DEPARTMENT OF COMPUTER SCIENCE

B.C.A. (COMPUTER APPLICATIONS)

(Students admitted during 2020-2021 Onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

SYLLABUS

III & IV SEMESTER

GOBI ARTS & SCIENCE COLLEGE

(Govt. Aided Autonomous Co-educational Institution, Affiliated to Bharathiar University, Coimbatore, Accredited with 'A' Grade by NAAC (4th cycle) and Recognised as a STAR College by DBT, Government of India)

KARATTADIPALAYAM POST,

GOBICHETTIPALAYAM - 638453

ERODE DISTRICT.

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remember; **K2**- Understanding; **K3**- Apply; **K4**-Analyze; **K5**- Evaluate

I. END OF SEMESTER (EOS) EXAMINATIONS:

1. Part I, II & III-Theory: 70 Marks

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer All)	15 × 1 = 15	MCQ	70
K2	B (Either or Pattern)	5 × 5 = 25	Short answers	
K3 & K4	C (Answer 3 out of 5)	3 × 10 = 30	Descriptive/Detailed	

2. Practical Examinations: 70 Marks

Knowledge Level	Section		Total
	Practical	Record work	
K3	60	10	70
K4			
K5			

II. CONTINUOUS INTERNAL ASSESSMENT (CIA):

1. Test – I & II: 30 Marks (Theory)

Knowledge Level	Section	Marks	Description	Total
K1	A (Answer All)	10 × 1 = 10	MCQ	30
K2	B (Answer 2 out of 3)	2 × 5 = 10	Short answers	
K3 & K4	C (Answer 1 out of 2)	1 × 10 = 10	Descriptive/Detailed	

2. Practical Internal Assessment: 30 Marks

Knowledge Level	Section		Total
	Test	Lab Performance	
K3	20	10	30
K4			
K5			

Components of Continuous Internal Assessment (CIA)

Components		Calculation	CIA Total
Test 1	30	$\frac{\text{Test 1 + Test 2}}{2}$	30
Test 2	30		

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	20UACA07	**Course Title:**	**Batch:**	2020
Total Hours:	60	Data Structures (Common for IT, CT, CS & BCA)	**Semester:**	III
			Credits:	3.5

Course Objective

The course aims

- To determine various data types such as stacks, queues, arrays and lists.
- To understand and evaluate prefix, infix and postfix expressions.
- To know about different types of sorting and searching.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K2, K4	**CO1**	Ability to analyze data structure operations and algorithms.
K4	**CO2**	Ability to analyze searching techniques.
K2	**CO3**	Ability to describe stack, queues and linked operations.
K1, K3	**CO4**	Ability to have knowledge of tree and graph concepts.
K1, K2	**CO5**	Illustrate types of sorting algorithms.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction – Basic Terminology: Elementary Data Organization – Data Structures – Data Structures Operations – Preliminaries – Mathematical Notation and Functions – Algorithmic Notation – Control Structure – Complexity of Algorithms – Other Asymptotic Notations for Complexity of Algorithms.	**12**
II	Arrays, Records and Pointers: Introduction – Linear Arrays – Representation of Linear Arrays in Memory – Traversing Linear Arrays – Inserting and Deleting – Linked List: Introduction Representation of Linked List in Memory – Traversing a Linked List – Searching a Linked List – ***Memory Allocation****; Garbage collection – Insertion into a Linked List – Deletion from a Linked List.	**12**
III	Stacks, Queues, Recursion: Introduction – Stacks – Arrays Representation of Stacks – Linked Representation of Stacks – Arithmetic Expression; Polish Notation – Quick Sort, an Application of Stacks – ***Recursion**** – Towers of Hanoi – Queues – Linked Representation of Queues.	**12**
IV	Trees: Introduction – Binary Trees – Representing Binary Trees in memory – Traversing Binary Trees – Traversal Algorithms using Stacks – Graphs and their Applications – Graph theory Terminology – Sequential Representation of Graphs: Adjacency matrix, Path matrix, Warshall's Algorithm, Shortest Paths.	**12**
V	Sorting and Searching: Introduction – Sorting – Insertion Sort – Selection Sort – Merging – Merge Sort – Radix Sort – Searching and Data Modification – Hashing.	**12**

<* - Self Study>

Text Book:

Seymour Lipschutz, GA Vijayalakshmi Pai, *"Data Structures"*, Tata McGraw HILL, Fourth Edition, 2006. (Unit I – V)

Reference Books:

1. Alfred V.Aho, John E. Hopcroft, Jeffrey D.Ullman, *"Data Structures AndAlgorithms"*, Pearson Education, First Edition, 2005.
2. Ellis Horowitz, Saartaj Sahni, *"Fundamentals of Data Structures"*, Galgotia Book Source, Fourth Edition, 1978.
3. Debasis Samanta, *"Classic Data Structures"*, PHI, Second Edition, 2009.

E-References:

1. https://www.javatpoint.com/data-structure-tutorial
2. https://www.programiz.com/dsa
3. https://www.slideshare.net/PsEditor/data-structures-17664936

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	S	H
CO2	H	S	H	S	H
CO3	S	S	S	S	S
CO4	M	M	H	M	M
CO5	S	H	S	H	M

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACA08	**Course Title:**	**Batch:**	2019
Total Hours:	60	Operating System	**Semester:**	III
			Credits:	3.5

Course Objective

The course aims

- To understand what a process is and how processes are synchronized and scheduled.
- To understand the structure and organization of the file system.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcomes
K1, K2	**CO1**	Describe and explain the fundamental components of a computer operating system, history of operating systems, various system calls and operating system structures.
K2, K3	**CO2**	Understand the various process states in an operating system and how it is implemented using Mutual Exclusion primitives.
K2	**CO3**	Identify with the conditions for deadlock occurrences and how to detect, avoid, prevent and recover the deadlock and also to know about the real storage.
K2, K3	**CO4**	Be aware of the policies for various processor scheduling.
K2, K3, K4	**CO5**	Know about the disk performance optimization and file systems.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction: What is an Operating System? - *History of operating systems*- Operating System Concepts: Processes–Files-The Shell. System Calls: Process Management–Signaling-File Management-Directory Management-Protection-Time Management.	**12**
II	Process Management: Introduction-Definitions of Process-Process States-Process State Transitions-The Process Control Block-Operations on Processes-Suspend and Resume-Interrupt Processing- The Nucleus of the Operating System. Asynchronous Concurrent Processes: Introduction-Parallel Processing- A Control Structure for Indicating Parallelism: Parbegin/Parend-Mutual Exclusion-Critical Sections-Mutual Exclusion Primitives-Implementing Mutual Exclusion Primitives.	**12**
III	Deadlock and Indefinite Postponement: Introduction-Examples of Deadlock-A Related Problem: Indefinite Postponement-Resource Concepts-Four Necessary Conditions for Deadlock-Major areas of Deadlock Research- Deadlock Prevention-Deadlock Avoidance and the Banker's Algorithm-Deadlock Detection-Deadlock Recovery. Real Storage: Introduction-Storage Organization-Storage Management-Storage Hierarchy-Storage Management Strategies-Contiguous vs Non contiguous	**12**

