

ALAGAPPA UNIVERSITY

(A State University Accredited with A+ Grade by NAAC (CGPA: 3.64) in the Third Cycle)
Karaikudi, Tamilnadu, India

DIRECTORATE OF DISTANCE EDUCATION

PROGRAMME PROJECT REPORT

for

P.G.D.C.A

(Post Graduate Diploma in Computer Applications)



Submitted to
UGC, DISTANCE EDUCATION BUREAU (DEB)
New Delhi

For seeking approval to introduce new programme through Distance Education
Mode

Contents

Sl.no	Title	Page no.
a.	Programme mission & objectives	3
b.	Relevance of the program with HEI's mission and goals	3
c.	Nature of perspective target group of learners	4
d.	Appropriateness of programme to be conducted in open and distance learning mode to acquire specific skills and competence	4
e.	Instructional design	
	e.1. Curriculum design	4
	e.2. Detailed Syllabi	5
	e.3. Durations of the Programme	16
	e.4. Faculty and Support Staff Requirement	16
	e.5. Instructional Delivery Mechanism	17
	e.6. Identification of Media	17
	e.7. Student Support Services	17
f.	Procedure for admissions, curriculum transaction and evaluation	
	f.1. Minimum Qualification for Admission	17
	f.2. Curriculum transaction	17
	f.3. Evaluation	18
g.	Requirement of the laboratory support and library resources	21
h.	Cost estimate of the programme and the provisions	21
i.	Quality assurance mechanism and expected programme outcomes	21

Post Graduate Diploma in Computer Applications (PGDCA)
Choice Based Credit System (CBCS)
(With effective from June 2018-19 onwards)

a) Programme mission and objectives

Mission:

It provides a strong foundation in the theoretical concepts of Computer Science as well as a firm grounding in Visual Programming Languages. It is designed to enable one to undertake software applications for business and industry. Successful candidates could also opt for a teaching career in secondary schools.

Objectives:

The programme aims at inculcating essential skills as demanded by the industry through an interactive learning process. The broad objectives of the programme are:

- To train students in basic computer technology concepts and information technology applications.
- To enhance their career opportunities in the software development and maintenance sector in the state.
- To expose the students to Open Source Technologies so that they become familiar with it and can seek appropriate opportunity in trade and industry.
- To give hands on experience to students while developing real life IT application as part of the study.
- To augment the knowledge base of the students, through various activities which will be complementary to the theoretical studies.

Outcome:

- To widen the ability to plan, analyze, design, code, test, implement & maintain a software product for real time system
- To prepare the learners to pursue higher studies in computing or related disciplines and to work in the fields of teaching and research
- Pursuing PGDCA in this Computer oriented and technology driven era opens up a large number of job opportunities for the students. With in depth knowledge of Computer Application, Computer system, and software, the students can seek employment as Computer operator, Software Engineer, Application Specialist, Computer operator, Computer Teacher/ Instructor.

b) Relevance of the program with HEI's mission and goals

HEI's mission and goals to be offered through distance mode to reach quality higher education to the rural learners. The distance mode meets the mission of HEI's like Digital India and paper-less transaction will enrich the human resources for the uplift of the nation.

c) Nature of prospective target group of learners

The nature of prospective target group of learners is graduates from various disciplines like mathematics, physics, chemistry, electronics etc. It also includes the learners who want to become Entrepreneurs like web designers, Developers etc.

d) Appropriateness of programme to be conducted in open and distance learning mode to acquire specific skills and competence:

P.G.D.C.A programme through distance learning mode is developed in order to give subject specific including a) Digital computer organization b) Operating Systems c) Computer Graphics d) Unix and shell programming etc.

e) Instructional Design

e.1 Regulations and curriculum design

1. The University reserves the rights to amend the regulations, schemes of examinations and syllabi from time to time based on recent IT trends
2. Every student should secure 32 credits to complete P.G.D.C.A programme.
3. Each theory course carries 3 credits with 75 marks in the university end semester and 25 marks in the internal assessment and each practical (lab) course carries 2 credits with 75 marks in the university end semester examination and 25 marks in the internal assessment.

