ALAGAPPA UNIVERSITY

(A State University Accredited with A+ Grade By NAAC(CGPA:3.64) in the Third Cycle and Graded as Category-I University By MHRD-UGC)
Karaikudi – 630003.
Tamilnadu

Directorate of Distance Education

PROGRAMME PROJECT REPORT

Certificate Course

in

C Programming

Submitted for seeking approval to introduce programme through Distance Education Mode

July 2020

Table of Contents

DIRECTORATE OF DISTANCE EDUCATION

CERTIFICATE COURSE IN C PROGRAMMING

Credit Based Curriculum and Evaluation System

(With effect from Academic Year 2020 - 2021 Onwards)

(a) PROGRAMME'S MISSION AND OBJECTIVES

Mission

Mission is to impart employability and creativity to the students and lives up to the standards of Computer science, Computer Applications and Information Technology (IT) industry.

Programme Objectives

This course will introduce you to the field of computer science and the fundamentals of computer programming. It is specifically designed for students with no prior programming experience, and touches upon a variety of fundamental topics. The goal of the computer science curriculum is to provide students with the knowledge and tools that will allow them to design and implement effective, economical, and creative solutions for the needs of individuals, society, and the high-tech economy.

(b) PROGRAMME OUTCOME

At the end of the course, student will be able to:

- Understand the nature of programming principles
- Know the fundamentals of computer and programming methods.
- have a strong understanding of the history of programming, and student will be ready to learn about programming concepts in more detail.

(c) NATURE OF PROSPECTIVE TARGET GROUP OF LEARNERS

The nature of prospective target group of learners is students from schools, Housewife's and college students from various discipline like Commerce, Mathematics, Physics, Chemistry, Biology, Electronics, and Engineering etc. It also includes the learners who want to become entrepreneurs like Web Designers, Web design instructor, Website Programmer, e-commerce site developer and web master, Software Developers, BPO's, KPO's etc.,

d) APPROPRIATENESS OF PROGRAMME TO BE CONDUCTED IN DISTANCE LEARNING MODE TO ACQUIRE SPECIFIC SKILLS AND COMPETENCE;

Certificate in C Programme through Distance Learning mode is developed in order to give subject-specific skills including i) fundamentals of programming ii) Knowledge about various kinds of programming constructs and logic development.

(E) INSTRUCTIONAL DESIGN

e.1 Revisions of Regulation and Curriculum Design

1. The University reserves the right to amend or change the regulations, schemes of examinations and syllabi from time to time based on recent market dynamics, industrial developments, research and feedback from stakeholders and learners.
2. Each student should secure 8 credits to complete certificate programme.
3. Each theory and practical course carry 2 credits with 75 marks in the University End Semester Examination (ESE) and 25 marks in the Continuous Internal Assessment (CIA).

Programme code :

Certificate course in C Programming	222

Course of Study and Scheme of Examinations

S.No	Course code	Name of the Course	CIA Marks Max.	ESE Marks Max.	Total Marks Max.	Credits
1	22211	Principles of Programming	25	75	100	2
2	22212	Programming in C	25	75	100	2
3	22213	Data structure and Algorithms	25	75	100	2
4	22214	C and Data structure Lab	25	75	100	2
		TOTAL	**100**	**300**	**400**	**8**

CIA : Continuous Internal Assessment ESE : End semester Examination

Course Code Legend:

2	2	2	S	C

222 – Programme code for Certificate Course in C Programming
S -- Semester Number
C – Course Number in the Semester

e.2 Detailed Syllabi

The detailed Syllabi of study and shall be as shown in Appendix.

e.3 Duration of the Programme:

The certificate programme shall consist of a period of six months (One Semester). Maximum duration to complete the course is 2 Years.

e.3.1 Medium of Instruction

The medium of instruction is only in **English**.
The course material is also in **English.**

e.4 Faculty and Support Staff Requirements:

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

S.No	Staff Category	Numbers
1	Core Faculty	2
2	Lab Assistant	1
3	Clerical Assistant	1

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 e-book, e-tutorials, Power Point, Video Lecture Links, Video Lectures, 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 are done by Office of the Controller of Examinations, Alagappa University, Karaikudi.

F. PROCEDURE FOR ADMISSION:

f.1 Minimum qualification for admission

Candidates for admission to the certificate programme shall be required to have passed HSc or (10+2/10+3) of any Recognized institution 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	**PCP (in Hours)**
Theory courses (3 Courses – 6 Hrs/course)	18
Practical course (1 Course – 60 Hrs/course	60
Total	**78**

f.3 Evaluation

There shall be two types of evaluation systems; internal assessment and end semester examination will be conducted by the University according to the following scheme. The maximum marks for the internal assessment for both theory and practical's is 25 marks. The maximum marks for end semester examination is 75 marks for each course. The candidate failing in any course(s) will be permitted to appear for each failed course(s) in the subsequent examination. Candidates who have passed the examination in all prescribed courses as per the above regulations shall be eligible for the award of the programme.