	Storage Allocation-Single User Contiguous Storage Allocation-Fixed Partition Multiprogramming-Variable Partition Multiprogramming.	
IV	Job and Processor Scheduling: Scheduling Levels-Objectives-Criteria-***Preemptive vs Nonpreemptive Scheduling****-The Interval Timer or Interrupting Clock-Priorities-Deadline Scheduling-First In First Out(FIFO)-RoundRobin(RR)-Shortest-Job-First(SJF)-Shortest- Remaining-Time (SRT)-Highest-Response-Ratio-Next(HRN)-Multilevel Feedback Queues-Fair Share Scheduling.	**12**
V	Disk Performance Optimization: Operation of Moving-Head Disk Storage-Desirable Characteristics of Disk Scheduling Policies - Seek Optimization - Rotational Optimization. File Systems: The File System- ***File System Functions****- The Data Hierarchy-Blocking and Buffering-File Organization-Queued and Basic Access Methods-Allocating and Freeing Space-File Descriptor.	**12**

<* - ***Self study***>

Text Books:

1. Andrew S.Tanenbaum, "*Operating Systems-Design And Implementation*", PHI Learning Private Ltd 2012. (Unit I).
2. H.M.Deitel, "*Operating System*", Pearson Education, Third Edition, 2013. (UNITS II, III, IV, V)**.**

Reference Books:

1. Rohit Khurana,"*Operating Systems*", Vikas Publishing House, First Edition, 2011.
2. Neeta Singh, "*Operating System*", Global Academic Publishers, Second Edition, 2011.
3. I.Chandra Mohan "*Operating System*", PHI Learning PVT Ltd, First Edition, 2013.

E-references:

1. https://www.studytonight.com/operating-system/cpu-scheduling
2. https://www.tutorialspoint.com/operating_system
3. https://www.slideshare.net/rajendraprasadalladi/operating-system-overview-concepts-ppt
4. https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	L	M	S
CO2	S	H	M	M	L
CO3	S	S	H	H	H
CO4	S	H	M	S	M
CO5	S	S	M	M	H

S-Strong, **H-**High, **M-** Medium**, L-** Low

Programme Code:	BCA	**Programme Title :**	Computer Applications	
Course Code:	19UACA09	**Course Title:**	**Batch:**	2019
Total Hours	60	Client Server Computing (Common for CS, CA, CT & IT)	**Semester:**	III
			Credits:	3.5

Course Objective

The course aim

- To learn specific knowledge of client/server concept.
- To know about the types and architecture of client/server.
- To understand the components and processing model of client/server.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Remember the basic knowledge on server types and building blocks.
K2	**CO2**	Understand the concept of SQL database servers and data warehouse.
K3	**CO3**	Apply on transaction processing models and TP monitors.
K4	**CO4**	Analyze knowledge about groupware.
K5	**CO5**	Evaluate distributed objects and components.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**INTRODUCTION TO CLIENT/SERVER COMPUTING:** What is client/server?, File Servers, Database Servers, Transaction Servers, Groupware Servers, Object/Servers, Web Servers, Middleware, Fat Servers, Fat Clients, 2-tier versus 3-tier. CLIENT/SERVER BUILDING BLOCKS: Operating Systems, Base Services, Extended Services, Server Scalability - Remote Procedure Call (RPC), Messaging and Queuing.	**12**
II	**SQL DATABASE SERVERS:** SQL and Relational Databases, SQL Database Server Architecture, Stored Procedures, Triggers and Rules DATA WAREHOUSE: OLTP, Information Hounds, DSS, EIS, Elements Of Data Warehousing, Warehouse Hierarchies, Replication Versus Direct Access, The Mechanics Of Data Replication.	**12**
III	**CLIENT/SERVER TRANSACTION PROCESSING:** The ACID Properties, Transaction Models, TP MONITORS: TP Monitors, Transactions Management Standards.	**12**
IV	**CLIENT/SERVER GROUPWARE:** Importance of Groupware, Groupware, ***The Components of Groupware*.***	**12**

V	**DISTRIBUTED OBJECTS AND COMPONENTS:** Benefits of distributed objects, From Distributed Objects to components, 3- tier Client/Server, Object Style – CORBA – Distributed Objects, CORBA style, OMG's Object Management Architecture, Object Request Broker (ORB), Anatomy of a CORBA 2.0 ORB, CORBA Object Services, ***CORBA Common Facilities****.	**12**

<* - ***Self study***>

Text Book:

Robert Orfali, Dan Harkey and Jeri Edwards, "*The Essential Client/Server Survival Guide*", Galgotia Publications Pvt. Ltd., Third Edition, 2001. (Unit I-V)

Reference Books:

1. Steve Bobrowski, "*Oracle 7.0 and Client/Server Computing*", BPB Publications, Second Edition, 1996.
2. Patrick Smith, Steve Guengerich, "*Client/Server Computing*", PHI Learning, Second Edition, 2012.
3. Dawna Travis Dewire, "*Client/Server Computing*", Tata McGraw Hill, First Edition, 2003.
4. Dr.A.Murugan, Dr.K.Shyamala, T.Sunitha Rani, "*Client/Server Computing*", Margham Publications, First Edition, 2016.