Programme Code: 412

COURSE OF STUDY AND SCHEME OF EXAMINATION

S.No	Subject Code	Title	CIA marks	ESE marks	Total Marks	credits
I SEMESTER						
1	41211	Digital Computer Organization	25	75	100	4
2	41212	Object oriented programming with C++	25	75	100	4
3	41213	Data Structures and Algorithms	25	75	100	4
4	41214	Computer Lab: Data Structures using C++	25	75	100	4
			100	300	400	16

II SEMESTER

S.No	Subject Code	Title	CIA marks	ESE marks	Total Marks	credits
1	41221	Software Engineering	25	75	100	4
2	41222	Relational Database Management Systems	25	75	100	4
3	41223	Computer Graphics	25	75	100	4
4	41224	Computer Lab-IV: RDBMS lab	25	75	100	4
		Total	100	300	400	16
			200	600	800	32

CIA: Continuous Internal Assessment

ESE: End Semester Examination

Course Code Legend:

4	1	2	X	Y
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XXX – Programme code for P.G.D.C.A

X – Semester Number

Y – Course Number in the Semester

No.of Credits per Course (theory) 4
 No.of Credits per Course (practical) 4
 Total No.of credits per Semester 16
 Total No.of credits of the programme : 16 * 2 = 32

e.2 Detailed Syllabi

SEMESTER I

Course Code	Title of the Course
41211	DIGITAL COMPUTER ORGANIZATION

Course Objectives:

To impart the knowledge in the field of digital electronics
 To impart knowledge about the various components of a computer and its internals.

Course Requirements:

- Before studying this course, the student has knowledge about

- Basic principles of number system
- Concepts of digital, Boolean and instruction

Course Outcome:

After the completion of this course, the student will be able to:

- Design and realize the functionality of the computer hardware with basic gates and other components using combinational and sequential logic.
- Understand the importance of the hardware-software interface

Unit No	Description
BLOCK 1 :NUMBER SYSTEMS	
1	Number Systems : Binary, Octal, Decimal and Hexadecimal number systems – Conversion from one base to another base – Use of complements – binary arithmetic – Numeric and Character codes.
2	Boolean algebra and Combinational Circuits: Fundamental concepts of Boolean Algebra – De Morgan’s theorems
3	Simplification of expressions – Sum of products and products of sums – Karnaugh map simplification – Quine - McKluskey method – two level implementation of Combinational Circuits.
BLOCK 2 COMBINATIONAL CIRCUITS AND SEQUENTIAL CIRCUITS	
4	Combinational Circuits: Half Adder – Full Adder – Subtractors – Decoders – Encoders – Multiplexers – Demultiplexer.
5	Sequential Circuits: Flip flops – Registers – Shift Registers – Binary Counters – BCD Counters – Memory Unit.
6	Data Representation : Data Types – Complements – Fixed Point Representations – Floating Point Representations – Other Binary Codes – Error detection codes.
BLOCK 3 : BASIC COMPUTER ORGANIZATION AND DESIGN	
7	Instruction Codes : Instruction Codes – Computer Registers – Computer Instructions – Timing and Control
8	Instruction cycle: – Memory reference instructions – Input output and Interrupt – Complete Computer Description – Design on Basic Computer – Design of Accumulator logic
BLOCK : 4 CENTRAL PROCESSING UNIT	
9	Introduction – General Register organization – Stack organization
10	Instruction formats: – Addressing modes – Data transfer and manipulation – Program control.
11	Input – output organization: Peripheral devices – Input output interface – Asynchronous data transfer – Modes of transfer
12	Priority interrupt: – DMA – IOP – Serial Communication.
BLOCK : 5 MEMORY ORGANIZATION	
13	Memory Hierarchy – Main memory – Auxiliary memory – Associative memory
14	Memory organization: Cache memory – Virtual memory – Memory management hardware.

Text Books:

1. Digital Computer Fundamentals, 6th Edition, Thomas C. Bartee, Tata McGraw Hill, 2008.
2. Digital Logic and Computer Design, M. Morris Mano, Pearson Education, 2008.

Reference Books:

1. Digital Computer Electronics, 3rd Edition, Albert Paul Malvino and Jerald A. Brown, Tata McGraw Hill, 2008.
2. Computer Organization, 5th Edition, V.C. Hamacher et al, Tata McGraw Hill.

Course Code	Title of the Course
41212	OBJECT ORIENTED PROGRAMMING with C++

Course Objectives:

- To provide an overview of working principles of object oriented paradigm
- To understand and apply the OOPs fundamentals
- To implement the features of OOP in real world applications

Course Outcome:

