaces, on user management, event driven programming, state management, page validation, website navigation, state management, user profile, working with database, dataset and other requirements to build a web application.

LIST OF PROGRAMS:

1. Implementing user authentication and authorization.
2. Web page validation.
3. Implement event handlers with various controls
4. Program implementing image map control.
5. Program demonstrating file upload, adrotator.
6. Program implementing wizard control.
7. Program implementing Login control.
8. Program implementing Master page and theme.
9. Implementation of session, cookies, etc.
10. Program implementing database connection and data manipulation.
11. Working data list class.
12. Working with dataset and data adapter

Subject: JEE-II PRACTICAL
Code: MCAS605
Credits: 3
Duration: 108 hrs.

OBJECTIVES: To be able to implement the concepts like hibernate, struts, XML and enterprise java bean (EJB)

LIST OF PROGRAMS:

1. Programs implementing the concept of JSP scripting elements.
2. Programs implementing the concept of JSP Actions, Custom Tag libraries, Directives andconnecting pages.
3. Programs implementing the concept of including and Forwarding from JSP Pages.
4. Programs implementing the concepts of Custom Actions.

5. Programs implementing the concept of servlets
6. Implementing a container-managed Entity Bean.
7. Programs implementing the Struts Action Class
8. Programs implementing the Using Struts HTML Tags.
9. Developing Application with Struts Tiles.
10. Programs implementing the Hibernate Application.
11. Write a program to access a table Product Master from MySql database using Java code.
12. Write a program for authentication, which validate the login-id and password by the servlet code.
13. Write a program to connecting a database using user-id and password.
14. Write a program to insert data into the database using the prepared statement.
15. Write a program to read data from the database using the Resulset.
16. Write a program to read data send by the client (HTML page) using servlet.
17. Write a program to include a HTML page into a JSP page
18. Write a program to display http request Header in JSP
19. Write a program to handle the JSP Exception
20. Write a program to read data send by a client (HTML page) using JSP
21. Write a program to Develop Login Form in Struts
22. Create an Enterprise application using Session Bean (Stateless) which convert the amount fromDollar to Rupees
23. Write a Enterprise Session bean to simulate a income Tax Calculator.
24. Write a Entity bean to find a student record in student data base using primary key property
25. Write a XML DTD document to validate and authenticate Student Details

Annexure C

CSC/BOS/2022-3: Introduction of Value-Added Course

(a) DATA ANALYSIS USING EXCEL

About this Course

Microsoft (MS) Excel is a widely used application in the business world, it is an extremely sophisticated data analysis tool, practically all large and small firms utilize it on a daily basis. The course may be considered for two types of learners: firstly, those individuals with little or no functional knowledge of Excel and secondly those who use Excel on a regular basis but only in a peripheral way and want to improve their skills.

The course progresses from the fundamentals of MS Excel, such as reading data using various data formats, organising and manipulating data, to some of the more advanced features.

After completing this course, students will be able to:

• Create an Excel report

• Create a pivot table and pivot chart

• Create a dashboard and analyze data

Credits: 2 (36 hours)

Eligibility: Any aspirant with Computer Knowledge

Certification Criteria: 70%

Mode of Delivery: Online

Course Contents

Module 1:

Introduction to MS Excel - MS Excel Options – Ribbon - Sheets - Saving Excel File as PDF, CSV and Older versions - Using Excel Shortcuts - Copy, Cut, Paste, Hide, Unhide, and Link the Data in Rows, Columns and Sheet - Using Paste Special Options - Formatting Cells, Rows, Columns and Sheets - Protecting & Unprotecting Cells, Rows, Columns and Sheets with or without Password - Page Layout and Printer Properties

Module 2:

Functions: - Logical Functions - Date and Time Functions - Information Functions -Math and Trigonometry Functions - Statistical Functions - Text Functions - Charts:- Simple Bar Chart – Multiple Bar Chart – Pie Chart – Donut Chart - Line Chart – Histogram – Scatter Plot - Radar

Chart – Bubble Chart

Module 3:

Vlookup, Hlookup, Index, Address, Match, Offset, Transpose - Conditional Formatting - Data Sorting and Filtering - Pivot Tables - Chart Templates – Adding Add-Ins in Excel

Module 4:

VBA Macro - Introduction to VBA Macro -Recording Macro & Understanding Code Behind - Editing, Writing VBA Code and Saving as Macro

References:

1. Wallace Wang, "Microsoft Office 2019 For Dummies", Wiley

2. M L Humphrey," Excel 2019 Formulas & Functions: 3 (Excel Essentials 2019)"

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