

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE
UG DEPARTMENT OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION

UNDER CBCS PATTERN GUIDED BY UNIVERSITY AND TANSCH
(FOR THE STUDENTS ADMITTED FROM THE 2020-2023 BATCH)

OUTCOME BASED EDUCATION (OBE)

Employability(EM) / Entrepreneurship(EN) / Skill Development(SD)

Part	Subject Code	Subject	Ins.Hours Per Week	Exam				Credit
				Hours	CIA	ESE	Total	
SEMESTER I								
I	20 UTL 101	TAMIL - I	6	3	30	70	100	3
	20 UHN 101	HINDI - I						
II	20 UEN 101	ENGLISH - I	6	3	30	70	100	3
III	20 UBC 101	CORE I: PROGRAMMING IN C	4	3	30	70	100	4
	20 UBC 102	CORE II: DIGITAL COMPUTER FUNDAMENTALS	4	3	30	70	100	4
	20 UBC 1A1	ALLIED I: MATHEMATICS I - COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS	4	3	30	70	100	4
	20 UBC 103	LAB - I : PROGRAMMING IN C	4	3	20	30	50	2
IV	20 UHR 101	HUMAN RIGHTS	1	2	-	50	50	2
	20 HEC 101	HUMAN EXCELLENCE-PERSONAL VALUES & SKY YOGA PRACTICE-I	1	2	25	25	50	1
V	Extension Activity - List Attached - Annexure I		-					
TOTAL			30	-	195	455	650	23
SEMESTER II								
I	20 UTL 202	TAMIL - II	6	3	30	70	100	3
	20 UHN 202	HINDI - II						
II	20 UEN 202	ENGLISH - II	5	3	30	70	100	3
III	20 UBC 204	CORE III: OBJECT ORIENTED PROGRAMMING WITH 'C++'	4	3	30	70	100	4
	20 UBC 205	CORE IV: DATA STRUCTURES	4	3	30	70	100	4
	20 UBC 2A2	ALLIED II: MATHEMATICS II - MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS	4	3	30	70	100	4
	20 UBC 206	LAB - II : PROGRAMMING IN C++	4	3	20	30	50	2
IV	20 EVS 201	ENVIRONMENTAL STUDIES	2	2	-	50	50	2
	20 HEC 202	HUMAN EXCELLENCE - FAMILY VALUES & SKY YOGA PRACTICE - II	1	2	25	25	50	1
V	Extension Activity - List Attached - Annexure I		-					
TOTAL			30	-	195	455	650	23

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 101	Title	Batch:	2020-2023
Hrs/Week:	4	PROGRAMMING IN C	Semester	I
			Credits	04

Course Objective

To understand the basic concepts of programming language and develop well-structured programs using 'C' language. To develop programming skills in order to meet the day to day IT demands.

Course Outcomes (CO)

K1	CO1	To recollect the structured programming concepts.
K2	CO2	To understand the branching statements and looping statements.
K3	CO3	To apply programming concepts such as Arrays, Functions, Structures, Pointers, etc.
K4	CO4	To analyze the File concepts and usage of storing the data in files.

Units	Content	Hrs
Unit I	Overview of C-Introduction-Importance of C-Basic Structure of C Program- Character Set- Tokens-Keywords and Identifiers-Constants-Variables - Data Types-Declaration of Variables-Assigning Values to Variables-Defining Symbolic Constants-Operations & Expressions-Arithmetic Operators-Relational – Logical- Assignment- Increment & Decrement- Conditional Operator-Bitwise and Special Operator-Arithmetic Expressions-Evaluation of Expressions-Precedence of Arithmetic Operators-Type Conversions in Expressions-Operator Precedence and Associativity- Mathematical Functions.	10
Unit II	Managing I/O operations-Reading a character-Writing a Character-Formatted Input-Formatted Output-Decision Making and Branching- Decision Making with IF Statement-Simple IF Statement-IF...ELSE-Nesting of IF...ELSE Statements-ELSE...IF LADDER-	10

	Switch Statement-?:- GOTO Statement-Decision Making and Looping- WHILE Statement-DO Statement-FOR Statement-JUMP IN LOOPS.	
Unit III	Arrays-One Dimensional Array-Two Dimensional Arrays- Initializing Two Dimensional Arrays-Multi Dimensional Arrays- Handling of Character Strings-Declaring and Initializing String Variables- Reading Strings from terminal-Writing Strings to Screen- Arithmetic Operations on Characters-Putting Strings Together- Comparison of Two strings-String Handling Functions-Table of Strings- User Defined Functions- Need for User Defined Functions-Form of C Functions- Return Values and their Types-Calling a Function-Category of Functions-No Arguments and No Return Types-Argument but No Return Types-Arguments with Return Values-Handling of Non-Integer- Functions- Nesting of Functions-Recursion-Function with Arrays- <i>Scope and Life Time of Variables in Functions.</i>	12
Unit IV	Structures and Unions-Structure Definition-Giving Values to members-Structure Initialization- Comparison of Structure Variables- Arrays of Structures-Arrays with Structures - Structures and Functions- Unions-Size of Structures-Bitwise Fields-Pointers-Understanding Pointers-Accessing the Address of Variables-Declaring and Initializing Pointers-Increments and Scale Factor-Pointer and Arrays-Pointer and Character Strings- Pointers and Functions- Pointers and Structures- Points on Pointers.	10
Unit V	File Management in C-Defining and Opening a File-Closing a File-I/O Operation on Files-Error Handling during I/O Operations- Random Access Files-File Inclusion- <i>Compiler Control Directives.</i>	10
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

1. E.Balagurusamy, *Programming in ANSI C*, Tata McGraw-Hill publications, Fourth Edition, 2007(Unit 1 to 5).

Books for Reference

1. Yashavant Kanetkar, *Let Us C*, BPB Publications, 3rd Edition, 1999
2. Yashavant Kanetkar, *Test Your C Skills*, BPB Publications, First Indian Edition, 1997.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	M	M
CO3	H	H	H	M	H
CO4	H	H	H	L	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 102	Title	Batch:	2020-2023
Hrs/Week:	4	DIGITAL COMPUTER FUNDAMENTALS	Semester	I
			Credits	04

Course Objective

To provide a comprehensive introduction to digital logic design leading to the ability to understand number system representations and Boolean algebra, combinational logic and IO devices.

Course Outcomes (CO)

K1	CO1	To recollect the knowledge about binary number system, Boolean algebra and binary codes.
K2	CO2	To get the idea about combinational systems composed of standard combinational modules, such as multiplexers, flip-flops, demultiplexers and decoders.
K3	CO3	To analyze and design sequential systems composed of standard sequential modules, such as counters and registers.
K4	CO4	To review the various Input and Output devices such as printers, keyboards, mouse, etc.

Units	Content	Hrs
Unit I	Flowchart and Number Systems: Logic and Flowcharting - Flowcharting-Flowcharting Symbols-Program Specification Analysis - Program Specification - Introduction- Input-Output - Throughput. Number system – Digital Computers and Digital Systems – Binary Numbers – Number Based Conversions – Octal and Hexadecimal Numbers – Complements – Binary Codes.	10
Unit II	Boolean Algebra: Boolean Algebra and Logic Gates-Basic Definition – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Other Logic Operations – Digital Logic Gates – IC Digital Logic Families – Semiconductor Memory – Bipolar MDS – ROM – RAM – PROM –	10

	EPROM.	
Unit III	Combinational Logic: Introduction – Adders – Full Adder – Half Adder- Subtractor – Half Subtractor - Full Subtractor – Multilevel NAND circuits – Multilevel NOR Circuits – Binary Parallel Adder – Decimal Adder – <i>BCD Adder</i> – Decoders – Encoder – Multiplexers – De Multiplexers.	12
Unit IV	Introduction – Flip Flops – Triggers of Flip Flops – Flip Flops Excitation Table – Design Procedure – Design Counters – Registers, Counters and Memory Unit. Registers – Shift Registers – Ripple Counters – Synchronous Counters – Timing Sequence.	10
Unit V	Input-Output Devices: Punched Tape, Tape Readers – Punched Cards – Card Readers – Alphanumeric Codes – Character Recognition – MICR – OCR –Output Equipment - Printers – CRT Output Devices – Output Offline Operation – Error Detecting and Error Correcting Codes – Keyboards – Terminals – Floppy Disks – Magnetic tape – <i>Tape Cassettes & Cartridges</i> .	10
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

1. M.Morris Mano – *Digital Logic and Computer Design* – Prentice Hall Of India, 1998.
(1 to 4).
2. Thomas C.Bartee- *Digital Computer Fundamentals*, Tata McGraw-Hill, Sixth Edition, 1991
3. J. Maynard, *Computer Programming*, International Edition (Unit 5).

Books for Reference

1. Donald P Leach, Albert Paul Malvino, Goutam Saha, *Digital Principles and Applications*, Tata McGraw-Hill, Sixth Edition, 2006

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	H
CO2	M	H	H	M	H
CO3	M	H	H	L	H
CO4	H	H	H	M	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Mr.K.SRINIVASAN	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20UBC103	Title	Batch:	2020-2023
Hrs/Week:	4	Lab-I: Programming in C	Semester	I
			Credits	02

Course Objective

To understand the programming logic and problem solving methods using 'C' Programming.

Course Outcomes (CO)

K3	CO1	To remember the Programming concepts using branching statements and looping statements.
K4	CO2	To get the idea about Arrays, Functions, Structures, Pointers, etc.
K5	CO3	To verify the files created using C.

1. Write a C program to check to whether the given number is Armstrong number or not.
2. Write a C program to find whether the given number is prime or not.
3. Write a C program to check the greatest among three numbers using the conditional operator.
4. Write a C program to generate the Fibonacci series for the given number.
5. Write a C program to find the addition of matrix.
6. Write a C program to find the matrix multiplication of the given number.
7. Write a c program to display the transpose of a Matrix.
8. Write a C program to find the given string is palindrome or not.
9. Write a C program to count the number of words, characters and lines in a given text.
10. Write a C program using types of functions for the arithmetic operations.
11. Write a C program to calculate the factorial value for the given number using recursion.
12. Write a C program to process a student detail using structures.
13. Write a C program to add the arrays using pointers.
14. Write a C program to create a student file with reg no, name, mark1, mark2.

15. Write a C program to create and process an employee file.

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	L	M
CO3	H	H	H	L	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 1A1	Title	Batch:	2020-2023
Hrs/Week:	4	Mathematics-I: Computer Oriented Numerical and Statistical Methods	Semester	I
			Credits	04

Course Objective

To develop appropriate Numerical Methods to solve differential equations and to provide and understand on statistical methods. To make inferences about the population based on information we get from sample taken from the population.

Course Outcomes (CO)

K1	CO1	To recollect the samples accuracy, locate and use good mathematical software.
K2	CO2	To understand the number representation errors and convergence properties.
K3	CO3	To apply numerical methods as the basis of procedural language such as C, C++ and JAVA.
K4	CO4	To analyze the influence of data representation and computer architecture on algorithm choice and development.

Units	Content	Hrs
Unit I	Introduction - Bisection Method – Method of Successive Approximations or the Iteration Method- Method of False Position- Newton Raphson Method –Horner’s Method	10
Unit II	System of Linear Algebraic Equations- Gauss Elimination - Inverse of Matrix using Gauss Elimination- Gauss Jordan – Triangularization-Gauss Jacobi and Gauss Seidal Method	11
Unit III	Interpolation and Approximation – Newton, Lagrange’s Method - Numerical Differentiation and Integration- Method’s Based on Interpolation- Trapezoidal Rule- <i>Simpson’s 1/3 and 3/8th rule.</i>	10

Unit IV	Correlation Analysis-Meaning-Types-Degrees of Correlating-Scatter Diagram-Correlation Graph-Karl Pearson's Coefficient of Correlation- Rank Correlation- Coefficient of Concurrent Deviations-Methods of Least Squares.	11
Unit V	Regression Analysis-Meaning- Types of Regression –Regression Equations-Regression Equations from Mean-Regression Coefficients-Properties of Regression Coefficients-Correlation and Regression, a Comparison.	10
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

1. P.Kandasamy, K.Thilagavathy, K.Gunavathi, Numerical Methods, S.Chand & Company Ltd, First Edition 1999 (Unit 1,2,3).
2. S.P Gupta, *Statistical Methods*, Sultana Chand & Sons, Thirty-Fourth Edition, 2004 (Unit 4,5).