- Able to understand the object oriented programming techniques

Unit No.	Contents
	BLOCK 1: INTRODUCTION
1	Introduction and Features: Evolution of Object Oriented Language, Object oriented Paradigm, Basic concept of object-oriented programming- objects, classes, encapsulation and data abstraction, inheritance, polymorphism, dynamic binding, message passing
2	Popular OOP languages. Moving from C to C++ Introduction – Predefined console streams, hierarchy of console stream classes,
3	I/O operations; Unformatted I/O operations, formatted console I/O operations, manipulators, custom/user-defined manipulators.
	BLOCK 2 : CLASSES AND OBJECTS
4	Classes and Objects: Introduction, class specification, class objects, accessing class members, defining member functions, accessing member functions within a class, outside member functions as inline, private member function,
5	Memory allocation for objects: array of objects, function prototype, call by reference, return by reference, objects as function arguments, inline function, friend function, constant parameter and member function.
6	Object Initialization: Introduction - constructors, default constructor, parameterized constructors, multiple constructors in a class, dynamic initialization through constructors, copy constructor, dynamic constructor, destructor. Dynamic Objects: Introduction, pointers to objects, array of pointers to objects, this pointer.
	BLOCK 3 : INHERITANCE, POLYMORPHISM AND DATA CONVERSION
7	Inheritance: Introduction, derived class declaration, forms of inheritance, inheritance and member accessibility, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance.

8	Polymorphism: Introduction, Function overloading, Operator overloading introduction, unary operator overloading, binary operator overloading, assignment operator overloading, overloading with friend functions.
9	Data conversion: conversion between basic data types, conversion between objects and basic types, conversion between objects of different classes. Virtual function: Introduction, need for virtual functions, pure virtual functions, abstract classes.
BLOCK 4 : TEMPLATES AND FILES	
10	Generic Programming with Templates: Introduction - class templates – class template with multiple arguments
11	Function template: function template with multiple arguments. inheritance of class template.
12	Streams with Files: Introduction, hierarchy of file stream classes, opening and closing of files, file pointers and their manipulators, sequential access to a file, file input/output with stream class, random access to a file.
BLOCK 5 : EXCEPTION HANDLING	
13	Exception Handling: Introduction – Basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism. Exceptions in constructors and destructors
14	Other Exception Handling methods: Handling uncaught exceptions, exceptions in operator overloaded functions, exception in inheritance tree, exceptions in class templates, memory allocation failure exception.

TEXT BOOK:

1. E.Balagurusamy, Object oriented programming in C++, Third Edition, Tata McGraw Hill Publications, 2007.
2. Mastering C++, K.R Venugopal and Rajkumar, T.Ravishankar, Tata McGraw Hill Publishing Company Ltd., 2006.

REFERENCE BOOK:

1. Object Oriented Programming in C++, Fourth Edition, Rober Lafore, Galgotia Publications Pvt. Ltd., New Delhi. 2010.

Course Code	Title of the Course
41213	DATA STRUCTURE AND ALGORITHMS

Course Objectives:

- The learner should be well versed with the fundamentals of Algorithms, learn various data structures, should be able to use them appropriately as per need during development of programs.
- Also, the learner should know different sorting and searching techniques so that correct techniques can be used in different programs so that the complexity of the program does not increase due the sorting/ search technique employed.

Course Outcome

After the completion of this course, the student will able to

- To write programs using structures, strings, arrays, pointers and strings for solving complex computational problem.
- Using the data structures real time applications
- Able to analyze the efficiency of Data Structures

Unit No	Contents
	BLOCK 1 : INTRODUCTION
1	Introduction to Data Structure : Types of Data Structure , Primitive data types Algorithms: –Time and space Complexity of algorithms
2	Arrays: Array initialization, Definition of Array, Characteristic of Array , One-dimensional Array, Two-dimensional array and Multi dimensional array
	BLOCK 2 : LINEAR DATA STRUCTURE
3	Stack : Stack related terms, Operations on a stack,
4	Representation of Stack: Implementation of a stack – application of Stack. Expression Evaluation Polish notation.
5	Queues: Operations on queue Circular Queue, Representation of Queues, Application of Queues
6	List: Merging lists, Linked list, Single linked list, Double Linked List, Header Linked list
7	Operation on Linked List : Insertion and Deletion of linked list
8	Traversal: Traversing a linked list , Representation of linked list.
	BLOCK 3 NON-LINEAR DATA STRUCTURE
9	Trees: Binary Trees, Types of Binary trees, Binary Tree Representation
10	Binary Tree operations / Applications : Traversing Binary Trees, Binary Search tree,
11	Operations on Binary Tree: Insertion and Deletion operations, Hashing Techniques.
	BLOCK 4 : SEARCHING TECHNIQUES
12	Searching : Introduction, Searching, Linear Search, Binary Search
	BLOCK 5 : SORTING TECHNIQUES
13	Sorting: Bubble sort, Insertion sort, Radix sort
14	Other sorting Techniques: Selection sort, Quick sort, Tree sort.