E-References:

1. https://en.wikipedia.org/wiki/Client%E2%80%93server_model
2. https://www.webopedia.com/Computer_Science/Client_Server_Computing
3. https://simple.wikipedia.org/wiki/Client-server

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	M	M
CO2	S	S	H	M	M
CO3	M	H	S	S	H
CO4	H	S	S	H	H
CO5	M	M	H	H	S

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACA10	**Course Title:**	**Batch:**	2019
Total Hours:	60	Object Oriented Programming with C++ (Common for CS, BCA, IT, CT)	**Semester:**	III
			Credits:	3.5

Course Objective

The course aims

- To learn the basic concept object oriented programming such as tokens, expressions, data types, variables and applications of OOP.
- To learn the syntax and semantics of C++ language which includes functions, class, constructors, destructors and inheritance.
- To acquire knowledge to manage console I/O operations and ability to develop application programs.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2, K5	**CO1**	Learn and understand the basic knowledge on Object Oriented programming concepts.
K1, K2, K5	**CO2**	Understand the concept of functions, class, objects and arrays with class.
K1, K2, K3, K5	**CO3**	Understand the role of constructors and destructors in programs.
K1, K2, K3, K4	**CO4**	Understand and apply the concept of inheritance and polymorphism in real time programs.
K3, K4, K5	**CO5**	Gain knowledge to develop program using I/O files and familiar about and error handling mechanisms in C++.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

Unit	SYLLABUS Content	No. of Hours
I	**Principles of Object Oriented Programming:** Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Application of Object Oriented Programming - Beginning With C++: What Is C++, Applications Of C++, Structure of C++ Statement – Tokens, Expressions and Control Structures: tokens, keywords, identifiers and constants, basic and user defined datatypes, derived datatypes, variables, Operators in c++, Operator Precedence, Expression and Their Types, Control Structures.	**12**
II	**Function in C++:** Main Function, Function Prototyping, Call By Reference, Return By Reference, Inline Functions, Default Arguments, Function Overloading – Classes And Objects: Specifying A Class, Defining Member functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays Within a Class, Memory Allocation For Objects, Static Data Members and Member Functions Arrays of Objects, Object As Function Arguments, Friendly Functions, Pointers to Members.	**12**

III	**Constructors And Destructors:** Constructors, Parameterized Constructors, Multiple Constructors In A Class, Constructors With Default Arguments, Copy Constructor, Destructors – Operator Overloading And Type Conversions: Defining Operator Overloading, Overloading Unary Operators**, *Overloading Binary Operators using Friend**, Rules For Overloading Operators, Type Conversions.	**12**
IV	**Inheritance:** Defining Derived Classes, Single, Multilevel, Multiple, Hierarchical And Hybrid Inheritance, Virtual Base Classes, *Abstract Classes*, Constructors in Derived Classes, Nesting Of Classes – Pointers, Virtual Functions And Polymorphism: Pointers To Objects, This Pointer, Pointers To Derived Classes, Virtual Functions, Pure Virtual Functions**.**	**12**
V	**Managing Console I/O Operations:** C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, managing Output With Manipulators Working With File: Classes For File Stream Operations, Opening And Closing A File Detecting End-Of-File, Open() File Modes, File Pointers And Their Manipulation, Sequential I/O Operations, ***Random Access File**, Error Handling During File Operations.	**12**

<* - ***Self study***>

Text Book:

E. Balagurusamy, *"Object Oriented Programming With C++"*, Tata McGraw Hill, Sixth Edition, 2013 (Unit I-V).

Reference Books:

1. Ananthi Sheshasaayee, G.Sheshasaayee, "*Object Oriented Programming With C++*", Margham Publication, First Edition, 2001.
2. Bjarne Stroustrup, "*The C++ Programming Language"*, Addison Wesley, Fourth Edition, 2013
3. Anirban Das, Goutam Panigraphi, "*Object Oriented Programming With C++*", Vikas Publishing Pvt Ltd, Second Edition, 2014.
4. M.T.Somashekara, D.S. Guru, H.S.Nagendraswamy and K.S. Manjunatha, "*Object Oriented Programming With C++"*, Vikas Publishing Pvt Ltd, Second Edition, 2012.

E-References:

1. https://en.cppreference.com/w/
2. https://www.tutorialspoint.com/cplusplus/cpp_references.htm
3. https://www.javatpoint.com/cpp-tutorial

Mapping with Programme Specific Outcomes

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	S	M
CO2	S	H	M	S	L
CO3	H	S	H	H	H
CO4	S	S	S	S	H
CO5	H	M	S	H	S

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

Programme Code:	B.C.A.	**Programme Title:**	Computer Applications	
Course Code:	19UBCO61	**Course Title:**	**Batch:**	2019
Total Hours:	90	Introduction to Accountancy	**Semester:**	III
			Credits:	5.0

Course Objective

The course aims

- To enable the students to learn the various Accounting Concepts and Conventions.
- To make the students to prepare final accounts of a Sole Trader.
- To impart the knowledge about various types of Errors and their Rectification.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Understand the concept of accounting terms and rules of accounting
K2	**CO2**	Prepare Journal entries, Ledger and Trial balance
K3	**CO3**	Analyse the results of final accounts of sole trader
K4	**CO4**	Gain the knowledge about bank reconciliation statement

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Accounting: Meaning-objectives-types-***Differences between Book Keeping and Accountancy****-**Accounting Concepts and Conventions- Double entry system: Meaning- advantages. Journal- Ledger-Trial balance.	**18**
II	Subsidiary Books: Meaning- preparation of subsidiary books including Petty cash book.	**18**
III	Revenue expenditure- capital expenditure- ***Differences between Revenue expenditure and capital expenditure****. Deferred Revenue expenditure-Reserve-Provisions-Opening entries- Closing entries- Adjustment entries-Transfer entries.	**18**
IV	Preparation of final accounts of a sole trader with adjustments of Closing stock-Outstanding expenses- Prepaid expenses-Depreciation-Provision for Bad and doubtful debts only.	**18**
V	Bank Reconciliation Statement: Meaning- objectives- preparation of Bank Reconciliation Statement simple problems only. Errors: Meaning- types-Rectification of Errors- simple problems only.	**18**

Note to the question paper setters:

Section B: Out of 5 Questions, atleast 4 shall be problems.

Section C: Out of 5 Questions, 3 shall be problems and 2 shall be theory.

<* **-** ***Self Study***>

Text Book:

T.S. Reddy and A. Murthy, Financial Accounting, Margham Publications.

Reference Books:

1. R.L. Gupta and Radhasamy, Advanced Accountancy, Sultan Chand & Sons.
2. M.C. Shukla , T.S. Grewal and Gupta S.C, Advanced Accounting, Sultan Chand & Sons.
3. S.P. Jain & K.L. Narang – Advanced Accountancy, Kalyani Publishers.