Books for Reference

1. Mark L.Crossley, The Desk Reference of Statistical Quality Methods, American Society for Quality, Quality Press, Second Edition 2008.
2. Rao V.Dukkipati, Numerical Methods, New Age International, First Edition, 2010.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	M	L
CO2	M	L	M	M	L

CO3	H	H	H	M	H
CO4	H	H	H	M	H

igh; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 204	Title	Batch:	2020-2023
Hrs/Week:	4	OBJECT ORIENTED PROGRAMMING WITH C++	Semester	II
			Credits	04

Course Objective

To understand the object oriented concepts and to develop well-structured object oriented programming using C++ language. To train to meet the day – to –day demands of IT industry.

Course Outcomes (CO)

K1	CO1	To recollect the Object Oriented Programming concepts.
K2	CO2	To understand the usage of various significant operators.
K3	CO3	To apply programming concepts such as Functions, Classes and Objects along with overloading concepts.
K4	CO4	To analyze the File concepts and in usage of storing the data in files.

Units	Content	Hrs
Unit I	Procedure Oriented Programming-Object Oriented Programming Paradigm-Basic Concepts of Object -Oriented Programming-Benefits of OOP-Object Oriented Languages-Applications of OOP-Steps in Object Oriented Analysis- Steps in Object Oriented Design.	10
Unit II	Tokens-Keywods-Identifiers and Constants-Data Types-Reference Variables-Operators in C++-Scope Resolution Operator-Member Dereferencing Operator-Memory Management Operators-Manipulators-Type Cast Operators-Expression and their Types-Control Structures.	10

Unit III	Functions: Function Prototype-Call By Reference-Return By Reference-Inline Functions-Default and Constant Arguments- Function Overloading -Friend and Virtual Functions- <i>Classes and Objects</i> - Constructors and Destructors.	12
Unit IV	Operator Overloading- Inheritance -Pointers-Virtual Functions and Polymorphism.	10
Unit V	Managing Console Input / Output operations: C++ Streams- C++ Stream Classes -Formatted and Unformatted I/O Operations-Managing Output Manipulations- <i>Working Files</i> .	10
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

2. E.Balagurusamy, *Object Oriented Programming with C++*, Tata McGrawHill Publications Ltd, Second Edition, 1999(Unit 1 to 5).

Books for Reference

1. C.Ravichandran, *Programming in C++*, Tata McGraw Hill Publications, Fourteenth Edition, 2001.
- 2.K.R Venugopal, Rajkumar Buyya, T Ravishankar, *Mastering C++*, Muhammadali Shaduli Publisher,1997

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	L	M	M
CO3	H	H	H	M	H
CO4	H	H	H	H	H

igh; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 205	Title	Batch:	2020-2023
Hrs/Week:	4	DATA STRUCTURES	Semester	II
			Credits	04

Course Objective

To instill knowledge on computer algorithms thereby enable the students to develop efficient program.

Course Outcomes (CO)

K1	CO1	To use linear and non-linear data structures like stacks, queues , linked list etc.
K2	CO2	To handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
K3	CO3	To solve problems like sorting, searching, insertion and deletion of data
K4	CO4	To learn a number of algorithm design techniques and to analyze the efficiency and the correctness of algorithms.

Units	Content	Hrs
Unit I	Introduction- Linear data structures: Arrays-Representation of Array-Operations of Array- Stacks - Queues . Linked Lists-Types of Linked Lists-Linked List Operations- Linked Stacks and Queues.	10
Unit II	Trees - Definitions and Concepts- Binary Trees – Representations-Operations- Traversals: In order-Pre order-Post order- Threaded Binary Trees - Binary Search Trees.	10
Unit III	GRAPHS- Terminology –Representations: Adjacency Matrix - Adjacency Lists - Adjacency Multi lists - Depth First Search-Breadth First Search -Shortest paths Dijkstra algorithm- <i>Minimum spanning Tree</i> - Kruskal's Algorithm & Prim's Algorithm.	12

Unit IV	Basic Steps-Greedy method- The traveling salesperson problem - Knapsack problem- Job Scheduling Problem- Backtracking- Divide and conquer algorithms -The 8 Queen s problem- Sum of subsets.	10
Unit V	Sorting Techniques: Insertion sort – Merge sort – Quick sort – Heap sort. <i>Searching</i> -Searching Techniques: Linear search –Binary Search.	10
Total Contact Hrs		52

- The topics given in **Italics** are noted as Self-Study topics.

Books for Study
1. Elliz Horowitz, Sartaj Sahani, <i>Fundamentals of Data Structures</i> , Galgotia Publishers, 1984 (Unit 1, 2 &3). 2. Elliz Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran, <i>Fundamentals of Computer Algorithms</i> , Galgotia Publishers, 2008 (Unit 4 & 5).

Books for references
1. Seymour Lipschutz, <i>Data Structures</i> , Mc - Graw- Hill, Indian Adapted Edition, 2006. 2. Jean- Paul Trembly, Paul G.Sorenson, <i>An Introduction to data structures with application</i> , Mc - Graw- Hill, Second Edition, 1991.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M
CO2	H	M	L	M	M
CO3	H	H	M	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Mr.K.SRINIVASAN Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 206	Title	Batch:	2020-2023
Hrs/Week:	4	LAB –II: PROGRAMMING IN C++	Semester	II
			Credits	02

Course Objective

To understand the object oriented concepts and problem solving methods using ‘C++’ Programming.

Course Outcomes (CO)

K3	CO1	To remember the Programming concepts using branching statements and looping statements.
K4	CO2	To get the idea about OOPS concepts such as inheritance, overloading, etc
K5	CO3	To verify the files created using C++.

1. Write a C++ Program to calculate simple interest using default arguments.
2. Write a C++ Program to perform arithmetic operations using inline functions.
3. Write a C++ Program to find the greatest of two numbers and three numbers using Friend function.
4. Write a C++ Program to print the Student Details using Single Inheritance.
5. Write a C++ Program to print the Student Details using Multiple Inheritance.
6. Write a C++ Program to print the Student Details using Multilevel Inheritance.
7. Write a C++ Program to print the Student Details using Hybrid Inheritance.
8. Write a C++ Program to calculate the sum of two numbers using Constructors.
9. Write a C++ Program to change the sign value of the inputs by overloaded unary operator.
10. Write a C++ Program to add input values by overloading binary operator.
11. Write a C++ Program to calculate the area using Function Overloading.
12. Write a C++ Program to find the inverse of the given number using formatted I/O operations.
13. Write a C++ Program to perform string operations using unformatted I/O operations.
14. Write a C++ Program to open and close multiple files.
15. Write a C++ Program to arrange the even and odd numbers in separate files using command line arguments.

Assignment, Case Study

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M
CO2	H	H	H	L	M
CO3	H	H	H	L	H

Mapping

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	20 UBC 2A2	Title	Batch:	2020-2023
Hrs/Week:	4	MATHEMATICS – II: MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS	Semester	II
			Credits	04

Course Objective

To recollect the samples accuracy, locate and use good mathematical software.
To understand the number representation errors and convergence properties.
To apply mathematical foundations as the basis of procedural language such as C, C++and JAVA.
To analyze the influence of data representation and computer architecture on algorithm choice and development.

Course Outcomes (CO)

K1	CO1	Be able to construct simple mathematical proofs and possess the ability to verify them.
K2	CO2	Acquire ability to describe computer programs in a formal mathematical manner.
K3	CO3	To prove simple mathematical properties of a variety of discrete structures.
K4	CO4	Be able to specify and manipulate basic mathematical objects such as Sets, functions, and relations and will also be able to verify simple mathematical properties.

Units	Content	Hrs
Unit I	Set Theory: Introduction - SET - Finite Set-Cardinality - SubSet-Equal Sets - Null Set (or) Empty Set- Singleton Set - Universal Set – Union –Intersection - Disjoint Sets - Difference Set - Complement Set - Power Set - Principle of Inclusion and Exclusion - Ordered Pair - Cartesian Products -Partition of Set - Min Sets - Max Set.	10

Unit II	Functions: Introduction - Types of Functions - Classification of functions - Algebraic function - Transcendental function - Composition of functions(Simple Problems Only)-Identity function - Inverse of a function(Simple Problems Only) - Characteristic function of a Set (Properties only) - Hashing functions . Relations: Binary Relation - Complementary Relation - Inverse Relation-Union and Intersection of two relations - Symmetric Relation - Anti-Symmetric Relation - Reflexive Relation - Transitive Relation-Equivalence Relation(Simple Problems only).	9
Unit III	Graph Theory: Graph: Undirected Graph - Directed Graph - Multi Graph - Pseudo Graph - Simple Graph - General Graph - Degree of Vertex - Finite Graph - Order of a Graph - Size of a Graph - Null Graph - Isolated Graph - Regular Graph - Isomorphic Graphs (Simple Problems Only). Matrix Representation of Graphs: Adjacency Matrices - Incidence Matrix - <i>Sub Graph</i> - Euler Graph - Hamiltonian Graph (Simple Problems Only).	11
Unit IV	Matrices: Introduction - Definition - Rank of a Matrix - Elementary Transformations - Solution of a System of linear equations (Simple Problems Only). Eigen values and Eigen Vectors - Singular and Non Singular Matrix –Inverse (or reciprocal) of a Square Matrix – Adjoint of a Square Matrix (Simple Problems Only).	11
Unit V	Discrete Probability : Introduction - Sample space – Event - Exhaustive event - Favorable event - Mutually exclusive events - Equally likely events - Independent events – Probability - Axioms of probability - Extension of general law of addition of probabilities - Conditional property - Multiplication law of Probability - Multiplication law of Probability for independent events - <i>Extension of multiplication law of probability</i> - Total Probability - Baye's theorem (Simple Problems only).	11
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Books for Study	
1. P.Geetha “Discrete Mathematics”, SCITECH PUBLICATIONS (INDIA) PVT. LTD., Chennai 2011 (Unit 1-5). 2. Dr.M.K.Venkataraman, Dr.N.Sridharan, N.Chandrasekaran, “Discrete Mathematics”, National Publishing Company, First Edition - 2000.	
Books for References	
1. 1 Ralph P.Grimaldi, <i>Discrete and Combinatorial Mathematics - An applied introduction</i> , Third Edition, Addison Wesley Publishing Company, 1994. 2. Tremblay J. P and Manohar R, <i>Discrete Mathematical Structures with Applications to Computer Science</i> , Tata McGraw Hill, 2001. 3. A K Sharma , <i>Text Book of Matrix</i> , Discovery Publishing House, 1993.	

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H
CO2	H	M	H	M	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Mr.K.SRINIVASAN	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE
UG DEPARTMENT OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION
UNDER CBCS PATTERN GUIDED BY UNIVERSITY AND TANSCH
(FOR THE STUDENTS ADMITTED FROM THE 2020-2023 BATCH)
OUTCOME BASED EDUCATION (OBE)

Employability(EM) / Entrepreneurship(EN) / Skill Development(SD)

V SEMESTER								
Part	Subject Code	TITLE	Duration in hours per week	Examination				Credits
				HOURS	CIA	ESE	TOTAL	
III	18UBC519	Object Oriented Programming Using Java Language	4	3	25	75	100	4
	18UBC520	Software Testing	4	3	25	75	100	4
	18UBC521	Elective-I	5	3	25	75	100	5
	18UBC522	Elective-II	5	3	25	75	100	5
	18UBC523	Programming Lab - IX: JAVA Programming	5	3	20	30	50	2
	18UBC524	Programming Lab - X: Software Testing	5	3	20	30	50	2
IV	18HEC505	Human Excellence-V: National Values	1	2	25	25	50	1
	18GKL501	Skill Based Subjects: General Awareness	SS	2	--	50	50	2
IV	18UBC5S1/ 18UBC5S2/ 18UBC5S3	Skill Based Elective: Software Analysis and Design E-Commerce Aptitude	1	2	--	50	50	2

VI SEMESTER								
Part	Subject Code	TITLE	Duration in hours per week	Examination				Credits
				HOURS	CIA	ESE	TOTAL	
III	18UBC625	Advanced Java programming	5	3	25	75	100	4
	18UBC626	Elective-III	4	3	25	75	100	3
	18UBC627	Information Security	4	3	25	75	100	3
	18UBC628	Mobile Application Development	5	3	25	75	100	5
	18UBC629	Programming Lab- XI: Advanced Java Programming	5	3	20	30	50	2
	18UBC630	Programming Lab- XII: Mobile Application Development	5	3	20	30	50	2
IV	18HEC606	Human Excellence-VI: Global Values	1	2	25	25	50	1
	18HECP03	Yoga Practical Paper-III	--	2	--	--	--	--
IV	18UBC6S4/ 18UBC6S5/ 18UBC6S6	Skill Based Elective: Software Industry Domains Multimedia and Animation Soft Skills	1	2	--	50	50	2

TOTAL MARKS	3900	140
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ADD-ON COURSE: Mini Project	-	-	20	80	100	2
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V SEMESTER

Elective-I:

Computer Networks

Grid Computing

Elective-II

Organizational behavior

Current Trends and Technologies

VI SEMESTER

Elective-III

Data Mining and Warehousing

Cloud Computing

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 519	Title :	Batch:	2018-2021
Hrs/Week:	4	OBJECT ORIENTED PROGRAMMING USING JAVA LANGUAGE	Semester	V
			Credits	04

Course Objective

To understand the basic concepts and techniques which form the object oriented programming paradigm in JAVA programming.