Text Books:

1. Fundamentals of Data structures , Second edition, Ellis Horowitz and Sartaj Sahini, Universities press, 2007.
2. Data Structures, Seymour Lipschutz, G.A.Vijayalakshmi Pai, Second Edition , Schaum's Outlines, Tata Mc-Graw Hill Private Ltd., 2006.

Reference Books:

1. Programming and Data Structure, Pearson Edition, Ashok N Kamthane, 2007.

Course Code	Title of the Course
41214	DATA STRUCTURE USING C++ - LAB

Course Objectives

- To be able to solve data structure problems using C++ language
- To learn and implement C++ language programming techniques
- To introduce the efficiency of the algorithm

Course Outcome

- Students can develop programming knowledge/
- Students can solve any kind of problems using C++ language
- Data Structure based problems can be solved

Experiments based on c++ programming and Data Structures

Unit No.	Contents
	BLOCK 1 : SIMPLE C++ PROGRAMS
1	Introduction Simple C++ Programs
2	Control Structures: Using if and switch constructs Programs
3	Looping , Arrays ,Structure statements: for, while, do-while, Strings and Matrices Programs Problems
	BLOCK 2 : OOPs CONCEPTS
4	Functions: static function, friend function ,constructor , destructor and operator overloading and Recursive programs
5	Inheritance and polymorphism: Inheritance types and polymorphism types, Virtual function
6	File: File Handling C++ Programs, opening and closing a data file - creating a data file, processing a data file.
7	Pointers : Pointers and Pointers with Arrays Programs
	BLOCK 3: LINEAR DATA STRUCTURE
8	Stacks : Stack Implementation, expression evaluation, Polish notation
9	Queues: Queue Implementation, Applications of Queue
10	Linked List programs: List, Merging lists, Linked list, Single linked list, Double Linked List, Header Linked list, Insertion and Deletion of linked list, Traversing a linked list.
	BLOCK 4 : NON LINEAR DATA STRUCTURE
11	Tree Programs : Trees, Binary Trees, Types of Binary trees, Binary Tree Representation, Traversing Binary Trees, Binary Search tree, Insertion and Deletion operations,
12	Graphs: Shortest Path Algorithms o Dijkstra's Algorithm o Graphs with Negative Edge costs o Acyclic Graphs o All Pairs Shortest Paths Algorithm Minimum cost Spanning Trees o Kruskal's Algorithm o Prims's Algorithm o Applications <input type="checkbox"/> Breadth First Search

	BLOCK 5 : SEARCHING AND SORTING ALGORITHMS
13	Searching Techniques: Linear and Binary search Programs
14	Sorting techniques: Bubble sort, Quick sort, Insertion sort, Merge sort

Reference Books:

1. Data Structures, Seymour Lipschutz, G.A.Vijayalakshmi Pai, Second Edition , Schaum's Outlines, Tata Mc-Graw Hill Private Ltd., 2006.
2. Fundamentals of Data structures in C, Second edition, Ellis Horowitz and Sartaj Sahini, Universities press, 2007.
3. Programming and Data Structure, Pearson Edition, Ashok N Kamthane, 2007.

SEMESTER II

Course Code	Title of the Course
41221	SOFTWARE ENGINEERING

Course Objective:

- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software

Course Requirement:

- Fundamental concepts of Software Engineering

Course Outcome:

- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing.

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Software: Role of software, Software myths. Generic view of process: A layered technology, a process framework, The Capability Maturity Model Integration (CMMI)
2	Process patterns, <i>Process assessment, Personal and Team process models.</i>
3	Process model: <i>The waterfall model, Incremental process models, Evolutionary process models, The Unified process.</i>
	BLOCK 2 : REQUIREMENT ENGINEERING:
4	Design and Construction, Requirement Engineering Tasks, Requirements Engineering Process, Validating Requirements.
5	Building the Analysis Model: Requirement analysis, Data Modeling concepts, Object-Oriented Analysis
6	Modeling: Scenario-Based Modeling, Flow-Oriented Modeling Class-Based Modeling, Creating a Behavioral Model.