Internal assessment

- Internal assessment of theory courses is through home assignment with workbook, case studies, review questions, quiz, multiple choice questions etc., for 25 marks.
- Internal assessment for the practical courses shall be through home assignment which includes lab observation, workbook designing algorithm, preparing source code, PL/SQL coding etc., for 25 marks.
- Student should submit assignment for theory and practical courses of every course.

Division of Internal Marks (Assignment)

Theory		**Practical**	
Assignment	**Marks**	**Assignment**	**Marks**
Class test/Review questions Workbook, case studies, quiz, multiple choice questions	25	Model practical, Web Design Workbook for preparing source code, results	25

End Semester Examination (ESE)

The university end Semester Examinations shall be of three hours duration with maximum of 75 Marks for both theory and practical courses.

f.3.1 Minimum for a pass:

To pass in each course, a candidate is required to secure 40% marks in the End Semester Examination and 40% marks in the aggregate (marks in End Semester Examination + marks in Internal Assessment).

The student who does not secure required minimum marks for pass in a course(s) shall be required to reappear and pass the same in the subsequent examination.

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.

All the Units Should Be covered in each Part

Part – A (10 x 2 Marks: 20 Marks) Answer all questions

Part – B (5 x 5 Marks: 25 Marks) Answer all questions choosing either (a) or (b)

Part – C (3 x 10 Marks: 30 Marks) (Answer any 3 out of 5 questions)

End Semester Examination (ESE) - Practical

Students are required to prepare a separate lab record for each lab course. The practical counsellor should duly sign this lab record after each session.

Students shall prepare practical record note book which includes aim, algorithm, source code, input, expected output and result of the experiment and submit during end semester practical examination.

Division of marks in ESE – Practical (Maximum 75 marks)

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

Practical details	**Max. Marks**
Algorithm / Flowchart	10
Source Code	20
Debugging	10
Execution	10
Results	10
Viva-Voce	5
Record	10
Total	75

f.3.3 Procedure for Completing the Course:

The candidate will qualify for the certificate programme only if he/she passes all the (including arrears) courses with in a period of TWO years from the date of admission.

f.3.4 Results:

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.4 Fees Structure:

Fee Particulars	Rs.
Admission Processing Fees	100
Course Fees	2700
ICT fees	150
Total Fees	**2950**

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:

Expense details	Amount in (Rs.) Approx.
Programme development (Single time Investment)	20,00,000/-
Programme delivery (per year)	24,00,000/-
Programme maintenance (per year)	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.

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Appendix
Detailed Syllabi

22211 PRINCIPLES OF PROGRAMMING

Course objectives

- To understand the fundamentals of computers, program logic and software life cycle.
- Able to understand various types of software's and its applications.

Course outcome

At the end of the course, student will be able to:

- Understand the nature of programming principles
- Know the fundamentals of computer and programming methods.
- have a strong understanding of the history of programming, and student will be ready to learn about programming concepts in more detail.

Unit I : Introduction to Computers, History of computers, Types of computers, Characteristics of computers, Basic Anatomy of a computer, Applications of computer. Memory Types– RAM -ROM.

Unit II: Programming: Programs – An Introduction - Programming Languages – First and second Generations: generations and levels. The instruction set, Machine Language – the first generation; assembly language – second generation. Third Generation: High level language - Procedural languages

Unit III : Translators – compilers – assemblers – interpreters – Programming methods: Data structure and algorithms; block structured programming, modular programming, object-oriented programming – Rapid Application Development.

Unit IV : System Development: How programs are developed – defining the problem, designing the solution – Flow chart – pseudocode – coding the program – testing the results – document final product.

Unit V : Corporate development: System Analysis and design - software development life cycle – analysis – design – development – implementation - maintenance.

Unit VI : Software- Kinds of Software - The five types of Applications software - Word processing – Spreadsheets - Database software, Presentation graphics software - Communications software- System Software – Operating system- functions.

Books for Reference

1. Dennis P.Curtin, Kim dolwy, KunL AWN, Xrhleen morin, Information Technology, the breaking wave, TMH 2000.
2. Stacey C Sawyer, Brain K Williams, Sarah E Hutchinson Using Information Technology – Brief Version A Practical Introduction to Computer and Communications Third Edition, McGraw Hill Companies 2011
3. James O'Brien – Introduction to Information systems. 16th edition, 2005.