E-references:

1. www.icai.org
2. www.icsi.edu
3. www.caclubindia.com

Mapping with Programme Specific Outcomes

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

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

Programme Code:	BCA	**Programme Title**	Computer Applications	
Course Code:	19UACAP3	**Course Title:**	**Batch:**	2019
Total Hours:	60	Major Core Programming Lab - III: (Data Structures in C)	**Semester:**	III
			Credits:	2.0

Course Objective

The course aims

- To determine various data types such as stacks, queues, arrays and lists.
- To understand and evaluate prefix, infix and postfix expressions.
- To know about different types of sorting and searching.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K2, K4	**CO1**	Ability to analyze data structure operations and algorithms.
K4	**CO2**	Ability to analyze searching techniques.
K2	**CO3**	Ability to describe stack, queues and linked operations.
K1, K3	**CO4**	Ability to have knowledge of tree and graph concepts.
K1, K2	**CO5**	Illustrate types of sorting algorithms.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

SYLLABUS
1. Write a C program to find factorial of the given number using recursion. 2. Write a C program to find Fibonacci series up to the given limit using recursion. 3. Write a C program to find GCD for the given two numbers using recursion.
4. Write a C program to perform disks movement to give a tower using recursion. 5. Write a C program to find binomial co-efficient for the given numbers. 6. Write a C program to search the given number by linear search.
7. Write a C program to search the given number by Binary search. 8. Write a C program to sort the given set of numbers using Insertion sort. 9. Write a C program to sort the given set of numbers using Quick sort.
10. Write a C program to display a sparse matrix. 11. Write a C program to perform various Stack operations. 12. Write a C program to perform various Queue operations.
13. Write a C program to convert infix to postfix expression. 14. Write a C program to evaluate postfix expression. 15. Write a C program to add two polynomial equations.

Text Books:

1. Seymour Lipschutz, GA Vijayalakshmi Pai, *"Data Structures"*, Tata McGraw Hill, Fourth Edition, 2006.
2. E. Balagurusamy, "*Programming in Ansi C*", Tata McGraw Hill Publications, Second Edition, 2003.

Reference Books:

1. Alfred V.Aho, John E. Hopcroft, Jeffrey D.Ullman, *"Data Structures and Algorithms"*, Pearson Education, First Edition, 2005.
2. Ellis Horowitz, Saartaj Sahni, *"Fundamentals of Data Structures"*, Galgotia Book Source, Fourth Edition, 1978.
3. Debasis Samanta, *"Classic Data Structures"*, PHI, Second Edition, 2009.
4. Ashok N. Kamthane, "*Programming in C*", Pearson, Second Edition, 2006.
5. Herbert Schildt, "*C: The Complete Reference*", Tata McGraw-Hill, Fourth Edition, 2008.

E-References:

1. https://www.javatpoint.com/data-structure-tutorial
2. https://www.programiz.com/dsa
3. https://www.slideshare.net/PsEditor/data-structures-17664936

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	S	H
CO2	H	S	H	S	H
CO3	S	S	S	S	S
CO4	M	M	H	M	M
CO5	S	H	S	H	M

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACAP4	**Course Title:**	**Batch:**	2019
Total Hours:	60	Major Core Programming Lab - IV: (C++) (Common for CS, BCA, IT, CT)	**Semester:**	III
			Credits:	2.0

Course Objective

The course aims

- To understand the feature of C++ supporting object oriented programming.
- To develop the knowledge of how to represent real-life entities of problems in system design.
- To implement inheritance and file operations.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2, K5	**CO1**	Remember the basic knowledge of object oriented concepts and to write simple programs.
K1, K2, K5	**CO2**	Understand and develop application programs using operators, loops and functions.
K1, K2, K3, K5	**CO3**	Write programs by applying the class structure as fundamental and modular building block.
K1, K2, K3, K4	**CO4**	Analyze the role of inheritance, polymorphism and building reusable code in application programs.
K3, K4, K5	**CO5**	Write and evaluate the C++ programs with pointers, file and error handling mechanisms.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

Program List
1. Write a C++ program to find the factorial of the given number using recursive function. 2. Write a C++ program for string manipulation using string handling functions. 3. Write a C++ program to find the biggest among the N numbers.
4. Write a C++ program to perform arithmetic operations using inline functions. 5. Write a C++ program for finding area of different shapes using function overloading. 6. Write a C++ program for displaying personal details using array of objects.
7. Write a C++ program for finding the largest number using friend function. 8. Write a C++ program for complex number addition using constructor. 9. Write a C++ program to join two strings using copy constructor.
10. Write a C++ program to perform arithmetic operations using operator overloading. 11. Write a C++ program to display product details using virtual functions. 12. Write a C++ program for electricity bill preparation using single inheritance.
13. Write a C++ program employee pay bill calculations using multiple inheritances. 14. Write a C++ program to create student mark sheet using multi level inheritance. 15. Write a C++ program to display bank details.

Text Book:

E. Balagurusamy, *"Object Oriented Programming With C++"*, Tata McGraw Hill, Sixth Edition, 2013 (Unit I-V).

Reference Books:

1. Ananthi Sheshasaayee, G.Sheshasaayee, "*Object Oriented Programming With C++*", Margham Publication, First Edition, 2001.
2. Bjarne Stroustrup, "*The C++ Programming Language"*, Addison Wesley, Fourth Edition, 2013
3. Anirban Das, Goutam Panigraphi, "*Object Oriented Programming With C++*", Vikas Publishing Pvt Ltd, Second Edition, 2014.
4. M.T.Somashekara, D.S. Guru, H.S.Nagendraswamy and K.S. Manjunatha, "*Object Oriented Programming With C++"*, Vikas Publishing Pvt Ltd, Second Edition, 2012.