BLOCK 3 : SYSTEM DESIGN	
7	Design Engineering: Design process and quality, Design concepts, the design model.
8	Architectural Design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.
9	User interface design: The Golden rules, User interface analysis and design, Interface analysis, Interface design steps, Design evaluation.
BLOCK 4 : SYSTEM TESTING	
10	Testing Strategies: Approach to Software Testing, Unit Testing, Integration Testing, Test strategies for Object-Oriented Software, Validation Testing, System Testing, the art of Debugging, Black-Box and White-Box testing.
11	Product Metrics: Software Quality, Product Metrics, Metrics for Analysis Model, Design Model, Source code and Metrics for testing, Metrics for maintenance. Metrics for Process and Projects Domains: Software Measurement, Metrics for Software Quality and Software Process.
BLOCK 5 : RISK and QUALITY MANAGEMENT	
12	Risk Strategies: Reactive vs. Proactive Risk strategies, software risks, Risk identification
13	Risk Protection and refinement: Risk projection, Risk refinement, Risk Mitigation, Monitoring and Management, RMMM Plan.
14	Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal Technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOK:

1. Roger S. Pressman Software Engineering - A practitioner's Approach McGraw-Hill 6th Edition (2010)

REFERENCE BOOKS:

1. Richard Fairlay Software Engineering Concepts McGraw Hill Book Company (2005)
2. Pankaj Jalote An Integrated Approach to Software Engineering Narosa Publishing House 3rd Edition (2005)
3. Software Engineering, Somzerville, 8th Edition, Pearson Education 2007.
4. Software Engineering K.K. Agarwal & Yogesh Singh, 3rd Edition New Age International Publishers 2007.
5. Software Engineering an Engineering Approach James F. Peters, Witold Pedrycz - John Wiley & Sons 2000.
6. Software Engineering Principles and Practice Waman S Jawadekar, , Tata McGraw-Hill 2004.

Course Code	Title of the Course
41222	RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS)

Course Objectives:

- To understand the fundamentals of data models
- To make a study of SQL and relational database design.
- To know about data storage techniques an query processing.

- To impart knowledge in transaction processing, concurrency control techniques and External storage

Course Requirements:

- Knowledge about the basic concepts of the database.

Course Outcome:

- Design a database using ER diagrams and map ER into Relations and normalize the relations
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.

Unit No	Contents
BLOCK 1 INTRODUCTION	
1	Data base System Applications , data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model
2	<i>Model :Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.</i>
3	History of Data base Systems - Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.
BLOCK 2 : RELATIONAL MODEL	
4	Introduction – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying / altering Tables and Views.
5	Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews –
6	Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.
BLOCK 3 : SQL QUERY	
7	Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases. Schema refinement
8	Normal forms :Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF–
9	Join: Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.
BLOCK 4 TRANSACTION	
10	Introduction :Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability

11	Protocols: Lock Based Protocols – Timestamp Based Protocols- Validation-Based Protocols – Multiple Granularity.
12	Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage- Advance Recovery systems- Remote Backup systems
BLOCK 5 STORAGE	
13	Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and
14	Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Text Books:

1. Raghurama Krishnan, Johannes Gehrke, Data base Management Systems, 3rd Edition, TATA McGrawHill.2003.
2. Silberschatz, Korth, Data base System Concepts, 6th Edition, Tata McGraw Hill, 2011.

Reference Books:

1. Relational Database Principles 2nd Edition, Colin Ritchie, 2004
2. Sharad Maheswari and Ruchin Jain, Database management systems Complete Practical Approach, Firewall media, 2006
3. Peter Rob & Carlos Coronel, Data base Systems design, Implementation, and Management, 7th Edition.
4. Elmasri Navrate , Fundamentals of Database Systems, Pearson Education.

Course Code	Title of the Course
41223	COMPUTER GRAPHICS

Course Objectives:

- To understand computational development of graphics
- To provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application.

Course Outcome:

- Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
- Able to develop interactive animations.

Unit No.	Contents
BLOCK 1 : INTRODUCTION	
1	Introduction Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.
2	Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.
3	Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

BLOCK 2 : 2 D TRANSFORM AND CLIPPING	
4	2-D geometrical transform: Translation, scaling, rotation, reflection and shear transformations
5	2D Matrix representations: homogeneous coordinates, composite transforms, transformations between coordinate systems.
6	2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions,
7	Clipping Algorithms: Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.
BLOCK 3 : 3D OBJECT REPRESENTATION	
8	Introduction: Polygon surfaces, quadric surfaces, spline representation,
9	Curve and surfaces: Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.
BLOCK 4 : 3D GEOMETRIC TRANSFORMATION	
10	3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
11	3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.
BLOCK 5 : VISIBLE SURFACE DETECTION METHODS AND ANIMATION	
12	Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.
13	Computer animation: Design of animation sequence, general computer animation functions, raster animation,
14	Other Animation Techniques: Computer animation languages, key frame systems, motion specifications.

Text Books

1. Donald Hearn and M.Pauline Baker, Computer Graphics C version, Pearson Education, 2007.

Reference Books:

1. M. Newman and F. Sproull, Interactive Computer Graphics, McGraw Hill 2004
2. Foley, VanDam, Feiner and Hughes, Computer Graphics Principles and Practice, 2nd Edition in C, Pearson Education, 2004.
3. Plastok and Gordon Kalley, Computer, McGraw Hill 2000.