Course Outcomes (CO)

K1	CO1	To remember the structure and model of the Java Programming Language.
K2	CO2	To understand the usage of Java Programming Language for various programming technologies.
K3	CO3	To implement certain technologies in the Java Programming Language to solve the given problem.
K4	CO4	To evaluate whether the Java Programming Language can meet user requirements.

Units	Content	Hrs
Unit I	Java Evolution – Overview of Java language, Constants, Variables and Data types – Operators and Expressions.	13
Unit II	Decision Making and Branching – Decision Making and Looping – Classes, Objects and Methods – Arrays, Strings and Vectors.	13
Unit III	Interfaces – Multiple Inheritance – Packages: Putting Classes Together- <i>Introduction to Utility Packages</i> – Java Collections – Overview of Interfaces – Overview of classes - Multi-Thread Programming.	13
Unit IV	Managing Errors and Exceptions – Applets Programming – Graphics Programming – The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons.	13

Unit V	Managing Input /Output Files in Java – Concepts of Streams – Stream Classes – Byte Stream Classes – Stream Classes – Character Stream Classes – Useful I/O Classes – Characters – Reading / Writing Bytes – Handling Primitive Data Types – Concatenating and Buffering Files – <i>Random Access Files</i> .	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. E.Balagurusamy, <i>Programming With Java</i> , Tata McGraw Hill , Second Edition, 2005(Unit 1 to 5).
Books for Reference
1. ISRD Group, <i>Introduction to Object Oriented Programming through Java</i> , Tata Mc-GrawHill Publishing Company Limited, 2007.
2. Patrick Naughton Herbert Schildt Java2, <i>The Complete Reference</i> , Tata Mc- Graw Hill, 1999.
3. John R. Hubbard, <i>Schaum's Outline of Programming with Java</i> .

Mapping

PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO					
CO1	M	S	H	H	M
CO2	S	H	H	M	H
CO3	S	S	H	S	S
CO4	H	H	S	S	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 520	Title:	Batch:	2018-2021
Hrs/Week:	4	SOFTWARE TESTING	Semester	V
			Credits	04

Course Objective

To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies and methods. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects using Win Runner tool.

Course Outcomes (CO)

K1	CO1	To keep in mind the fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
K2	CO2	To understand how to plan a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report and how to write software testing documents.
K3	CO3	To execute software testing automation problems and solutions.
K4	CO4	To analyze the techniques and skills on how to use modern software testing tools to support software testing projects.

Units	Content	Hrs
Unit I	Software Quality Assurance (SQA), Quality Control (QC), Comparison between QA & QC. Introduction to Testing, Black Box Testing: Equivalence Partitioning- Boundary Value Analysis- Error Guessing- White Box Testing: Statement Coverage-Decision Coverage-Path Coverage- Test Case- Levels of Testing: Unit Testing-Integration Testing- Sub System Testing-System Testing-Acceptance Testing.	10

Unit II	Software Testing Life Cycle-Special Types of Testing: Documentation Testing- Smoke Testing- Sanitary Testing- Compatibility Testing- Usability Testing- Configuration Testing- Disaster Testing- Interoperability Testing- Acceptance Testing- Load Testing-Stress Testing- Recovery Testing-Regression Testing- Security Testing, Client/Server Testing - Web Testing- Performance Testing.	10
Unit III	Test Plan - Phases of Test Plan- <i>Hierarchy of Test Plan</i> - Hierarchy of Test Document-Test Plan Process-Components of a Test Plan.- Verification and Validation - Audits-Reviews- Software Metrics- Process Metrics- Project Metrics-Product Metrics- Testing Metrics.	10
Unit IV	Introduction to Automation Test Tools- Automation Process -Features of Automation Tools: Record and Playback- Integration- Environment Support- Database Test- Data Function- Object Mapping-Image Testing- Object Name-Map-Object Identity Tool- Test/Error Recover-Web Testing- Extensible Language- Mercury Interactive- Quality Standards	10
Unit V	Introduction to WINRUNNER- Two Models for Recording Test : Context Sensitive- Analog Model- Six Main Stages of Testing Process in Win runner - Starting Win runner- Main Win runner-Window- Text Window-User Tool Bar- Executing Commands using Soft Keys- Understanding GUI Map- Viewing GUI Object Properties-Saving the GUI Map.	12
Total Contact Hrs		52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

- | |
|--|
| 1. Course Material prepared by the Department of Computer Science based on the above web references (Unit 1 to 5). |
|--|

Books for Reference

1. Srinivasan Desikan & Gopalswamy Ramesh, Software Testing, Pearson Edition, 2007.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	H
CO2	S	S	H	S	M
CO3	H	S	S	H	H
CO4	S	S	H	H	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 521	Title	Batch:	2018-2021
Hrs/Week:	5	COMPUTER NETWORKS	Semester	V
			Credits	05

Course Objective

To be familiar with the basics of data communication, various types of computer networks, experience in designing communication protocols.

Course Outcomes (CO)

K1	CO1	To remember, use and implement Computer Networks and the basic components of a Network system.
K2	CO2	To understand the layers of OSI and TCP and get knowledge about congestion control and network security.
K3	CO3	To apply pieces of hardware and software to make networks more efficient, faster, more secure, easier to use, able to transmit several simultaneous messages, and able to interconnect with other networks.
K4	CO4	To analyze packet switching networks, evaluate shortest path routing and traffic management at packet level, flow level and flow aggregate level.

Units	Content	Hrs
Unit I	Introduction: Uses of Computer Network- Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. Reference Models: OSI Reference Model – TCP/IP reference Model	13
Unit II	Physical Layer - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared	13

	and Millimeter Waves – Light Waves. Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites – Satellites versus Fiber. Data-Link Layer: Error Detection and correction – Elementary Data-link Protocols – Sliding Window Protocols.	
Unit III	Medium-Access Control Sub Layer: Multiple Access Protocols – Ethernet – Wireless LANs - Broadband Wireless – Bluetooth. Network Layer: Routing algorithms – Congestion Control Algorithms. Transport Layer: Elements of Transport Protocols – Internet Transport Protocols: TCP.	13
Unit IV	Session Layer: Session and Transport Interaction – Synchronization Points – Session Protocol Data Unit. Presentation Layer: Translation – Encryption/Decryption – Authentication – Data Compression.	13
Unit V	Application Layer: DNS – E-mail. NETWORK SECURITY: Cryptography –Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Andrew S. Tanenbaum, “ <i>Computer Networks</i> ”, 4th edition Reprint 2003, PHI. (Unit -1, 2, 3, 5) 2. Behrouz A.Forouzan, “ <i>Data Communication And Networking</i> ”, 2 nd Edition Update, Genuine Tata Mcgraw – Hill Edition. (Unit – 4)
Books for Reference
1. Achyut Godbole, “ <i>Data Communication And Networks</i> ” , 2007, TMH. 2. Uyless Black, “ <i>Computer Networks Protocols, Standards, And Interfaces</i> ” , 2 nd Edition.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H
CO2	H	H	S	M	H
CO3	H	M	H	M	M
CO4	H	M	S	M	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 522	Title	Batch:	2018-2021
Hrs/Week:	5	CURRENT TRENDS AND TECHNOLOGIES	Semester	V
			Credits	05

Course Objective

To study and apply IT applications with a wide range of concepts and technical skills in the areas to succeed in the future.

Course Outcomes (CO)

K1	CO1	To implement Data and Knowledge Management and use of Devices in IoT Technology.
K2	CO2	To analyze the terminology used by SAP ABAP, knowledge of big data and its technologies in Big Data Analytics.

K3	CO3	To keep in mind of Cyber Security Policy and Security Evolution.
K4	CO4	To get the idea to apply a Objectives and Guidance of Cyber security.

- The topics given in **Italics** are noted as Self-Study topics.

Units	Content	Hrs
Unit I	IOT ARCHITECTURE: History of IOT- <i>Machine to machine- Web of things</i>- IOT protocols APPLICATIONS: Remote monitoring and sensing- Remote controlling - Performance analysis - The layering concepts - IOT communication pattern- IOT protocol Architecture- The 6LoWPAN- Security aspect in IOT.	13
Unit II	SAP: SAP System Overview: SAP System Architecture-Environment for Programs-First look at the ABAP Workbench. DATA DICTIONARY: Introduction-Creating a table- Technical settings-Entering records into a table-Viewing the data in a table.	13
Unit III	BIG DATA NOW: Introduction - <i>Evolving tools and techniques-Data Analysis</i>-Big data and advertising-Tightly integrated engines streamline big data analysis -Data scientists tackle the analytic lifecycle-Pattern Detection and Twitter's Streaming API.	13
Unit IV	CYBER SECURITY: Introduction - What is Cyber Security? - What is Cyber Security Policy – Domain of Cyber Security Policy- Laws & Regulations – Enterprise Policy – Technology Operations – Technology Configurations – Cyber Security Evolution – Productivity - Internet – E Commerce – Counter Measures Challenges.	12
Unit V	CYBER SECURITY OBJECTIVES AND GUIDANCE: Cyber Security Metrics – Security Management Goals – counting Vulnerabilities – Security Frameworks - E-Commerce System- Industrial Control system - Personal Mobile Device – Security policy Objectives Guidance for Decision Markers – Tone at the Top – Policy as a project – Cyber Security Management –Arriving at Goals – Cyber Security Documentation – The catalog Approach – Catalog Format – Cyber Security Policy.	14
Total Contact Hrs		65

Seminar, Assignment, Case Study

Books for Study

1. Rajiv Ramnath, Roger Crawfis, and paolo sivilotti, Android SDK3 for Dummies, Wiley2011 (Unit 1).
2. BEGINNER’S GUIDE TO SAP ABAP- Peter Moxon, Sapprouk Limited 2012 (Unit 2).
3. Big Data Now 2013 Edition- O’Reilly Media, Inc. (Unit 3).
4. Jennifer L. Bayuk, J. Healey, P.Rohmeyer , Marcus Sachs , Jeffery Schmit , Joseph Weiss
“Cyber Security Policy Guidebook” John Wiley & Sons 2012. (Unit 4 & 5)

Books for Reference

1. Brain fling, Mobile Design and Development O’Reily media, 2009
2. Maximiliano Firtman, Programming the Mobile Web, O’Reily Media 2010

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	H	M	H	M	M
CO3	H	M	H	M	H
CO4	S	H	M	M	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE

Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Skill Development(SD) 100%

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 523	Title	Batch:	2018-2021
Hrs/Week:	5	PROGRAMMING LAB -IX: JAVA PROGRAMMING	Semester	V
			Credits	02

Course Objective

To provide students with the ability to write programs in Java and apply concepts described in the Object-Oriented Programming course.

Course Outcomes (CO)

K3	CO1	To recollect object-oriented concepts.
K4	CO2	To understand the usage of Java Programming Language for various programming technologies.
K5	CO3	To decide frontend and backend of an application

1. Write a java program to check the Armstrong number
2. Write a java program to generate Fibonacci series
3. Write a java program to print the Floyd's triangle using for loops.
4. Write a program in java using multiple catch statements.
5. Write a program in java for method overloading to draw circle, triangle, rectangle..
6. Write a java program to sort the given numbers in ascending order.
7. Write a java program to find the prime numbers between 1 to 200.

8. Write a program in java for method overriding.
9. Write a program in java to sort the strings in alphabetical order.
10. Write a java program for employee details using single inheritance concept.
11. Write a java program to check the given string is palindrome or not.
12. Write a program to find the roots of a quadratic equation.
13. Write a java program for multithreading concept.
14. Write a program in java to read and write using random access file.
15. Write a java program to draw lines and rectangles using applets
16. Write a java program to draw ellipses and circles using applets
17. Write a program in java for method overriding.
18. Write a program in java to copy bytes from one file to another.
19. Write a program in java to copy characters from one file to another.
20. Write a program in Java using the concept of interface.
21. Write a program in java to multiply two matrices.
22. Write a program to add two numbers using applets

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	M	M
CO2	S	H	H	M	M
CO3	S	S	S	H	S

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE

Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Employability (EM) - 100% & Skill Development (SD) - 100%

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 524	Title :	Batch:	2018-2021
Hrs/Week:	5	PROGRAMMING LAB –X : SOFTWARE TESTING	Semester	V
			Credits	02

Course Objective

To learn strengths and weaknesses of variety of software testing techniques by implementing practically. To learn how to write test cases in programming languages and to practice different testing methodologies.