E-References:

1. https://en.cppreference.com/w/
2. https://www.tutorialspoint.com/cplusplus/cpp_references.htm
3. https://www.javatpoint.com/cpp-tutorial

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	S	M
CO2	S	H	M	S	L
CO3	H	S	H	H	H
CO4	S	S	S	S	H
CO5	H	M	S	H	S

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACA11	**Course Title:**	**Batch:**	2019
Total Hours:	75	Relational Database Management System	**Semester:**	IV
			Credits:	4.0

Course Objective

The course aims

- To educate students with fundamental concepts of RDBMS, models, different database languages.
- To design and develop a relational database system with appropriate functionality to process data with constraints data integrity and avoid data redundancy.
- To learn SQL and use normal forms to reduce anomalies in relations.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2	**CO1**	Gain good understanding of Database Architecture and entity-relationship modelling.
K1, K2, K4	**CO2**	Get knowledge about normalization techniques and relational algebra & Calculus to design a relational database system effectively.
K1, K2, K3	**CO3**	Able to describe and use the basic SQL commands efficiently.
K1, K2, K3	**CO4**	Demonstrate the concept of SQL objects like indexes, sequences, views and synonyms in SQL.
K1, K2, K3	**CO5**	Explore about PL/SQL techniques.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	INTRODUCTION: RDBMS Terminology – The Relational Data Structure - Relational Data Integrity – Codd's Rules. DATABASE ARCHITECTURE AND DATA MODELING: Conceptual, Physical and Logical Database Models – Database Design – Design Constraints – Functional Dependencies. ENTITY RELATIONSHIP MODELING: E-R Model – Components of an E-R Model, E-R Modeling Symbols.	**15**
II	DATA NORMALIZATION: Introduction – First(1NF), Second(2NF), Third(3NF), Boyce-Codd Normal Form(BCNF), Fourth(4NF), Fifth(5NF) Normal Forms, Denormalization, RELATIONAL ALGEBRA AND RELATIONAL CALCULUS: Relational Algebraic operations: union, intersection, difference, cartesian product, select, project, rename, join, division. – Tuple Relational Calculus, Domain Relational Calculus.	**15**
III	SQL PLUS: Menus – commands – Editing the Command Line – The Describe Command – The COLUMN Command- Basic SQL: SQL Language Basics – The SELECT Command – ***Data Types**** – Expressions and operators – Functions – The INSERT Command – The UPDATE Command – The DELETE Command.	**15**

IV	DATA INTEGRITY: Types – Integrity Constraints. CREATING AND MANIPULATING TABLES: The CREATE TABLE Command – Modifying Tables – Deleting a Table. INDEXES: Creating Indexes – Changing an Index. SEQUENCES: The create sequence command – Pseudo columns – Deleting, Changing, using Sequence. VIEWS: How a view works? – Creating a View – Deleting a View – Replacing a View. SYNONYMS: Creating, Renaming and Removing Synonyms.	**15**
V	PL/SQL: Blocks – ***Control Structures**** – Integrating SQL in a PL/SQL Program. TRIGGERS: Components – Types – Creating, Modifying, Enabling/Disabling a Trigger, Deleting, Replacing a Trigger – STORED PROCEDURES AND FUNCTIONS: Creating, Executing, Deleting a Stored Procedure – Functions, Cursors – Transactions.	**15**

<* - ***Self study***>

Text Books:

1. Alexis Leon & Mathews Leon, *"Database Management Systems"*, Vikas Publishing House Pvt. Ltd., (Unit I, II),1999
2. Jose A. Ramalho, *"Learn Oracle 8i"*, BPB publications. (Unit III, IV, V)**,**2000

Reference Books:

1. Raghu Ramakrishnan, Johannes Gehrke,*"Database Management Systems"*, McGraw Hill, 2009.
2. Ramez Elmasri, Shamkant B. Navathe, *"Database Systems [Models, languages, Design and Application programming] "*, Pearson Education, Sixth edition, 2013.
3. Ivan Bayross, *"SQL, PL/SQL The Programming Language of Oracle"*, BPB Publications Pvt Ltd, Third Revised Edition, 2005.

E-References:

1. https://www.w3schools.com/sql/sql-intro.asp/beginner-sql-tutorial.com/sql-comands.htm
2. https://www.tutorialspoint.com/sql/sql_tutorial.pdf
3. https://searchsqlserver.techtarget.com/definition/database-management-system

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	M	M
CO2	S	S	H	H	M
CO3	S	S	M	H	H
CO4	S	S	H	M	M
CO5	S	S	M	H	M

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACA12	**Course Title:**	**Batch:**	2019
Total Hours:	75	Visual Programming (Common for CS, BCA, IT and CT)	**Semester:**	IV
			Credits:	4.0

Course Objective

The course aims

- To introduces computer programming using the Visual BASIC programming language with object oriented programming concepts.
- To emphasis is on event driven programming methods, including creating and manipulating objects, classes, and using object oriented tools such as the class debugger.
- To upon completion, students should be able to design, code, test and debug at a beginning level.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2, K4	**CO1**	Able to learn visual programming basics and its components.
K1, K2, K3, K4, K5	**CO2**	Learn Windows Forms, common controls, design-view, code view, class diagram view.
K1, K2, K3, K5	**CO3**	Cover visual programming skills needed for modern software development.
K1, K2, K3, K5	**CO4**	Learn the Visual Basic syntax, program structure, properties, modules, procedure, functions with the event-driven programming model.
K1, K2, K3, K5	**CO5**	Make familiar with Database connectivity and Window Programming.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyse; **K5** - Evaluate

Unit	SYLLABUS Content	No. of Hours
I	**INTRODUCTION TO VISUAL BASIC:** Introduction – Features of VB – Visual Basic Concept- Visual basic environment – Properties, Methods and Events – Debugging – Difference between .Exe And .Dll file. VB **PROGRAMMING BASICS:** Introduction – Keyword – Data Types – Variables – Literals – Operators in VB – Some useful Function.	**15**
II	**WORKING WITH CONTROLS:** Introduction – Intrinsic and Container Control – Working with Controls – Create Event Procedure – Manipulating Forms – Basic Controls – Control Arrays – Some useful Events – ActiveX Control – Object Linking and Embedding (OLE) – Dialog box.	**15**
III	**CONTROL STRUCTURE:** Introduction – Control flow – Decision Structures – If...Then Statement – Select...Case Statement – Looping Structure – For...next – Do loop Structure – While...Wend – Problems with loop – Arrays – Dimension of an Array – Declaring Array – Static and Dynamic Array – Arrays within UDTs – Array within another Array.	**15**

IV	**PROCEDURES, FUNCTIONS AND MODULES:** Introduction – Procedures – Sub Procedures (Sub-routines) – Function Procedure – Passing Parameters to Procedures – Property Procedure – Code module – ***Library Function****.	**15**
V	**VB INTERFACE STYLE:** Introduction – Interface Style – Creating Menus – Designing Menus – Pop up Menus. **ERROR HANDLING AND FILE HANDLING:** Introduction – Types of Error – Handling Errors – Trap the Error – Handle the Error – File Handling. **DATABASE CONNECTIVITY AND VISUAL DATABASE TOOLS:** Introduction – DB Concepts – Data access mechanism – DB Engine – VB Data Control – Company Database – ***Visual Database Tools****.	**15**