Course Code	Title of the Course
41224	RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS) LAB

Use the concepts like data normalization, link between table by means of foreign keys and other relevant database concepts for the following applications. The implementation of each should have necessary input screen (forms) Menu-driven query processing and reports. Necessary validations should be made for each table;

Unit No.	Contents
BLOCK 1 : TABLE MANIPULATION	
1	Table creation, Renaming a Table, Copying another table, Dropping a Table
2	Table Description: Describing Table Definitions, Modifying Tables, Joining tables, Number and Date functions.
BLOCK 2 : SQL QUERIES AND SUB QUERIES	
3	SQL Queries: Queries, Sub Queries, and aggregate functions
4	DDL: Experiments using database DDL SQL statements
5	DML: Experiment using database DML SQL statements
6	DCL: Experiment using database DCL SQL statements
BLOCK 3 : INDEX AND VIEW	
7	Index : Experiment using database index creation, Renaming a index, Copying another index, Dropping a index
8	Views: <i>Create Views, Partition and locks</i>
BLOCK 4 : EXCEPTION HANDLING AND PL/SQL	
9	Exception Handling: PL/SQL Procedure for application using exception handling
10	Cursor: PL/SQL Procedure for application using cursors
11	Trigger: PL/SQL Procedure for application using triggers
12	Package: PL/SQL Procedure for application using package
13	Reports: DBMS programs to prepare report using functions
BLOCK 5 : APPLICATION DEVELOPMENT	
14	Design and Develop Application: Library information system, Students mark sheet processing, Telephone directory maintenance, Gas booking and delivering, Electricity bill processing, Bank Transaction, Pay roll processing. Personal information system, Question database and conducting Quiz and Personal diary

Reference Books:

1. Raghurama Krishnan, Johannes Gehrke, Data base Management Systems, 3rd Edition, TATA McGrawHill.2003.
2. Silberschatz, Korth, Data base System Concepts, 6th Edition, Tata McGraw Hill, 2011.
3. Relational Database Principles 2nd Edition, Colin Ritchie, 2004
4. Sharad Maheswari and Ruchin Jain, Database management systems Complete Practical Approach, Firewall media, 2006
5. Peter Rob & Carlos Coronel, Data base Systems design, Implementation, and Management, 7th Edition.
6. Elmasri Navrate , Fundamentals of Database Systems, Pearson Education.

e.3 Duration of the Programme:

The P.G.D.C.A programme shall consist of a period of one year (Two Semesters).

e.4 Faculty and Support Staff Requirements:

The following faculty and support staff is required for this programme.

S.No	Staff Category	Numbers
1	Computer Science Subject Core Faculty*	3
2	Inter-disciplinary Subject Faculty* (Mathematics, Account & Financial Management and Communication Skills)	-

3	Lab Assistant	1
4	Clerical Assistant	1

* Faculty at least in Assistant Professor level

e.5 Instructional Delivery mechanisms

The instructional delivery mechanisms of the programme includes SLM- Study materials, Lab instruction manual, Personal contact session for both theory and practical courses of the programme, e-version of the course materials in the form of CD, e-book, e-tutorials, Massive Open Online Courses (MOOC) courses, Open Educational Resources(OER) and virtual lab.

e.6 Identification of media

The printed version of SLM – study material shall be given to the learners in addition to MOOC, E-tutorial and virtual lab.

e.7 Student Support Services

The student support services will be facilitated by the Directorate of Distance Education, Alagappa University, Karaikudi and its approved learning centres located in various parts of Tamilnadu.

The pre-admission student support services like counseling about the programme including curriculum design, mode of delivery, fee structure and evaluation methods will be explained by the staff at Directorate of Distance Education or Learning centres. The post - admission student support services like issuing Identity card, study materials will be provided thru Directorate or Learning centres. The face to face contact sessions of the programme for both theory and practical's will be held at the Directorate or Learning centres. The student support regarding the conduct of examinations, evaluations, publication of results and certificates done by the Office of the Controller of Examinations, Alagappa University, Karaikudi

(f) Procedure for Admissions, curriculum transaction and evaluation

f.1 Minimum qualification for admission

Candidates for admission to the Post Graduate Diploma in Computer Applications (P.G.D.C.A) programme shall be required to have passed the following examinations. Candidates who have passed any degree of Recognized University or authority accepted by the Syndicate of the Alagappa University as equivalent thereto shall be eligible.

f.2 Curriculum transaction

- The face to face contact sessions in class room teaching with the support of SLM, Power Point Presentations, web based tools, audio and animated videos.
- The practical classes are based on the respective subject study materials containing requirement for the laboratory experiments.
- Face to face contact sessions will be conducted for both theory and practical courses in the following manner.