Course Outcomes (CO)

K3	CO1	To remember the fundamental concepts in software testing
K4	CO2	To understand the current state-of-the-art in software testing.
K5	CO3	To validate software testing automation

1. To perform some basic operation using calculator in context sensitive mode.
2. To perform some basic operation in paint using Win Runner Analog Mode.
3. To create a GUI checkpoint for single Property using Win Runner.
4. To create a GUI checkpoint for object property using Win Runner.
5. To create a GUI checkpoint for multiple object using Win Runner.
6. To work with the BITMAP checkpoint for object/window property using Win Runner.
7. To check the database checkpoint for default check using Win Runner.
8. To check the database checkpoint for custom check using Win Runner.
9. To create a GUI-SPY using Win Runner.

10. To perform an operation in data driver wizard using Win Runner.
11. To develop a test script to test addition of two numbers in VB using GUI checkpoint.
12. To develop a test script for testing calculator using GUI checkpoint.
13. To develop a test script for testing Flight Reservation using GUI checkpoint.
14. To develop a test script to test the Timer control application and adding GUI checkpoint.
15. To develop a test script for List box application developed in VB.
16. To develop a test script for student details using GUI in database checkpoint.
17. To develop a test script for testing Railway Reservation using synchronization point.
18. To develop a test script for testing bank details application developed in VB using insert function.
19. To develop a test script for testing Hotel Management application using insert function and data driver Wizard.
20. To work with insert function for object window in Win Runner.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	H	M
CO2	S	H	S	S	M
CO3	S	H	S	H	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 5S2	Title	Batch:	2018-2021
Hrs/Week:	1	E-COMMERCE	Semester	V
			Credits	02

Course Objective

To understand the interest and opportunity of e-commerce to plan and how to manage e-commerce solutions to apply processes of e-commerce and to analyze and understand the human, technological and business environment associated with e-commerce, how to use technologies to build e-commerce websites.

Course Outcomes (CO)

K1	CO1	To keep in mind of the foundations and importance of E-commerce.
K2	CO2	To understand the electronic payment system for e-commerce and its security issues.
K3	CO3	To apply the concept of electronic data interchange and its legal, social and technical aspects.
K4	CO4	To analyze the security issues over the web, the available solutions and future aspects of e-commerce security.

Units	Content	Hrs
Unit I	Introduction to E-Commerce -Nature of E-Commerce-Features-Need for E-Commerce-Objectives-Types of E-commerce-Advantages and disadvantages-Framework of E-Commerce.	3
Unit II	E-Commerce and Business-Business Models of E-Commerce-B2B-B2C-B2C-C2B-C2C-B2E-G2B.Business applications of E-Commerce- Mobile Commerce -Applications.	3
Unit III	Electronic Data Interchange-Definitions-Evolution of EDI-Objectives-Advantages-Bottlenecks of EDI-Components of EDI- Electronic Payment Systems .	2
Unit IV	E-Online Banking -Electronic Delivery Channels-ATM-Telebanking-Electronic Money Transfer (EMT)-E-Cheque-E-Banking-Components-Advantages and Limitations of Online Banking.	3

Unit V	Security Issues in E-Commerce-Risks involved- E-Commerce security tools-Biometric-Client Server Network Security-Data and Message Security-Legal and Ethical Issues-Cyber Law-Aims-Salient Provisions.	2
	Total Contact Hrs	13

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. E-Commerce, E-Business-Dr.C.S Rayuda, Himalaya Publishing house, Reprint Editions 2008(Unit 1 to 5).
Books for Reference
1. E-Commerce,Kamalesh, K.Bajaj and Debjani Nag, TATA MC Graw Hill Publications, New Delhi.
2. Marketing and E-Commerce, Roger Leroy Miller, West Thomson Learning Australia

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	H	M	M
CO2	S	M	H	M	H
CO3	M	M	M	L	M
CO4	S	M	M	M	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
Signature:	Signature:	Signature:	Signature:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 5S3	Title	Batch:	2018-2021
Hrs/Week:	1	APTITUDE	Semester	V
			Credits	02

Course Objective

To equip the students to critically evaluate various real life situations and will be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

Course Outcomes (CO)

K1	CO1	To keep in mind the personal career assessment to identify the strong and weak points.
K2	CO2	To understand which type of career will be best suited according to their potential.
K3	CO3	To apply the individual's potential ability to grow with their career.
K4	CO4	To analyze their skills, values likes, dislikes and their innate abilities.

Units	Content	Hrs
Unit I	Number System: Prime numbers- Divisibility of numbers – Factors and multiples – HCF & LCM – Average: Average of different groups – Addition and removal of items and change in average – Profit and Loss: Relation among Cost price, selling price, gain/loss and its percentage.	3
Unit II	Simple and Compound Interest: Fundamentals of Interest & its understanding –Difference between Compound Interest and Simple Interest – Ratio and Proportion: Ratio application problems – proportion application problems – Time and Work: Individual efficiency – Group efficiency – Pipes and cistern.	3
Unit III	Time, Speed and Distance: Average speed – Early - late problem – Relative speed – effective speed - Mensuration & Geometry: Area – Volume - Heights & Distance – Data Interpretation: Table - Bar chart - Pie chart - <i>Line graph</i> .	3

Unit IV	Logical Reasoning: Coding & Decoding – Seating Arrangement – Blood relation – Cubes – Venn diagram – Number series – odd man out – Data sufficiency.	2
Unit V	Verbal Ability: Reading Comprehension – Error spotting – Sentence correction – Para Jumbles – Cloze test – Vocabulary – fill in the blanks.	2
	Total Contact Hrs	13

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Dr.R.S.Aggarwal, <i>Quantitative Aptitude</i> , S.Chand Publication, 20 th Edition, (Unit 1 to 3).
2. Dr.R.S.Aggarwal, <i>A Modern Approach to Verbal and Non- Verbal</i> , Reasoning,S.Chand Publication, Old Edition, (Unit 4 to 5)
Books for Reference
1. Abhijit Guha, ‘Quantitative Aptitude for All Competitive Examinations’, Sixth revised edition

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	H	M
CO2	S	S	S	H	M
CO3	S	S	M	M	H
CO4	H	S	M	S	H

Mapping

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 625	Title	Batch:	2018-2021
Hrs/Week:	5	ADVANCED JAVA PROGRAMMING	Semester	VI
			Credits	04

Course Objective

Develop error-free, well-documented Java programs; test Java servlets while developing Java programs which incorporate advanced graphic functions. Learn how to write, test, and debug advanced-level Object-Oriented programs using Java.

Course Outcomes (CO)

K1	CO1	To keep in mind to implement programs in the Java programming language that makes strong use of classes and objects.
K2	CO2	To understand the concept of Connecting database using JDBC and accessing database.
K3	CO3	To implement the concepts of servlets, JSP & EJB for building enterprise applications.
K4	CO4	To analyze platform independent applications using a variety of component based frameworks.

Units	Content	Hrs
Unit I	A Tour of Swing: JApplet-Icons and Labels-Text Fields-Buttons-The JButton Class-Check Boxes-Radio Button-Combo Boxes-TabbedPane-Scroll Panes-Tree-JMenus.	13
Unit II	Servlet Overview and Architecture: Movement to Server Side Java-What is Java Servlet-Practical Applications for Java Servlet-Java Servlet Alternatives-Reasons to use Java Servlets-Java Servlet Architecture. Servlet Basics: Life cycle of a Servlet- A Basic	13

	Servlet-Basic Servlet Source-Building and Installing the Basic Servlet- The HTML Required to Invoke the Servlet-Dissecting the Basic Servlet.	
Unit III	Servlet chaining: What is Servlet Chains-Invoking a Servlet Chain-Servlet Alias-HTTP Request- A Practical Example using Servlet Chaining Servlets and JDBC : What is JDBC-Two and Three Tier Database Access Models- JDBC Driver Types- <i>JDBC Basics</i> - A Basic JDBC Servlet.	13
Unit IV	JSP : What are JSP-User Defined Java Beans-Implicit Java Beans-Conditions-Directives-Declarations-Implicit Variables-Scriptlets-Expressions.	13
Unit V	EJB: EJB Architecture -Overview of EJB- <i>Software Architecture</i> -View if EJB-Conversation-Building and Deploying EJB's-Roles in EJB.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Herbert Schildt, <i>The Complete Reference</i> , Tata McGraw-Hill, Fifth Edition, 2002 (Unit 1). 2. James Goodwill, <i>Developing Java Servlet</i> , Techmedia, First Edition, 1999 (Unit 2, 3 &4). 3. Tom Valesky, " <i>Enterprise Java Beans</i> ", Pearson Education, 2002 (Unit 5).

Books for Reference
1. James Keogh, Jim Keogh, <i>J2EE: The Complete Reference</i> , McGraw- Hill/Osborne, Seventh Edition, 2002. 2. Bruce W.Perry, <i>Java Servlet and JSP Cookbook</i> , O'Reilly, First Edition, 2004.

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	H	H
CO2	H	M	M	H	H
CO3	H	H	M	M	H
CO4	S	H	M	H	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 626	Title	Batch:	2018-2021
Hrs/Week:	4	DATA MINING AND WAREHOUSING	Semester	VI
			Credits	03

Course Objective

To introduce students the basic applications, concepts and techniques of data mining and to develop skills for applying data mining techniques and algorithms to solve practical problems in variety of disciplines.

Course Outcomes (CO)

K1	CO1	To remember the contribution of data mining to the decision-support level of organizations
K2	CO2	To understand and carefully differentiate between situations for applying different data-mining techniques
K3	CO3	To implement different models used for OLAP and data preprocessing
K4	CO4	To estimate data-mining and data warehousing solutions for different applications

Units	Content	Hrs
Unit I	Introduction to Data Mining: Definition- Kinds of Data- Kinds of Patterns - Technologies used – Major Issues in Data mining – Data mining Applications & Trends – Data objects & Attribute types – Data visualization.	10
Unit II	Data Preprocessing: Data cleaning: Missing values, Noisy data, Data cleaning as a process-Data Integration: Entity Identification problem, Redundancy and correlation analysis, Tuple Duplication, Data value conflict detection & resolution – Overview of Data reduction strategies – Data transformation strategies overview.	10

Unit III	Knowledge Discovery Process: Data Selection -Cleaning-Enrichment-Coding-Data Mining- <i>Preliminary Analysis of Data Set Using Relational Query Tools</i> -Visualization Techniques-Likelihood and Distance-OLAP Tools-K-Nearest Neighbour-Decision Trees-Association Rules-Neural Networks-Genetic Algorithms-Reporting.	10
Unit IV	Setting Up KDD Environment: Introduction-Different forms of Knowledge-Getting Started-Data Selection-Cleaning-Enrichment-Coding-Reporting- 10 Golden Rules .	10
Unit V	Data warehousing: Basic concepts – Modeling – Design and usage – Data warehouse Implementation – Data generalized by Attribute – <i>Oriented Induction</i> .	12
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Data mining concept and Techniques, Jiawei Han, Micheline Kamber, Jian pei, Morgen Kaufmann publishers, 3 rd edition (Unit 1,2 and 5). 2. Peter Andriaans Dolf Zantinge, <i>Data Mining</i> , Addison Wesley Publications, Second Edition, 2000(Unit 3, 4).
Books for Reference
1. Ian H. Witten & Edile Frank, <i>Data Mining- Practical Machine Learning Tools & Techniques</i> , Second Edition, 2005. 2. Daniel T. Larose, <i>Data Mining Methods and Models</i> , John Weiley & Sons, Student Edition, 2006.

Mapping

PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO					

CO1	H	H	M	H	S
CO2	S	H	S	S	H
CO3	S	H	M	S	M
CO4	S	M	S	S	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 627	Title	Batch:	2018-2021
Hrs/Week:	4	INFORMATION SECURITY	Semester	VI
			Credits	3

Course Objective

To select appropriate techniques to tackle and solve problems in the discipline of information security management. To know why security and its management are important for any modern organization.