<* - ***Self Study***>

Text Book:

Dr. Narendra Kumar, Shilpi Srivastava, Rajesh Chadhary, Hariom Pancholi, "*Visual Basic*", Vayu Education of India, First Edition, 2011. (Unit I – V)

Reference Books:

1. Mohammed Azam, "*Programming with Visual Basic 6.0*", Vikas Publishing House Pvt. Ltd, First Reprint, 2009.
2. Gray Cornell, "*Visual Basic 6.0 from the Ground up*", Tata McGraw Hill, 2013.
3. N.Krishnan, N.Saravanan, "*Mastering Visual Basic 6.0 In 30 Days*", SciTech Publications Pvt. Ltd, Reprint, 2012.
4. Hasit Mehta, Radhika Raval, "*Visual Basic Applications & Programming*", Acme Learning Pvt. Ltd, First Edition, 2010.

E-references:

1. https://lecturenotes.in/materials/17698-note-of-visual-basic-by-magesh-kid
2. https://www.scribd.com/doc/24339321/Visual-Basic-6-0-Notes-short
3. https://www.uotechnology.edu.iq/appsciences/filesPDF/material/lectures/2c/5-Computer1.pdf
4. https://www.vbtutor.net/vb6/vb6_preview.pdf

Mapping with Program Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	S	H
CO2	S	H	S	S	S
CO3	S	S	S	H	S
CO4	S	S	M	S	H
CO5	S	H	S	S	H

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

Programme Code:	B.C.A.	**Programme Title:**	Computer Applications	
Course Code:	19UACO61	**Course Title:**	**Batch:**	2019
Total Hours:	90	Marketing	**Semester:**	IV
			Credits:	4.0

Course Objective

The course aims

- To enable the students to learn about various concepts of Marketing.
- To study the concepts of Marketing Mix.
- To make the students to know the functions of marketing.

Course Outcome

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1	**CO1**	Understand the concept of Market and Marketing.
K2	**CO2**	Enhance the knowledge about the 4 Ps of Marketing.
K3	**CO3**	To know about the importance of channels of distribution
K4 & K5	**CO4**	Acquire the Knowledge about advertising and salesmanship.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Market: Meaning- types. Marketing: Meaning- Importance – Functions- Marketing mix. Service marketing: Characteristics - Importance - Classification of Service - ***Differences between Product marketing and Service marketing**** - 7 Ps in Service Marketing.	**18**
II	Product: Meaning - Classifications - Product Life Cycle: Meaning-Phases- New product planning process. Branding: Meaning-types- importance. Transportation: Classification-importance of various mode of transportation. Channels of distribution: Meaning-importance.	**18**
III	Storage: Meaning- Advantages. Warehouses: Meaning – Classification. ***Differences between storage and warehouse**** . Standardization: Meaning- Types- merits and de-merits. Pricing: Objectives - Kinds -Factors affecting pricing decisions.	**18**
IV	Advertising: Meaning - objectives – functions-types. Advertising media: Meaning- types- Determinants of media selection. Advertisement copy: Meaning- elements.	**18**
V	Personal selling: Meaning- importance-types of salesmanship-Qualities of a good salesman. Sales promotion: Meaning-types-Importance.	**18**

<* - ***Self Study***>

Text Books:

1. R.S.N. Pillai and Bagavathi, Modern Marketing, S. Chand & Company Pvt. Ltd.
2. N. Rajan Nair, Marketing, Sultan Chand & Sons.

Reference Books:

1. C.B. Memoria, Principles and Practice of Marketing in India, Kitab Mahal.
2. V. S. Ramaswamy and S. Namakumari, Marketing Management, Macmillan Publishers India Ltd.

E-references:

1. https://www.qsstudy.com/business-studies/standardization-grading-definition-marketing-function.
2. https://byjus.com/commerce/what-is-the-difference-between-selling-and-marketing/

Mapping with Programme Specific Outcomes

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

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACAP5	**Course Title:**	**Batch:**	2019
Total Hours:	60	Major Core Programming Lab - V: (RDBMS & Accounting Package)	**Semester:**	IV
			Credits:	2.0

Course Objective

The course aims

- To educate students about SQL queries.
- To design and develop PL/SQL programs.
- To work with accounting software.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2	**CO1**	Gain good understanding about SQL queries for table creation & insertion and built-in functions and operators.
K1, K2, K4	**CO2**	Get knowledge about programming techniques using SQL.
K1, K2, K3	**CO3**	Demonstrate the concept of creating constraints and exception handling.
K1, K2, K3	**CO4**	Explore about PL/SQL programming techniques.
K1, K2, K3	**CO5**	Work with Accounting software for solving accounting problems.

K1 – Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate

SYLLABUS

1. Write a MYSQL program for creating a table for employee details, insert the values in the table, alter, update and delete the table.
2. Write a MYSQL program for creating a table and write queries for illustrating the following.
   (i) Comparison, logical and set operators. (ii) Sorting and grouping operators
   (iii) Built in functions for ceil, sysdate, sqrt, round, length, count and sum.

3. Write a SQL program to find the factorial of a given number using loop.
4. Write a SQL program to find the sum of individual digits of a given number using while statement.
5. Write a SQL program to find the biggest among three numbers.
6. Write a SQL program to check the given string is palindrome or not.

7. Write a SQL program for creating constraints Primarykey, not null and check the foreign key.
8. Write a SQL program for exception handling.
9. Write a SQL program for user defined exception
10. Write a SQL program to print the student mark list using cursor.

11. Write a PL/SQL program for train ticket reservation.
12. Write a PL/SQL program for calculating the sales man commission amount using procedure.
13. Write a PL/SQL program for sequence creation using recursive function.