Course Type	Face to face contact session per semester (in Hours)
Theory courses (3 Courses with 4 credits each)	48
Practical courses (1 Courses with 4 credits each)	120
Total	168

The examinations shall be conducted separately for theory and practical's to assess the knowledge acquired during the study. There shall be two systems of examinations viz., internal and external examinations. In the case of theory courses, the internal evaluation shall be conducted as Continuous Internal Assessment via. Student assignments preparation and seminar, etc. The internal assessment shall comprise of maximum 25 marks for each course. The end semester examination shall be of three hours duration to each course at the end of each semester. In the case of Practical courses, the internal will be done through continuous assessment of skill in demonstrating the experiments and record or report preparation. The external evaluation consists of an end semester practical examinations which comprise of 75 marks for each course.

f.3.1 Minimum for a pass:

- For internal Examination, the passing minimum shall be 40% (Forty Percentage) of the maximum marks (25) prescribed for UG and PG Courses.
- For External Examination, the passing minimum shall be 40% (Forty Percentage) of the maximum marks (75) prescribed for UG and PG Courses.
- In the aggregate (External + Internal), the passing minimum shall be 40% for UG and 50% for PG courses.

f.3.2 Question Paper Pattern - Theory

The end semester examination will be conducted in the duration of 3 Hours and maximum of 75 Marks.

Answer ALL questions

One question from each unit from the course syllabi

Part – A (10 x 2 Marks: 20 Marks)

Part – B (5 x 5 Marks: 25 Marks) (Internal Choice)

Part – C (3 x 10 Marks: 30 Marks) (Internal Choice)

f.3.3 Procedure for Completing the Course:

A student shall be permitted to continue the programme from I to II semester irrespective of failure(s) in the courses of the earlier semesters. The candidate will qualify for the PGDCA degree only if he/she passes all the (including arrears) courses with in a period of FIVE years from the date of admission.

f.3.4 Results and Classification:

Results will be declared at the end of each semester of the University examination and

the marks/grade obtained by the candidate will be forwarded to them by the Controller of Examinations, Alagappa University.

f.3.4.1 Marks and grades

The following table gives the marks, grade points, letter, grades and classification to indicate the performance of the candidate

Range of Marks	Grade Points	Letter Grade	Description
90-100	9.0 - 10.00	O	Outstanding
80-89	8.0 - 8.9	D+	Excellent
75-79	7.5 - 7.9	D	Distinction
70-74	7.0 - 7.4	A+	Very Good
60-69	6.0 - 6.9	A	Good
50-59	5.0 - 5.9	B	Average

00-49	0.00	U	Reappear
ABSENT	0.00	AAA	Absent

For a semester

$$\text{Grade Point Average [GPA]} = \frac{\sum C_i G_i}{\sum C_i}$$

Grade Point Average = $\frac{\text{Sum of the multiplication of Grade points by the credit of the courses}}{\text{Sum of the credit of the courses in the semester}}$

$$= \frac{\text{Sum of [Credit earned x Grade Points]}}{\text{Sum of the credits earned in the semester}}$$

For the entire programme

$$\text{Cumulative Grade Point Average [CGPA]} = \frac{\sum_n \sum_i C_{ni} G_{ni}}{\sum_n \sum_i C_{ni}}$$

= $\frac{\text{sum of the multiplication of grade points by the credits of the entire programme}}{\text{Sum of the credits of the courses for the entire programme}}$

Where

C_i - Credits earned for the course i in any semester

G_i - Grade Point earned for course i in any semester

n - is number of all Courses successfully cleared during the particular semester in the case of GPA and during all the semesters (programme) in the case of CGPA.

CGPA	Grade	Classification of Final Result
9.5 – 10.00	O+	First class – Exemplary*
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First class with Distinction*
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
0.0 and above but below 5.0	U	Reappear

* The candidates who have passed in the first appearance and within the prescribed semester

f.4 Fees Structure

Fee Particulars	Amount in (Rs)	Nature of Fees
	First Year	
Admission Processing Fees	300	Non-refundable
Course Fees	8300	Non-refundable
ICT fees	150	Non-refundable
Total Fees(in Rs)	8750	Non-refundable

The above mentioned fees structure is exclusive of examination fees.