Course Outcomes (CO)

K1	CO1	To recollect the familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.
K2	CO2	To understand the information assurance as practiced in computer operating systems, distributed systems, networks and representative applications
K3	CO3	To implement the basic understanding of cryptography, how it has evolved, and some key encryption techniques used today
K4	CO4	To analyze the security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.

Units	Content	Hrs
Unit I	Introduction to Computer Security: Basic Concepts – Security Trends – OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms - Threat models - Common Security Goals - Memory protection - Access control – Authorization - Authentication- Enforcement of security - Security Evaluation.	11

Unit II	Cryptography: Cryptographic Protocols - Including Encryption – Message Authentication Goals – DES - Hash Functions - Public-key Cryptography - Secure channels - Cryptographic Protocols and their Integration into Distributed Systems and other applications.	10
Unit III	Network Security: Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats – Countermeasures – Distributed Denial of Service Attacks – Firewalls – Design Principles – Trusted Systems.	10
Unit IV	Software Security: Secure software engineering – Hackers, Crackers, and Attackers – Security Failures – Technical Trends affecting Software Security - Defensive programming and its Techniques - Buffer overruns and other implementation flaws.	10
Unit V	Language-based security: Analysis of code for Security errors - Safe languages and Sandboxing Techniques. Case Studies: Privacy - Mobile code - Digital rights management and copy protection - Trusted devices - Denial of Service and Availability - Network based Attacks - Security and the Law - Electronic Voting .	11
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study	
1. William Stallings, “Cryptography and Network Security”, 4 th Edition, Prentice Hall, 2008 (Unit 1, 2 & 3). 2. Debby Russell and Sr. G.T.Gangemi, “Computer Security Basics (Paperback)”, 2 nd Edition, O’Reilly Media, 2006 (Unit 4). 3. Behrouz A. Forouzan, “Cryptography and Network Security”, Special Indian Edition, Tata Mc-Graw Hill Publications, 2007 (Unit 3, 4 &5)	
Books for Reference	
1. Charles P pfleeger and Shai Lawrence pfleeger, “Security in Computing”, Fourth Edition, Prentice Hall, 2007. 2. Ross J.Anderson and Ross Anderson, “Security Engineering: A Guide to Building Dependable Distributed Systems”, Wiley, 2001. 3. Thomas R. Peltier, Justin Peltier and John Blackley, “Information Security Fundamentals”, 2 nd Edition, Prentice Hall, 1996.	

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	H	M	H	S	H
CO3	M	S	S	M	M
CO4	M	H	H	L	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
Signature:	Signature:	Signature:	Signature:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 628	Title	Batch:	2018-2021
Hrs/Week:	5	MOBILE APPLICATION DEVELOPMENT	Semester	VI
			Credits	05

Course Objective

To introduce students, the basic applications, concepts and techniques of Mobile App development and make the student to design and develop android application.

Course Outcomes (CO)

K1	CO1	To remember about the Android application development tools.
K2	CO2	To understand the Install and configure Android application development
K3	CO3	To implement the design and develop user Interfaces for the Android platform
K4	CO4	To estimate the database connection for android application.

Units	Content	Hrs
Unit I	Getting Started with Android Programming: What is Android?, Obtaining the Required tools, Creating Your First Android Application , Anatomy of an Android Application.	10
Unit II	Activities, Fragments and Internets: Understanding Activities , Linking Activities Using Intents, Calling Built-in Applications Using Intents, Displaying Notifications.	10
Unit III	Getting to know the Android User Interface: Understanding the Components of a screen , Adapting to display Orientation, Managing Changes to Screen Orientation .	10
Unit IV	Designing Your Interface with Views: Using Basic Views , Using Picker Views, Using List Views to Display Long Lists. Data persistence: Saving and Loading User Preferences , Persisting Data to Files, Creating and Using Databases .	10

	Content Providers: Using a Content Provider, Creating Your Own Content Provider , Using the Content Provider.	
Unit V	Messaging: SMS Messaging , Sending E-Mail . Location-Based Services: Displaying Maps , <i>Getting Location Data</i> .	12
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. “Beginning ANDROID 4 Application Development” by Wei-Meng Lee, Wiley Publications, 2015 Edition.
Books for Reference
1. “Android Application Development AA-in-one for Dummies”, by Barry A.Burd, Published on August 2015, 2nd Edition.
2. “Professional Android 2 Application Development”, by Reto mier., 2 nd Edition.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	H	S
CO2	S	H	L	S	M
CO3	H	H	S	M	M
CO4	S	M	S	S	L

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
Signature:	Signature:	Signature:	Signature:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN

Skill Development(SD)- 100%

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 629	Title	Batch:	2018-2021
Hrs/Week:	5	PROGRAMMING LAB –XI: ADVANCED JAVA PROGRAMMING LAB	Semester	VI
			Credits	02

Course Objective

To provide encapsulation for an application's business logic, with a strong foundation in Advanced Java Programming techniques.

Course Outcomes (CO)

K3	CO1	To remember the interactive user interfaces using the Java Swing class and appropriate layout managers.
K4	CO2	To get the idea in exposing advanced topics including multithreading, internet networking, and JDBC database connectivity.
K5	CO3	To identify advance concepts of java programming with database connectivity.

1. Write a program to implement the concept of JTextField.
2. Write a program to implement the concept of JLabel.
3. Write a program to implement the concept of JCheckBox.
4. Write a program to implement the concept of JRadioButton.
5. Write a program to implement the concept of JComboBox.
6. Write a program to implement the concept of JMenu, JMenuBar, JMenuItem.
7. Write a program to implement the concept of JTabbedPane.
8. Write a program to implement the concept of JTree.
9. Write a program to make use of Generic Servlet.
10. Write a program to find the request method that is fetched using Servlet.
11. Write a program to develop simple servlet using Generic servlet.

12. Write a program to display the employee details using servlets.
13. Write a program to illustrate servlet chaining.
14. Write a program to develop simple servlet using HTTP tags.
15. Write a program to develop simple servlet to count the number of times an applet being accessed.
16. Write a program to implement the concept of JDBC-ODBC Connectivity.
17. Write a program to count the number of times an JSP is accessed.
18. Write a program to generate Fibonacci series using JSP.
19. Write a program to create java beans to make use of juggler beans.
20. Write a program to create java beans to make use of molecular beans.
21. Write a program to create java beans to make use of sorter beans.
22. Write a program to implement the concept of simple property.
23. Write an EJB Stateless Program to create bonus of an employee.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	M	M
CO2	H	H	M	M	M
CO3	H	M	M	M	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE

Name:	Name:	Name:	Name:
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Signature:	Signature:	Signature:	Signature:

Employability(EM) – 100% / Entrepreneurship(EN) – 100% / Skill Development(SD) – 100%

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 630	Title	Batch:	2018-2021
Hrs/Week:	5	PROGRAMMING LAB –XII: Mobile Application Development	Semester	VI
			Credits	02

Course Objective

To measure the knowledge of student's about the Android Application tool. Primary emphasis will be on Android development, while students will also learn the basics of developing applications for Smartphone's.

Course Outcomes (CO)

K3	CO1	To keep in mind about basic development of Mobile application.
K4	CO2	To get the idea about how to develop the Android Application.
K5	CO3	To access the database connection using Android.

1. Write a program to implement the Activities on ANDROID
2. Write a program to implement the Intent Filters using ANDROID
3. Write a program to implement the User Interface using ANDROID
4. Write a program to implement the Image views using ANDROID
5. Write a program to implement the location tracking using ANDROID
6. Write a program to store the data in SD Card using ANDROID

7. Write a program to implement the Content Providers using ANDROID
8. Write a program to implement the SMS Messaging using ANDROID
9. Write a program to create a database to store the values using ANDROID
10. Write a program to create a database to store and retrieve the images using ANDROID

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	S
CO2	H	M	H	S	H
CO3	L	S	S	M	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 6S4	Title	Batch:	2018-2021
Hrs/Week:	1	SOFTWARE INDUSTRY DOMAINS	Semester	VI
			Credits	02

Course Objective

To develop software development processes, including the knowledge, skills and professional competencies necessary to begin practice as a software engineer.

Course Outcomes (CO)

K1	CO1	To recollect the usage of computers in Healthcare systems.
K2	CO2	To understand the process of banking & Insurance with computers.
K3	CO3	To apply IT in Telecommunication and Textiles at various levels.
K4	CO4	To analyze a solution to the utility problem using computer softwares.

Units	Content	Hrs
Unit I	Health Care Information Systems : History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support – Security of health care information systems - Organizing information technology services – IT alignment and strategic planning – IT governance and management - Assessing and achieving value in health care information systems - Case study.	3
Unit II	Banking and Insurance : Account Management - Hardware Technology - Customer Accounts – Branch Banking Support – Information Systems Audit – Internet Banking - Electronic Transactions - Web-based Banking. The Uses of Computers in Insurance – Record Keeping - Providing Quotes - Assessing Risk – Underwriting - Life Insurance Applications: Life Administration Module - Policy Servicing of existing policies – New Business - Renewal notice/Billing – Loans - Statistics and MIS Claims - Archiving of historical data and imaging Systems.	3
Unit III	Telecommunication Systems and Technologies : Fundamental of Telecommunications - Digital Signal Processing - Wireless / Wire line Networks - PCS - GSM - working of dial up connection – ISP - ISDN - <i>Web enabled systems, virtual reality, and multimedia applications over Internet.</i> Protocol Engineering: Principles, stages, specification formalisms of telecom protocol design, protocol software development process, and computer aided protocol engineering.	3

Unit IV	Textile Industry: Computers in Textiles – Texture Mapping – Computer Integrated Manufacturing – Order processing, Machinery Planning, Manufacturing – Quality Integration – MIS Reporting – Online monitoring in spinning and weaving – Maintenance and Quality control.	2
Unit V	Energy Utilities: Multi processor system – Real Time tasks- Energy Minimization – Energy aware scheduling- Dynamic Reconfiguration- Adaptive power management- <i>Energy Harvesting Embedded system</i> . Energy Aware Applications: On chip network – Video codec Design – Surveillance camera - Low power mobile storage.	2
	Total Contact Hrs	13

Books for Study

1. Course Material prepared by the Department of Computer Science based on the below web references (Unit 1 to 5).

Websites for Reference

www.inventors.about.com www.economywatch.com
www.modernhealthcare.com www.indiantextilejournal.com
www.atmbanking.net www.apparesearch.com
www.banknetindia.com www.telecoms.org

Mapping

PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO					
CO1	H	H	H	M	H
CO2	M	M	S	S	H
CO3	H	H	M	S	H
CO4	H	H	H	S	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	18 UBC 6S5	Title	Batch:	2018-2021
Hrs/Week:	1	MULTIMEDIA AND ANIMATION	Semester	VI
			Credits	02

Course Objective

To learn the basic elements in basic of drawing, color and implement in the multimedia software and to apply the techniques to design real time pictures.

Course Outcomes (CO)

K1	CO1	To recollect the effects of multimedia in your daily life
K2	CO2	To get the idea about the animation into digital content and multimedia products.
K3	CO3	To execute the animation using computerised animation tools.
K4	CO4	To evaluate projects and presentations utilizing a variety of digital media multimedia technologies.

Units	Content	Hrs
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Unit I	Introduction : MM presentation and production – Characteristics of MM presentation – h/w and s/w requirements- Uses of MM – Steps for creating MM presentation. Text - Types of text – Insertion of text – Text Compression – File formats .	3
Unit II	Image: Image types – Seeing color – Color models – Basic steps for image processing – Scanner– Digital Camera – Specification of Digital Images – Device independent Color Models – Image processing s/w – File formats.	3
Unit III	Audio: Nature of Sound-Fundamental characteristics of sound – Musical Note and Pitch – Elements of Audio systems . What is MIDI – MIDI manufacturers Association (MMA)-MDI Specification-MIDI <i>MESSAGES-MIDI Connections</i> .	3
Unit IV	Video: Introduction- Analog Video Camera – Transmission of video signals – Video signal formats..	2
Unit V	Introduction – Uses of animation – Key frames and Tweening – Types of animation – Creating movement – Principles of animation – <i>Techniques of animation</i> — Animation Software .	2
	Total Contact Hrs	13

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

1.Principles of Multimedia – Ranjan Parekh – Tata McGraw-Hill publishing Company Limited, New Delhi,2007 (Unit 1 to 5).