14. Prepare a trial balance in Tally for the following and show profit & loss account and balance sheet.

	PARTICULARS	AMOUNT
1.	Elangovan invested cash in business	2,00,000
2.	Paid into bank	50,000
3.	Purchase building	70,000

4. Purchase goods 50,000
5. Sold goods 60,000
6. Withdrawn cash from bank 10,000
7. Paid electric charges 300
8. Paid salary 1,500

15. Prepare a trial balance in Tally for the following and show profit & loss account and balance sheet.

	PARTICULARS	AMOUNT
1.	Started business with	10,000
2.	Paid into bank	5,000
3.	Bought furniture	500
4.	Bought goods	300
5.	Bought one type writer from Mr.Bala on credit	500
6.	Sold goods	600
7.	Sold goods to Mr.Anand & Sons on credit	1,000
8.	Bought goods from Ms.Radha & Sons on credit	20,000
9.	Paid telephone rent for 1 year	240
10.	Paid Advertisement	100
11.	Sold goods to Mr.Das for each	800
12.	Paid salaries	800
13.	Paid rent	100
14.	Withdrawn from bank for private use	300
15.	Bought one delivery van from Delhi motors & co which have to be Rs.10,000 need monthly installments each together interested at 9%first installment paid by cheque.	

Text Books:

1. Alexis Leon & Mathews Leon, *"Database Management Systems"*, Vikas Publishing House Pvt. Ltd., (Unit I, II), 1999.
2. Jose A. Ramalho, *"Learn Oracle 8i"*, BPB publications. (Unit III, IV, V)**,** 2000.

Reference Books:

1. Ivan Bayross, "SQL & PL/SQL –The programming language of oracle", BPB publications, Fourth Revised Edition, 2009.
2. Stephens, Plew, Jones, "Teach yourself SQL", Pearson Education, Fifth Edition, 2012.
3. Asok K.Nadhani, Kisor K.Nadhani, "Simple Tally 9", BPB publications, 2008.

E-References:

1. https://www.w3schools.com/sql/sql-intro.asp/beginner-sql-tutorial.com/sql-comands.htm
2. https://www.tutorialspoint.com/sql/sql_tutorial.pdf
3. https://www.tutorialkart.com/tally/tally-tutorial/

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	M	S
CO2	S	S	H	H	M
CO3	S	S	S	H	H
CO4	H	M	H	M	S
CO5	S	S	M	H	S

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

Programme Code:	BCA	**Programme Title:**	Computer Applications	
Course Code:	19UACAP6	**Course Title:**	**Batch:**	2019
Total Hours:	60	Major Core Programming Lab - VI: (Visual Programming) (Common for CS, BCA, IT and CT**)**	**Semester:**	IV
			Credits:	2.0

Course Objective

The course aims

- To understand the structure of visual programming.
- To learn usage of basic concepts of visual programming.
- To know how to use Lists, Database Connectivity, Functions in visual programming programs.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K1, K2, K5	**CO1**	Construct and execute basic programs in Visual programming.
K1, K2, K5	**CO2**	Identify and repair coding errors in a program.
K1, K2, K3, K5	**CO3**	Use primitive data types, control statements, functions to write programs.
K1, K2, K3, K4, K5	**CO4**	Use of controls in Visual programming.
K1, K2, K3, K4, K5	**CO5**	Develop programs to solve a variety of problems in science, business, and games.

K1– Remember; **K2**– Understanding; **K3** – Apply; **K4**– Analyze; **K5**– Evaluate

S. No.	SYLLABUS (60 Hours)
1	Write a VB equivalent Program to find the sum of digits of the given number.
2	Write a VB equivalent Program to exchange items among two list boxes.
3	Write a VB equivalent Program to change the text foreground color and textbox Background color using scroll bar.
4	Write a VB equivalent Program to check whether the given string is palindrome or not.
5	Write a VB equivalent Program to replace the given character and to find the number of occurrences of the given character.
6	Write a VB equivalent Program to find the factorial value and generate the fibonacci series for the given number.
7	Write a VB equivalent Program to move the text in the label box using slider control.
8	Write a VB equivalent Program to change the size of an image in a picture box.
9	Write a VB equivalent Program to use the various options of the common dialog boxes.
10	Write a VB equivalent Program for moving an image randomly within a window using timer control.
11	Write a VB equivalent Program to design a calculator for performing arithmetic Operations.
12	Write a VB equivalent Program to draw different shapes using menu editor.
13	Write a VB equivalent Program to view the employee details stored in a database table using MYSQL.
14	Write a VB equivalent Program to generate a telephone bill stored in a database table using MYSQL.

15	Write a VB equivalent Program to generate student mark sheet stored in a database table using MYSQL.

Text Book:

Dr. Narendra Kumar, Shilpi Srivastava, Rajesh Chadhary, Hariom Pancholi, "*Visual Basic*", Vayu Education of India, First Edition, 2011. (Unit I – V)

Reference Books:

1. Mohammed Azam, "*Programming with Visual Basic 6.0*", Vikas Publishing House Pvt. Ltd, First Reprint, 2009.
2. Gray Cornell, "*Visual Basic 6.0 from the Ground up*", Tata McGraw Hill, 2013.
3. N.Krishnan, N.Saravanan, "*Mastering Visual Basic 6.0 In 30 Days*", SciTech Publications Pvt. Ltd, Reprint, 2012.
4. Hasit Mehta, Radhika Raval, "*Visual Basic Applications & Programming*", Acme Learning Pvt. Ltd, First Edition, 2010.

E-references:

1. https://lecturenotes.in/materials/17698-note-of-visual-basic-by-magesh-kid
2. https://www.scribd.com/doc/24339321/Visual-Basic-6-0-Notes-short
3. https://www.uotechnology.edu.iq/appsciences/filesPDF/material/lectures/2c/5-Computer1.pdf
4. https://www.vbtutor.net/vb6/vb6_preview.pdf

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S
CO2	S	S	M	H	S
CO3	S	S	H	S	H
CO4	S	M	S	S	H
CO5	H	S	S	S	H

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

Question Paper Pattern

(Common for Major, Allied, Allied Optional and Major Optional Papers)

For EOS Examinations: 70 Marks

The Question Paper is to be divided into THREE Sections.

Section-A Carries 15 Marks, Section-B Carries 25 Marks and Section-C Carries 30 Marks.

Section-A Contains 15 Multiple Choice Questions. (15 x 1 = 15 Marks)

Three Questions from each unit. (Q. No: 1 to 15)

Section-B Contains 5 Either or Choice Questions. (5 x 5 = 25)

Each Question carries 5 Marks. Both (a) and (b) from the same unit.