(g) Requirement of the laboratory support and library resources

g.1 Laboratory Support

A well-equipment Computer Laboratory was established in the Alagappa University, Karaikudi with necessary software's as per the practical's syllabi for conducting face to face contact sessions for practical courses of this programme. Model Practical Questions is available to the learners in the university website.

g.2 Library Resources

The Directorate of Distance Education, Alagappa University provides library facility with number of books and Self Learning materials for Computer Science programmes. The Central library of Alagappa University provides the collection of volumes of Self Learning Materials, Printed books, Subscriptions to printed periodicals and Non-book materials in print form for the learner's references. All these library resources are meant for learner's reference purpose only.

(h) Cost estimate of the programme and the provisions:

S.No	Expense details	Approximate Amount in (Rs.)
1	Programme development(Single Time Investment)	20,00,000/-
2	Programme delivery(Per Year)	24,00,000/-
3	Programme maintenance	5,00,000/-

(i) Quality assurance mechanism and expected programme outcomes:

i.1 University's Moto:

'Excellence in Action'

i.2 University's Vision and Mission

Vision

Achieving Excellence in all spheres of Education, with particular emphasis on ' PEARL' - Pedagogy, Extension, Administration, Research and Learning.

Mission

Affording a High Quality Higher Education to the learners so that they are transformed into intellectually competent human resources that will help in the uplift of the nation to Educational, Social, Technological, Environmental and Economic Magnificence (ESTEEM).

i.3 University Objectives

1. Providing for instructions and training in such branches of Learning at the university may determine.

2. Fostering Research for the Advancement and Dissemination of Knowledge and Application.

i.4 Quality Policy

Attaining Benchmark Quality in every domain of 'PEARL' to assure Stakeholder Delight through Professionalism exhibited in terms of strong purpose, sincere efforts, steadfast direction and skillful execution.

i.5 Quality Quote

Quality Unleashes Opportunities Towards Excellence (QUOTE).

i.6. Course benchmarks

The benchmark qualities of the programme may be reviewed based on the performance of students in their end semester examinations and number of enrolments of students. Feedback from the alumni, students, parents, stakeholders and employers will be received to analyze the benchmark qualities for the further improvement of the programme.

Minutes of the Meeting of the Board of Studies in Computer Science for the Master of Computer Applications (M.C.A), M.Sc(Information Technology), M.Sc. (Computer Science), Post Graduate Diploma in Computer Applications (P.G.D.C.A), Bachelor of Computer Applications (B.C.A), B.Sc (Information Technology), B.Sc. (Computer Science) Programmes to be offered through Open Distance Learning (ODL) Mode held at The Directorate of Distance Education, Alagappa University, Karaikudi - 630 003, on 04.09.2017, (11.00 A.M).

Members Present

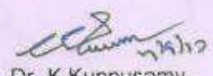
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|----|----------------------|---|-----------------|
| 1. | Dr. V. Palanisamy | - | Chairman |
| 2. | Dr. E.Ramaraj | - | Member |
| 3. | Dr. K.Kuppusamy | - | Member |
| 4. | Dr. T.Meyyappan | - | Member |
| 5. | Dr. S.S.Dhenakaran | - | Member |
| 6. | Dr. K.Mahesh | - | Special Invitee |
| 7. | Dr. A. Padmapriya | - | Special Invitee |
| 8. | Dr. P. Prabhu | - | Member |
| 9. | Mr S.Balasubramanian | - | Member |


After the deliberation and discussion the board resolved the following;

1. The Board considered the curriculum design and detailed syllabi of Computer Science programmes, prepared as per the norms and the Board scrutinized and necessary modifications are specified.
2. The Board resolved to approve curriculum design, detailed syllabi and other regulations for the Master of Computer Applications (M.C.A), M.Sc(Information Technology), M.Sc. (Computer Science), Post Graduate Diploma in Computer Applications (P.G.D.C.A), Bachelor of Computer Applications (B.C.A), B.Sc (Information Technology), B.Sc. (Computer Science) programmes to be offered from 2018-2019 academic year onwards by the Directorate of Distance Education of Alagappa University, Karaikudi.


Dr. V. Palanisamy

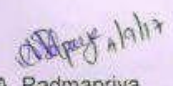

Dr. E. Ramaraj

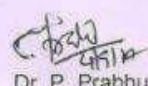

Dr. K. Kuppusamy

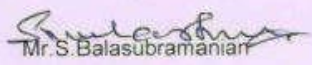

Dr. T. Meyyappan


Dr. S. S. Dhenakaran


Dr. K. Mahesh


Dr. A. Padmapriya


Dr. P. Prabhu


Mr. S. Balasubramanian