Books for Reference

1. Multimedia systems design – Prabhat K. Andleigh – Prentice Hall PTR publishing the University of Michigan, 1996.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	H	S
CO2	H	H	M	S	H
CO3	M	S	S	S	L
CO4	S	H	H	H	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE

Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE
UG DEPARTMENT OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION
UNDER CBCS PATTERN GUIDED BY UNIVERSITY AND TANSCH
(FOR THE STUDENTS ADMITTED FROM THE 2020-2023 BATCH)
OUTCOME BASED EDUCATION (OBE)
Employability(EM) / Entrepreneurship(EN) / Skill Development(SD)

Part	Subject Code	Subject	Ins.Hours Per Week	Exam				Credit
				Hours	CIA	ESE	Total	
SEMESTER III								
III	19 UBC 307	CORE V: RDBMS AND VISUAL PROGRAMMING	5	3	25	75	100	4
	19 UBC 308	CORE VI: OPERATING SYSTEMS	5	3	25	75	100	4
	19 UBC 309	CORE VII: ORGANIZATIONAL BEHAVIOUR	4	3	25	75	100	3
	19 UBC 3A3	ALLIED III: ACCOUNTANCY FOR DECISION MAKING	5	3	25	75	100	4
	19 UBC 310	LAB - III :RDBMS AND VISUAL PROGRAMMING	4	3	20	30	50	2
	19 UBC 311	LAB - IV: OS COMMANDS AND SHELL SCRIPT PROGRAMMING	4	3	20	30	50	2
	19 UBC 312	LAB - V: DTP PROGRAMMING	1	2	20	30	50	1
IV	19 HEC 303	HUMAN EXCELLENCE - PROFESSIONAL VALUES & SKY YOGA PRACTICE - III	1	2	25	25	50	1
	19 UBC 3N1/ 19 UBC 3N2	NON- MAJOR ELECTIVE I - WEB DESIGNING LAB / DTP PROGRAMMING LAB	1	2	-	50	50	2
V	Extension Acticity - List Attached - Annexure I		-					
TOTAL			30	-	185	465	650	23
SEMESTER IV								
III	19 UBC 413	CORE VIII: WEB DEVELOPMENT	5	3	25	75	100	4
	19 UBC 414	CORE IX: COMPUTER SYSTEM ARCHITECTURE	5	3	25	75	100	4
	19 UBC 415	CORE X: SOFTWARE ENGINEERING	4	3	25	75	100	3
	19 UBC 4A4	ALLIED IV: MATHEMATICS III - COMPUTER BASED OPTIMIZATION TECHNIQUES	5	3	25	75	100	4
	19 UBC 416	LAB - VI: WEB DEVELOPMENT	4	3	20	30	50	2
	19 UBC 417	LAB - VII: PHP PROGRAMMING	4	3	20	30	50	2
	19 UBC 418	LAB - VIII: SCRIPTING & HTML	1	2	20	30	50	1
IV	19 HEC 404	HUMAN EXCELLENCE - SOCIAL VALUES & SKY YOGA PRACTICE - IV	1	2	25	25	50	1
	19 UBC 4N3/ 19 UBC 4N4	NON-MAJOR ELECTIVE II - OPEN SOURCE SOFTWARE LAB / 2-D ANIMATION LAB	1	2	-	50	50	2
V	Extension Acticity - List Attached - Annexure I		-	-	-	50	50	1
TOTAL			30	-	185	515	700	24

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 307	Title	Batch:	2019-2022
Hrs/Week:	5	RDBMS AND VISUAL PROGRAMMING	Semester	III
			Credits	04

Course Objective

To gain knowledge about the DML, DDL operations and to develop a Database with enhanced models and Techniques and understand about RDBMS, Object oriented Databases and issues.

Course Outcomes (CO)

K1	CO1	To understand the VB Application and IDE.
K2	CO2	To get the idea about Data types, Functions and Procedures.
K3	CO3	To execute more about the Relational database to apply in the database.
K4	CO4	To analyze the SQL Statement and Query to apply in the application program.

Units	Content	Hrs
Unit I	Introduction to Visual Basic Steps in VB Application Integrated Development Environment (IDE) – Menu Bar – Tools Bar – Project Explorer Window Property Window Form Layout Window Code Window Properties , Methods and Events-Event Driven Programming –Working with Forms- Variables – Scope of Variables- Constants – Data Types – Functions – Procedures – Control Structures – Arrays – User Defined Data Types – Operators- String, Date and Time Function.	13
Unit II	Creating and Using Standard Controls - Text Box, Command Button, Check Box, Combo Box, List Box, Option Box, Timer, Frame, Label, Shape &	13

	Line Control, Picture Box, Image Control, Scroll Bar Controls - DB Grids – Dialog Boxes – Control Arrays - Single Document Interface(SDI) – Multiple Document Interface(MDI) – Menus. DAO – RDO-ADO	
Unit III	Introduction- <i>Database System Applications</i> - Database System Versus File Systems- View of Data- Data Models- Entity- Relationship Model : Basic Concepts- Constraints- Keys - Design Issues- ER Diagram Weak Entity Sets- Extended ER Features- Design of an ER Schema to Tables. Relational Model- Structure of Relational Databases- The Relational Algebra- Extended Relational Algebra Operation - Relational Database Design: First Normal Form- Pitfalls in Relational Database Design - Functional Dependencies- Decomposition- Desirable Properties of Decomposition- BCNF- Third Normal Form- Fourth Normal Form- More Normal Forms.	14
Unit IV	ORACLE: Introduction- CODD's Rule - Tools of ORACLE- Introduction to SQL- Benefits of SQL- Data Types- DDL- DML- DCL- TCL- Data Constraints. ORACLE SQL Functions - Single Row Functions- Date, Number, Miscellaneous, Conversion, Character Functions- Group Functions- SQL Operators- Arithmetic, Comparison and Logical Operators- Set Operators- Joins- Sub Queries- Views.	12
Unit V	PL/SQL Introduction- Advantages of PL/SQL- Architecture of PL/SQL- Introduction to PL/SQL Block- Data Types- Control Structure- Concept Of Error Handling - Cursors Procedures Functions- Triggers- Types of Triggers. SQL * Forms - Basic concepts- Components of ORACLE Form- SQL * Forms System Variables- Creating a Form- <i>Generating and Running a Form</i> - Reports.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study

1. Steven Holzner, *Visual Basic 6 programming black book*, Dreamtech Press, First Edition, 2007 (Unit 1 & 2).
2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*, Tata McGraw-Hill, Fourth Edition (Unit 3).
3. Ivan Bayross, *ORACLE- 7 The Complete Reference*, BPB Publications, Revised Edition (Unit 4&5)

Books for Reference

1. C.J. Date, A. Kannan, S. Swamynathan, *An Introduction to Database*, Pearsons Education, Eighth Edition, 2004.
2. Ivan Bayross, *SQL, PL/SQL-The Programming Language of ORACLE*, BPB Publications, Third Revised Edition.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	H	S	H
CO2	H	H	S	S	H
CO3	H	S	H	S	H
CO4	H	M	L	H	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 308	Title	Batch:	2019-2022
Hrs/Week:	5	OPERATING SYSTEMS	Semester	III
			Credits	04

Course Objective

To study and apply concepts relating to operating systems, such as concurrency and control of asynchronous processes, deadlocks, memory management, processor and disk scheduling, parallel processing, and file system organization.

Course Outcomes (CO)

K1	CO1	To remember the Master functions, structures and history of operating systems.
K2	CO2	To understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.
K3	CO3	To deploy, Linux has become sufficiently mainstream that deploying it isn't a mystery.
K4	CO4	To analyze the need for security measures for a Linux environment.

Units	Content	Hrs
Unit I	Introduction to OS – Early History – Hardware: Interrupts and Polling, Buffering, Storage Protection, Online – Offline Operation-Cycle Stealing- Processing-Storage Hierarchy- Reduced Instruction Set Computing (RISC).	13

	Semaphores – Process Synchronization with Semaphores – Counting Semaphores. Storage Management: Real Storage – Storage Organization – Storage Management Storage Hierarchy –Swapping – Virtual Storage – Basic Concepts.	
Unit II	PAGING: Basic Concepts – Segmentation. Dead Lock: Examples – Dead Lock Preventions – Dead Lock Avoidance – Bankers Algorithms Only – Dead Lock Detection – Dead Lock Recovery. Processor Management: Job and Processor Scheduling – Introduction – Scheduling Levels – Scheduling Objectives – Preemptive Vs Non preemptive Scheduling – Priorities – FIFO Scheduling – Round Robin Scheduling – Quantum Size Shortest Job First Scheduling – Shortest Remaining Time Scheduling – Highest Response Ratio Next Scheduling.	13
Unit III	Auxiliary Storage Management: Disk Performance Optimization – Why Disk – Scheduling is Necessary – Desirable Characteristics of Disk Scheduling Policies – Seek Optimization – Disk Caching – RAM Disks. FILE Database System: Introduction – The File System – File System Functions – Blocking and Buffering – File Organization – Allocating and Freeing Space – File Description – Access Control Matrix – Access Control by User Classes – <i>Backup Recovery</i>.	13
Unit IV	Linux: Introduction – File structure of Linux – Directory hierarchy – Environmental variables – file access permissions –utility commands- files – print – login details. VI-editors - three modes. File splitting – pipes and filters – paginating files – head – tail – grep – process termination – timing process.	13
Unit V	Shell Programming: Creation and execution – command line arguments – logical operations – condition statements – System administration – Booting and shutting down – super user status – Disk management – security – user services – mount – unmount- <i>installing and managing printers</i>.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study	
1. H. M. Deitel, <i>Operating Systems</i> , Addison Wesley Publication, Second Edition. (Unit 1, 2 & 3). 2. Sumitabha Das, “Unix system Concepts and applications” Tata McGraw Hill, 1995(Unit 4 & 5).	
Books for Reference	
1. Stewart E. Madnick, John J.Donovan, <i>Operating Systems</i> ,Tata McGraw Hill, Sixth Edition, 2008. 2. Williams Stallings, <i>Operating Systems- Internals and Design Principles</i> , Prentice hall of India, Fifth Edition, 2005. 3. Mark.G.Gobell “Red Hat Linux” – Reference Manual, Pearson Edition, First Edition, 2003.	

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	M	L
CO2	L	M	M	L	L
CO3	M	L	M	H	L
CO4	S	M	S	H	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 309	Title	Batch:	2019-2022
Hrs/Week:	4	ORGANIZATIONAL BEHAVIOUR	Semester	III
			Credits	03

Course Objective

To develop the knowledge in personality, perception, attitudes and motivation and to learn about stress management, communication, leadership, organization structure and organization culture.

Course Outcomes (CO)

K1	CO1	To recollect the Individual Behaviour and its effects.
K2	CO2	To understand the Personality, Perception, Attitudes and Values.
K3	CO3	To apply Learning and Motivation concepts in an Organization.
K4	CO4	To analyze the Organizational Culture and Organizational Structure.

Units	Content	Hrs
Unit I	Introduction: Elements of OB – Nature and Scope of OB - Contributing Disciplines to OB - Foundations of Individual Behaviour: Introduction – The Individual and Individual Differences – Human Behaviour and its Causation – Personality : Concepts – Determinants – Types.	10
Unit II	Perception: Perceptual Process – Factors affecting perception – Improving Perception – Impression management - Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes - Values: Concept of Value – Types of Values – Formation of Values – Values and Behaviour - Job Satisfaction.	10

Unit III	Learning: Meaning and Definition – Determinants of Learning - Learning Principles – Reinforcement – Punishment – Learning and Behaviour - Motivation : Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – <i>Group Behaviour</i> .	12
Unit IV	Organizational Conflicts : Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management - Job Frustration - Stress Management.	10
Unit V	Communication: Nature and Need for Communication – Communication Process –Communication Channel – Communication Networks –Communication Barriers – Effective Communication - Leadership – Organizational Culture: Types – Functions – <i>Team Building</i> .	10
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. S.S Khanka, “ <i>Organizational Behaviour</i> ”, S.Chand & Company Ltd, 2002 (Unit 1 to 5).
Books for Reference
1. John W Newstorm and Keith Davis – “ <i>Organizational Behaviour</i> ” – TMH, 2001.
2. Hugh J Arnold and Daniel C Fieldman – “ <i>Organizational Behaviour</i> ” – MC Graw Hill, 1996.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	L	S
CO2	S	S	L	M	M
CO3	S	S	S	M	H
CO4	H	H	S	S	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	ProgrammeTitle:	Bachelor of Computer Applications	
Course Code:	19UBC3A3	Title	Batch :	2019-2022
		ACCOUNTANCY FOR	Semester	III
Hrs/Week:	05	DECISION MAKING	Credits:	04

Course Objective

To enlighten the students on the basics of Accountancy.