Q. No.: 16 (a) or (b) to 20(a) or (b)

Section-C Contains 5 Questions out of which, 3 Questions are to be answered. (3 x 10 = 30)

Each Question carries 10 Marks. One Question from each unit. Q. No.: 21 to 25

For CIA Examinations: 30 Marks

Section-A: 10 Multiple Choice Questions. (10 x 1 = 10)

Section-B: Two Questions out of Three. (2 x 5 = 10)

Section-C: One Question out of Two. (1 x 10 = 10)

Programme Code:	ALL U.G.	**Programme Title:**	Allied Optional	
Course Code:	19UDCA01	**Course Title:**	**Batch**	2019
Total Hours:	90	Fundamentals of Computers	**Semester**	IV
			Credits	5.0

Course Objective

The course aims

- To study the computer system and architecture.
- To know about the memory and storage management.
- To get knowledge about input and output devices.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K2	**CO1**	Understand computer architecture.
K3	**CO2**	Understand memory units.
K1, K2	**CO3**	Known input and output units.
K4, K5	**CO4**	Known number systems.
K5	**CO5**	Understand network communications and internet.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Introduction – Generations of Computers – Classification of Computers – Computing Concepts – The Computer System – Applications of Computers. Computer Organisation and Architecture – Introduction – Central Processing Unit – The Bus – Instruction Set.	**18**
II	Memory and Storage Systems – Introduction – Memory Representation – ***RAM**** – ***ROM**** – Storage Systems – Optical Storage Systems – Magneto Optical Systems – Solid-state Storage Devices – Storage Evolution Criteria.	**18**
III	Input Devices: Introduction – ***Keyboard**** – Pointing Devices – Scanning Devices – Optical recognition Devices – Digital Camera – Voice Recognition System – Media Input Devices. Output Devices: Introduction – ***Display Monitors**** – Printers – Impact Printers – Non-impact Printers – Plotters – Voice Output Systems – Projectors – Terminals.	**18**
IV	Number Systems: Introduction – Number System – Conversions – Binary Addition and Subtraction – Binary Multiplication and Division – Complements – Binary Coded Decimal Number Representation. Flowcharts: Introduction – Algorithm – Flow Chart – Pseudocode – Decision Table.	**18**
V	Data Communications and Computer Networks: Introduction – Data Communication – Computer Networks – Network Topology – Network Terms. Internet Basis: Introduction to Internet – The History of the Internet – Applications of Internet - Domain Name System – Email – FTP.	**18**

<* ***- Self study***>

Text Books:

1. E.Balagurusamy, “Fundamentals of Computers”, Tata McGraw Hill, First Edition, 2009. (Unit I - III)
2. Dr. Manoj Wadhwa, “Fundamental of Computers”, International Book House PVT. LTD, New Delhi, First Edition, 2011. (Unit IV – V)

Reference Books:

1. Priti Sinha, “Computer Fundamentals”, BPB Publications, Sixth Edition, 2003.
2. R.Krishnamoorthy, “Computer Programming Basic and Fortran”, J.J.Publications, Second Edition, 2010.
3. Sybex, “Internet Complete”, BPB Publications, New Delhi, Second Edition, 2000.

E-References:

1. https://www.javatpoint.com/computer-fundamentals-tutorial.
2. http://people.bu.edu/baws/computer%20fundamental.html.
3. https://www.chtips.com/computer-fundamentals/what-is-computer-fundamentals

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	H
CO2	S	M	L	H	S
CO3	S	S	H	M	S
CO4	M	M	M	L	M
CO5	S	M	S	H	S

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

Programme Code:	ALL U.G.	Programme Title:	Allied Optional	
Course Code:	19UDCA02	Course Title:	Batch:	2019
Total hours:	90	System Analysis and Design	Semester:	IV
			Credits:	5.0

Course Objective

The course aims

- To study the system life cycle, Feasibility studies, Implementations.
- To know about the System planning, Cost benefits.
- To get knowledge about System testing and software maintenance.

Course Outcomes (CO)

On the successful completion of the course, students will be able to

Knowledge Level	CO Number	Course Outcome
K2	**CO1**	Understand characteristics of system.
K3	**CO2**	Understand decision trees and Decision tables.
K1, K2	**CO3**	Known logical and physical design.
K4, K5	**CO4**	Known quality assurance goals of the system.
K5	**CO5**	Understand implementation and maintenance of system.

K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Characteristics of a system – Element of a systems – The system development life cycle, - Recognition of need – Feasibility study – Analysis – Design – Implementation – Post Implementation – Maintenance – ***Prototyping**** – Multifaced role of systems analyst.	**18**
II	System planning and initial investigation – Dimension of Planning – Needs identification – Determining the user's information requirements – Problem definition and Project initiation – Fact and Background Analysis – Kinds of information procedure – information gathering tools. Structured Analysis: Structure analysis tools – DFD – ***Data Dictionary**** – Decision tree and Decision tables, Feasibility study: System performance definition – Feasibility considerations – steps in feasibility analysis – Feasibility report, Cost Benefit analysis: Categories and procedures.	**18**
III	Process and stages of system design – Logical and Physical design – Structure design – HIPO and IPO charts – Audit considerations, Input/output design, Forms design: Classification – requirements of form – copy types – Layout considerations.	**18**
IV	System testing: Need of system testing – Activity network, Quality assurance goals – Audit trial – Activity network for conversion – Role of DP auditor	**18**
V	Post implementation review – Software maintenance – Maintenance cost – System Security – Threats of security – Control measures – disaster/Ethics in system development.	**18**

<* - Self study>

Text Book:

Elias H.Awad, "SYSTEM ANALYSIS AND DESIGN", Galgotia Publication, Second Edition, 1987. (Unit I – V)

Reference Books:

1. Jeffrey A.Hoffer, "MODERN SYSTEMS ANALYSIS AND DESIGN", Pearson Education, Fourth Edition, 2008.
2. Alan Daniels, Don Yeates, "BASIC SYSTEMS ANALYSIS", Galgotia Publications Pvt Ltd, Second Edition, 1986.
3. Jeffrey L.Whitten, Lonnie D.Bentley, Kevin C.Dittman," System Analysis and Design Methods", Seventh Edition, McGraw Hill, 1900.

E-References:

1. http://download.nos.org/cca/cca1.pdf.
2. https://en.wikibooks.org/wiki/Systems_Analysis_and_Design/Introduction.
3. http://www.ddegjust.ac.in/studymaterial/pgdca/ms-04.pdf.

Mapping with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	S	H
CO2	H	S	L	H	S
CO3	S	S	H	M	S
CO4	M	S	M	S	M
CO5	S	H	S	H	S

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