Course Outcomes (CO)

K1	CO1	To recollect the knowledge of accounting theory based on conceptual framework of accounting.
K2	CO2	To enable students to understand the concept of accounting.
K3	CO3	To execute the knowledge going in accounting for decision making.
K4	CO4	To analyze and interpret accounting related transactions in accordance with accounting theory.

Units	Content	Hrs
Unit I	Financial Accounting – Meaning - Definition– Concepts – Conventions – Accounting Cycle – Methods of Book Keeping– Journal – Ledger – Trial Balance .	13
Unit II	Subsidiary Books – Purchase Book and Sales Book – Purchase Returns and Sales Returns Book – Cash Book - Preparation of Final Accounts with Simple Adjustments.	13
Unit III	Cost Accounting – Elements of Cost – Cost Sheet –Stock Valuation – FIFO - LIFO - Simple Average Method .	13
Unit IV	Management Accounting – Meaning - Definition – <i>Objectives of Management Accounting</i> - Budgetary Control – Cash Budget – Flexible Budget.	13
Unit V	Ratio Analysis – Meaning - Significance of Ratio Analysis -Types – Liquidity Ratio – Profitability Ratio – Solvency Ratio.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Group discussion, Seminars and Assignment

Books for Study
1. Shukla. M.C And Grewal. T.S And Gupta. S.L.(2010), Advanced Accountancy, New Delhi, S.Chand & Co.

Books for Reference
1. Jain. S.P and Narang. K.L. ,Cost Accounting (2012), New Delhi, Kalyan Publishers.
2. Sharma. K, Sasi.K.Gupta. (2012), Management Accounting, New Delhi, Kalyani Publishers.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	S	S	M
CO2	H	M	M	M	S
CO3	S	H	H	S	S
CO4	S	H	S	H	S

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 310	Title	Batch:	2019-2022
Hrs/Week:	4	PROGRAMMING LAB –III: RDBMS AND VISUAL PROGRAMMING	Semester	III
			Credits	02

Course Objective

To familiarize with the basic SQL Queries, Functions, Join operations and PL/SQL program in RDBMS with GUI environment.

Course Outcomes (CO)

K3	CO1	To recollect about the oracle queries.
K4	CO2	To understand the simple application program using VB concepts.
K5	CO3	To validate a knowledge to connect VB with oracle database.

1. Write Oracle Queries in Data Definition Language.
2. Write Oracle Queries in Data Manipulation Language.
3. Write Oracle Queries in Transaction Control Language.
4. Write Oracle Queries in Data Control Language.
5. Write Oracle Queries using Data Constraints.
6. Manipulate Single Row Function.
7. Manipulate Function – Group function.
8. Generate Operators in SQL plus.
9. Manipulate SET Operators.
10. Generate View.
11. Generate Join functions.
12. Write PL/SQL to find whether the given number is Even or Odd.

13. Write PL/SQL to find whether the given number is Armstrong or Not.
14. Write PL/SQL to Display ten numbers.
15. Write PL/SQL to reverse of given number.
16. Write PL/SQL to find whether the given number is Prime number or not.
17. Write Oracle Query to Update Trigger.
18. Write PL/SQL to Access Restriction Trigger.
19. Write Oracle Queries to Display Department Name.
20. Develop a VB program to process the Arithmetic Operation.
22. Develop a VB program to generate timer control.
23. Develop a VB program to design a scientific calculator.
24. Develop a VB program for Railway Reservation using menus.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	S	M	L
CO2	H	S	H	H	H
CO3	H	S	S	H	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19UBC 311	Title	Batch:	2019-2022
Hrs/Week:	4	PROGRAMMING LAB –IV: OS –COMMANDS AND SHELL SCRIPT PROGRAMMING	Semester	III
			Credits	02

Course Objective

To familiarize students with the Linux environment, fundamentals of shell scripting/programming with basic linux administration.

Course Outcomes (CO)

K3	CO1	To remember the various UNIX commands on a standard UNIX/LINUX Operating system.
K4	CO2	To get the idea about be able to do shell programming on UNIX OS.
K5	CO3	To verify the files to understand and handle UNIX system calls.

1. Work with utility commands.
2. Work with directory commands.
3. Work with handling file commands.
4. Work with file access commands.
5. Work with pipes and filters.
6. Work with VI editors.
7. Create a program to find simple interest
8. Create a program to find factorial value
9. Create a program to find Fibonacci series.
10. Create a program to find sum of N numbers.

11. Write a program with case condition.
12. Create a program to find divisibility of numbers.
13. Create a program to find greatest of three numbers.
14. Create a program to find Armstrong number.
15. Create a program to find prime or not.
16. Create a program to find reverse the digit.
17. Create a program to find sum of individual digit.
18. Create a program to find odd or even.
19. Create a program to swap any two numbers.
20. Create a program for sorting of N numbers.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	L
CO2	L	S	M	H	M
CO3	L	M	M	M	L

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 312	Title	Batch:	2019-2022
Hrs/Week:	1	PROGRAMMING LAB V: DTP PROGRAMMING	Semester	III
			Credits	01

Course Objective

To provide a deep knowledge in various image processing effects.

Course Outcomes (CO)

K3	CO1	To remember the basic technical tools.
K4	CO2	To get the idea for handling tools and applying various effects.
K5	CO3	To access various formats in this platform for editing.

1. Design the Wedding Invitation using the associated tools in Photoshop.
2. Apply special art effects for the image using various options from the Filter Gallery.
3. Design the Banner.
4. Implement the Usage of different modes in a Single Image.
5. Design the College Profile.
6. Work with different images to implement Sharpen tool and Smudge Tool
7. Design the Calendar.
8. Edit the image using Blur tool.
9. Design the Visiting Card.
- 10 Edit the image using Burn and Sponge tool.
11. Edit the image using Clone tool.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H
CO2	M	M	H	H	H
CO3	H	H	H	M	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 3N1	Title	Batch:	2019-2022
Hrs/Week:	1	NME I: PROGRAMMING LAB –WEB DESIGNING	Semester	III
			Credit	02

Course Objective

To develop the basic concepts of HTML and to equip with the programming skills in implementing and debugging Web based applications.

Course Outcomes (CO)

K3	CO1	To recollect the logic behind advanced Web page applications.
K4	CO2	To understand the HTML and CSS programming.
K5	CO3	To verify the files created in Web applications.

1. Write HTML code to develop a web page for giving details of your name, age, address. It contains the different background and foreground color, with different attributes of Font tags like italic, bold, underline etc. and give suitable heading style
2. Create a Web Page using HREF tag having the attribute ALINK, VLINK etc.
3. Create a Web Page, when user clicks on the link it should go to the bottom of the page.
4. Write a HTML code to create a Web Page of pink color and display moving message in red color.
5. Create a Web Page, showing an ordered list of name of your five friends and unordered list of any five your hobbies.
6. Create a HTML document containing a nested list showing the content page of any book.
7. Write a HTML program to reload the page which contains an image that should reload automatically for every 5 seconds.

8. Create the following table in HTML with Dummy Data.

Name of the train	Place	Destination	Train No	Time Arrival	Departure	Fare

9. Design a form using all input types.

10. Create a simple form for accepting –Name, Register No, and use Submit Button.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	S	S
CO2	H	H	H	H	M
CO3	M	H	H	M	S

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 3N2	Title	Batch:	2019-2022
Hrs/Week:	1	NME I: PROGRAMMING LAB –DTP PROGRAMMING	Semester	III
			Credits	02

Course Objective

To provide a deep knowledge in various image processing effects.

Course Outcomes (CO)

K3	CO1	To remember the basic technical tools.
K4	CO2	To get the idea for handling tools and applying various effects.
K5	CO3	To access various formats in this platform for editing.

1. Design the Wedding Invitation using the associated tools in Photoshop.
2. Apply special art effects for the image using various options from the Filter Gallery.
3. Design the Banner.
4. Implement the Usage of different modes in a Single Image.
5. Design the College Profile.
6. Work with different images to implement Sharpen tool and Smudge Tool
7. Design the Calendar.
8. Edit the image using Blur tool.
9. Design the Visiting Card.
- 10 Edit the image using Burn and Sponge tool.
11. Edit the image using Clone tool.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H
CO2	M	M	H	H	H
CO3	H	H	H	M	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 413	Title	Batch:	2019-2022
Hrs/Week:	5	WEB DEVELOPMENT	Semester	IV
			Credits	04

Course Objective

To develop knowledge about the methodologies behind VB.NET and ASP.NET. To develop Dot Net based applications using ADO.NET and SQL managed provider-OLEDB managed provider and also enable the students to learn the scripting knowledge through Java Script.

Course Outcomes (CO)

K1	CO1	To recollect the basic structure of Visual Basic .NET and main features of IDE.
K2	CO2	To understand the .NET framework and describe some of the major enhancement to the new version of visual basic and scripting languages.
K3	CO3	To apply message passing mechanism between components and message threads using messaging.
K4	CO4	To analyze the applications using Microsoft windows forms, ADO .Net and Scripting Languages.

Units	Content	Hrs
Unit I	Introduction to .NET: .NET framework- difference between VB6 and VB.NET-Data types-Variables-Operators-Arrays-Conditional logic - Procedures - Dialog boxes.	13

Unit II	Classes and Objects- Multithreading - Visual Basic .NET IDE - Data access: ADO.NET – Data Access in Visual Studio .NET: Visual Studio .NET Database Tools – Visual Studio .NET and ADO.NET.	13
Unit III	Active Server Pages (ASP) - Introduction - Advantages of using ASP - First ASP Script - Processing of ASP Scripts with Forms - Variables and Constructs - ASP Cookies - <i>ASP Objects</i> - Connecting to Data with ASP.	13
Unit IV	Introduction to ASP.NET - Page framework - HTML server controls - Web controls - Validation controls - Events-CSS- State management.	13
Unit V	Java Script : Introduction – Language Elements : Identifiers – Expressions – JavaScript Keywords – Operators – Statements _ Functions – Objects of JavaScript : The Window Object – The Document Object – Forms Object – Text boxes and Text areas – Buttons, Radio buttons and Checkboxes – The Select Object – Other Objects – Arrays.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Bill Evjen, Jason Beres, et.al, —Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd. ISBN 81-265-0254-1(Unit I, II & IV).
2. N.P.Gopalan and J.Akilandeswari, “Web Technology – A Developer’s Perspective”, PHI Learning Private Limited, Delhi, Seventh Edition, 2013. (Unit III & V)

Books for References

1. Fergal Grimes, —Microsoft .NET for programmers||, Shroff publishers & distributors (p) Ltd. ISBN 81-7366-540-0.
2. Thuan Thai & Hoang Q.Lam, —.NET Framework essentials||, Shroff publishers & distributors (p) Ltd. ISBN 81-7366-654-7.
3. Scot Johnson, *Using Active Server Pages*, Prentice Hall of India Pvt. Ltd, Special Edition, 1997

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	S	H	M	S	H
CO3	M	H	H	S	H
CO4	H	H	H	M	L

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name:	Name:	Name:	Name:
	Dr.K.HARIDAS	Dr.M.DURAIRAJU	Dr.R.MUTHUKUMARAN
Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC414	Title	Batch:	2019-2022
Hrs/Week:	5	COMPUTER SYSTEM ARCHITECTURE	Semester	IV
			Credits	04

Course Objective

To develop knowledge about the architecture of computer and to understand the concepts CPU, ALU design, I/O instruction format and different processors. To conceptualize the basics of organizational and architectural issues of digital computer.

Course Outcomes (CO)

K1	CO1	To recollect basic structure of computer and control unit operations.
K2	CO2	To understand the concept of computer arithmetic operations and memory system design.
K3	CO3	To apply the cache mapping techniques and conceptualize instruction level parallelism.
K4	CO4	To analyze the concept of I/O organization and to identify high performance architecture.

Units	Content	Hrs
Unit I	Basic Computer Organization- Instruction Codes-Computer Registers-Computer Instructions-Timing and Control-Instruction Cycle-Memory Reference Instructions-Input-Output Interrupts.	13
Unit II	CPU-General Register Organization-Control Word-Examples of Micro Operations-Stack Organization-Instruction Formats-Addressing Modes-Data Transfer and Manipulation-Program Control-RISC.	13
Unit III	Computer Arithmetic-Addition & Subtraction-Multiplication Algorithm-Division Algorithm-Floating Point Arithmetic Operations-Register Configurations-Addition & Subtractions- Decimal Arithmetic -Decimal Arithmetic Operation.	13

Unit IV	I/O Organization- Peripheral devices -I/O Interface- Synchronous and Asynchronous Data Transfer-Modes of Transfer-Priority Interrupt-DMA-IOP.	13
Unit V	Memory Organization-Memory Hierarchy- Main Memory-Auxiliary Memory -Associative Memory-Cache Memory –Virtual Memory- Memory Management Hardware .	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Morris Mano, Computer System Architecture, Prentice Hall Of India, Third Edition, 1994 (Unit 1 to 5).
Books for references
1. David A. Patterson and John L.Hennessy, Computer Organisation and Design, Harcourt Asia Pvt Ltd, Second Edition, 1999.
2. William Stallings, Computer Organization & Architecture, Designing for Performance, Pearson Education, Sixth Edition.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	S	H	M
CO2	H	S	H	M	H
CO3	S	H	M	S	H
CO4	M	H	S	L	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 415	Title	Batch:	2019-2022
Hrs/Week:	4	SOFTWARE ENGINEERING	Semester	IV
			Credits	03

Course Objective

To prepare graduates who will be successful in the chosen career path. It develops a broad understanding of the discipline of software engineering and encompasses with a detailed knowledge of techniques for the analysis and design of complex software intensive systems and to get success in their chosen profession.

Course Outcomes (CO)

K1	CO1	To recollect the software models, techniques and technologies to bring out the innovative and novelistic solutions for the growth of the society.
K2	CO2	To understand the issues affecting the organization planning and control of software based systems development.
K3	CO3	To apply the end user requirements into system and software requirements.
K4	CO4	To analyze, formulate, identify and solve the problems as well as identify the computing requirements appropriate to their solutions.

Units	Content	Hrs
Unit I	System Concepts and the Information Systems Environment: System Definition-Characteristics of System-Elements of a System- Types of System- The System Development Life Cycle: Recognition of Need - Feasibility Study – Analysis – Design – Implementation - Post	10

	implementation and Maintenance- Consideration for Candidate System.	
Unit II	Software-Software Characteristics-Software Components-Software Applications-The Process-Software Engineering a Layered Technology-The Process, Methods, Tools-A Generic View of Software Engineering- The Software Process- Software Process Models-Linear Sequential Models-Prototyping Model-RAD Model-Evolutionary Software Model-The Incremental Model-Spiral Model-Component Assembly Model-Concurrent Model.	10
Unit III	An Agile view of Process-Agility-Agility Process-The Politics of Agile Development-Human Factors-Agile Process Models-Extreme Programming-Adoptive Software Development –Dynamic System Development Method-Scrum-Crystal-Feature Driven Development-Agile Modeling. Analysis Concepts and Principles-Requirement Analysis-Communication Techniques-Initiating the Process-FAST-QFD-Analysis Principles-Information Domain-Modeling-Partitioning-Essential and Implementation Views- Analysis Modeling-Elements of Analysis Model-Data Modeling-Data Objects, Attributes and Relationship Diagram-Function Modeling-Data Flow Diagram, Extensions- Behavioral Modeling.	12
Unit IV	Design Concepts and Principles-The Design Process-Design Principles-Design Concepts-Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structured Partitioning, Software Procedure, Information Hiding-Effective Modular Design-Functional Independence-Cohesion-Coupling-Design Documentation.	10
Unit V	Design Method-Data Design-Architectural Design- Architectural Design Process-Transform Mapping-Transaction Mapping- Interface Design -Human Computer Interface Design –Interface Design Models-Task Analysis and Models-Design Issues-Implementation Tools-Design	10

	Evaluation-Tabular Design Notation-Program Design Notation- Program Design Languages .	
	Total Contact Hrs	52

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Elias M.Award, <i>System Analysis and Design</i> , Galgotia Publications (P) Ltd, Second Edition, 1996 (Unit 1). 2. Roger Pressman, <i>Software Engineering, A Practioner's Approach</i> , Fourth Edition, 1997(Unit 2,3,4 &5). 3. Roger Pressman, <i>Software Engineering, A Practioner's Approach</i> , Sixth Edition, 2005(Unit 3).

Books for Reference
1. Sommerville, <i>Software Engineering</i> , Pearson education, Sixth Edition.

Mapping

PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO					
CO1	H	S	S	S	H
CO2	S	H	S	H	M

CO3	M	M	M	M	L
CO4	H	H	H	H	M

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 4A4	Title	Batch:	2019-2022
Hrs/Week:	5	MATHEMATICS-III COMPUTER BASED OPTIMIZATION TECHNIQUES	Semester	IV
			Credits	04

Course Objective

Every industrial organization faces multifaceted problems to identify best possible solution to their problems. OR aims to help the executives to obtain optimal solution with the use of OR techniques and to locate best or optimal solution.

Course Outcomes (CO)

K1	CO1	To recollect the modeling tools and computational tools as well as analytic skills to evaluate the problems.
K2	CO2	To understand how to translate real world problem given in words into a mathematical formulation.
K3	CO3	To apply mathematical optimization techniques, existing optimization tool kits to write computer programs and to implement algorithms and solve problems.
K4	CO4	To analyze the problem situation leading to better control, better co-ordination, better systems and finally better decisions.

Units	Content	Hrs
Unit I	Linear Programming Problem: Graphical Solution Method- General Linear Programming Problem (Definition alone) - Canonical and Standard forms of LPP. Simplex Method: Basic Solution and Degenerate Solutions to Linear Equation- Simplex Method- Big M Method (Only Simple Problems).	13

Unit II	Transportation Problem: North West Corner Method- Least Cost Method- Vogel's Approximation Method- Moving towards optimality UV Method. Assignment Problem: Definition- Assignment Algorithm- Hungarian Assignment Method- Unbalanced AP.	13
Unit III	Inventory Control: Introduction- <i>Types of Inventory</i> - Inventory Decision- Economical Order Quantity (EOQ) - Deterministic Inventory Problems.	13
Unit IV	Sequencing Problems: Introduction- Problems with n Jobs and 2 Machines- Problems with n Jobs and k Machines- Problems with 2 Jobs and k Machines (Simple Problems).	13
Unit V	Network Scheduling: Introduction- Network and Basic Components- <i>Rules of Network Construction</i> - Time calculation in Networks- CPM-PERT -PERT Calculations- Difference between CPM and Pert Network.	13
	Total Contact Hrs	65

- The topics given in **Italics** are noted as Self-Study topics.

Seminar, Assignment, Case Study

Books for Study
1. Kanti Swarup, P.K.Gupta, Man Mohan <i>Operations Research</i> , Sultan Chand & Sons, Seventh Edition, 1996(Unit 1 to 5).
Books for Reference
1. R. Paneer Selvam, <i>Operation Research</i> , Prentice Hall of India Pvt Ltd, Second Edition.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	H	H
CO2	S	M	M	H	M
CO3	M	M	S	L	M
CO4	S	H	S	S	H

S-Strong; H-High; M-Medium; L-Low

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Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 416	Title	Batch:	2019-2022
Hrs/Week:	4	PROGRAMMING LAB VI : WEB DEVELOPMENT	Semester	IV
			Credits	02

Course Objective

To provide students a good understanding and knowledge about Web Service based applications and .net applications

Course Outcomes (CO)

K3	CO1	To remember the .NET environment to create Web Service- based applications and components.
K4	CO2	To get the idea about VB.net and ASP.net.
K5	CO3	To validate the files created in dynamic web pages and java script.

PROGRAMS:

VB.net

1. Write a program to implement Stack operations using array.
2. Write a program to perform file operations.
3. Create a calculator using basic controls.
4. Create an application to illustrate the use of dialog boxes.
5. Create an application for students proctorial list.
6. Create an application for library management system.

ASP.net

1. Create an Alumni registration form.
2. Create a website for online Quiz.
3. Create a portal and validate the web page using validation controls.

4. Create a web page and validate that page using client side scripting.
5. Write a program to calculate the number of visitors accessed the webpage using cookies.
6. Create a program using AdRotator.

Java script

1. Write a program using opening and closing window.
2. Write a program on math object using java script.
3. Write a program on string object using java script.
4. Write a program on sorting of array using java script.

CSS

1. Create a program using style sheet (Inline, Internal, External).

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	S	S	M
CO2	S	S	H	H	M
CO3	S	H	S	M	M

S-Strong; H-High; M-Medium; L-Low

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Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 417	Title	Batch:	2019-2022
Hrs/Week:	4	PROGRAMMING LAB-VII:PHP Programming	Semester	IV
			Credits	02

Course Objective

To measure the student's knowledge about the PHP script languages. To demonstrate how to store and retrieve data from the database. .

Course Outcomes (CO)

K3	CO1	To know about the practical fundamentals of php script.
K4	CO2	To get the idea about function and array using php.
K5	CO3	To access the database connection

1. Write a PHP script for Arithmetic operation.
2. Write a PHP script which will display the colors.
3. Write a PHP script using nested for loop that creates a chess board.
4. Write a function to sort an array.
5. Write a PHP function that checks if a string is all lowercase.
6. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birthday.
7. Write a PHP script to generate simple random password.

8. Program to Store and Read a image in Database.
9. Program to Insert records to the table in Database and fetch records from the table in Database.
10. Create a Contact Form using PHP and WAMP server connectivity

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	H	S
CO2	S	M	H	S	H
CO3	M	S	S	M	M

S-Strong; H-High; M-Medium; L-Low

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Signature:	Signature:	Signature:	Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 418	Title	Batch:	2019-2022
Hrs/Week:	1	PROGRAMMING LAB –VIII: SCRIPTING & HTML	Semester	IV
			Credits	01

Course Objective

To apply basic knowledge about designing web pages.

Course Outcomes (CO)

K3	CO1	To keep in mind about the HTML tags.
K4	CO2	To get the idea about to design web page.
K5	CO3	To access the scripting languages.

1. Design a home page which will display your information i.e. Bio data.
2. Create Hyperlinks in home page i.e educational details, Hobbies, Achievement, My Ideals etc.
3. Design a timetable and display it in tabular format.
4. Design a Registration form in HTML.
5. Design a webpage for Biodata using CSS.
6. Design webpage using Frames, Framesets.

7. Embedding Javascripts in HTML pages.

8. Design a Biodata page whose content can be changed using JavaScript like events.

9. Design a Signup form with all validations.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	H	S
CO2	S	H	H	S	H
CO3	M	S	S	H	M

S-Strong; H-High; M-Medium; L-Low

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Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 4N3	Title	Batch:	2019-2022
Hrs/Week:	1	NME:II PROGRAMMING LAB –OPEN SOURCE SOFTWARE	Semester	IV
			Credits	02

Course Objective

To create a high-end image manipulation application that is free to use and modify by everyone, ever.

Course Outcomes (CO)

K3	CO1	To keep in mind about the open source software and their opportunity in their career.
K4	CO2	To get the idea about the Graphic Design open software software.
K5	CO3	To verify their creativity skill using GIMP Free open source software.

1. Create a Business Card.
2. Create a Monthly Calendar.
3. Change the Background Transparent and Save it in Transparent Image.
4. Create a Poster with a Fancy Font.
5. Convert Blur Image into Correct Image.
6. Changing Hair Color into Simply Fix Grey Hair.

7. Convert an Image into Blend Images using Layer Masking.

8. Create a 3D Text.

9. Create an Outline using a Brush Strokes.

10. Create a Photo Manipulation.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	H	H
CO2	S	H	M	M	H
CO3	M	H	S	M	H

S-Strong; H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name and Signature	CDC	COE
Name: Signature:	Name: Dr.K.HARIDAS Signature:	Name: Dr.M.DURAIRAJU Signature:	Name: Dr.R.MUTHUKUMARAN Signature:

Programme Code:	BCA	Programme Title:	Bachelor of Computer Applications	
Course Code:	19 UBC 4N4	Title	Batch:	2019-2022
Hrs/Week:	1	NME:II PROGRAMMING LAB 2D ANIMATION	Semester	IV
			Credits	02

Course Objective

To provide a depth knowledge in designing text animation and lighting effects.

Course Outcomes (CO)

K3	CO1	To remember graphics primitives and demonstrate geometrical transformations.
K4	CO2	To get the idea with interactive graphics applications using one or more graphics application programming interfaces.
K5	CO3	To identify effectively and creatively solve a wide range of graphic design problems.

1. Setting Motion for a Butterfly.
2. Create a Rain Effect.
3. Create a masking.
4. Create a Basket Ball.
5. Create a Text Animation.
6. Design a Cartoon Background.

7. Create a Water Effect.
8. Create a flash website.
9. Create a Lightening Effect for Text.
10. Create an Image Gallery using Buttons.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	H	M	H	S	H
CO3	M	S	S	M	M

S-Strong; H-High; M-Medium; L-Low

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