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Certificate Course in C Programming

Credit Based Curriculum and Evaluation System

22212 PROGRAMMING IN C

Course Objectives:

- To provide an overview of working principles of C language.
- To understand and apply the functions, arrays, pointers.
- To implement the features of C language in real world applications

Course Outcome:

At the end of the course, student will be able to:

- understand the C programming techniques
- solve the real-time problems using programming constructs

Unit I:

Introduction and Features: History of C, Importance of C, Basic Structure of C program, character set, Tokens, keywords and identifiers - Constants and variables and data types - declaration of variables, defining symbolic constants, declaring a variable as a constant - Operators and expressions: Evaluation of expressions, precedence of arithmetic operators.

Unit II:

Managing I/O operations: reading and writing a character, formatted input, output - Decision making and branching: IF statement, If..else statement, nesting if else statement, else if ladder, switch statement, goto statement, while statement, do statement, for statement.

Unit III:

Arrays: one-dimensional arrays, declaration, initialization, two dimensional arrays, multi-dimensional arrays, dynamic arrays. Strings : Declaration, Initialization of string variables, reading and writing strings, string handling functions.

Unit IV:

Functions basics: Elements of user defined functions, definitions, return values and their types, function calls, declaration, nesting of functions, recursion.

Unit V
Structures and Unions: Defining a structure, declaring a structure variable, accessing structure members, array of structures, array within structures, structures within structures, structures and functions

Unit VI:

Pointers: Basics, declaring, initialization of pointer variables, address of variable, accessing a variable through its pointer - Files: Introduction, Defining, opening and closing files, I/O operations on files

Books for Reference

1. Yashavanth Kanetkar, Let Us C, BPB publications, 2016.
2. Programming with C, Schaum outline series, Gottfried, TataMcHill,2010.
3. Programming with ANSI and Turbo C, Ashok N Kamthane, Pearson Education, 2008.
4. C: The complete reference, H Schildt, TMH Edition, 2000.

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22213 DATA STRUCTURES AND ALGORITHMS

Course Objectives:

- The learner should be well versed with the fundamentals of Algorithms, learn various data structures, 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;

- 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 I :
Introduction to Data Structure : Introduction – Define data structure - Types of Data Structure , Primitive data types -Algorithms –Time and space Complexity of algorithms.

Unit II:

Arrays: Array initialization, Definition of Array, Characteristic of Array, One- dimensional Array, Two-dimensional array and Multi-dimensional array.

Unit III:
Stack : Stack related terms, Operations on a stack - Representation of Stack: Implementation of a stack – application of Stack. Expression Evaluation Polish notation. Queues: Operations on queue Circular Queue, Representation of Queues, Application of Queues.

Unit IV:
List: Merging lists, Linked list, Single linked list, Double Linked List, Header - Linked list - Operation on Linked List : Insertion and Deletion of linked list -Traversal: Traversing a linked list , Representation of linked list.

Unit V:
Trees: Binary Trees, Types of Binary trees, Binary Tree Representation - Binary Tree operations / Applications : Traversing Binary Trees, Binary Search tree -Operations on Binary Tree: Insertion and Deletion operations, Hashing Techniques.

Unit VI:

Searching Techniques: Introduction, Searching, Types of searching, Linear Search, Binary search technique-Applications.

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.

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22214 C AND DATA STRUCTURE LAB

Course Objectives

- To be able to solve data structure problems using C language
- To learn and implement C language programming techniques.
- To know about the implementation of data structures..

Course Outcome

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

Lab Experiments based on C programming and Data Structures

Simple C Programs
Using if and switch constructs Programs
Looping statements Problems
Functions and Recursive programs
Arrays, Strings and Matrices Programs
File Handling Programs
Pointers and Arrays Programs
Programs using structure and union
Programs based on file handling
Exercises using Stacks, queues, expression evaluation programs
Infix to postfix conversion Program
Linked List programs: Single linked list, Double Linked List, Insertion and Deletion of linked list

REFERENCE BOOKS:

1. Programming in ANSI C, Fifth Edition, E.Balagurusamy, Tata McGraw-Hill Publishing Company Ltd, 2011
2. Data Structures, Seymour Lipschutz, G.A.Vijayalakshmi Pai, Second Edition , Schaum's Outlines, Tata Mc-Graw Hill Private Ltd., 2006.
3. Fundamentals of Data structures in C, Second edition, Ellis Horowitz and Sartaj Sahini, Universities press, 2007.
4. Programming and Data Structure, Pearson Edition, Ashok N Kamthane, 2007.

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Minutes of the Meeting of the Board of Studies in Computer Science by circulation to Board Members, for the Diploma in Computer Applications, Certificate Course in Computer Fundamentals, Certificate Course in Web Designing and Certificate Course in C Programming programmes to be offered through Distance Education mode held at the Directorate of Distance Education, Alagappa University, Karaikudi on 29-06-2020 at 3.00 p.m.

MEMBERS PRESENT:

1.	Dr.V.Palanisamy	:	Chairman
2.	Dr.T.Meyyappan	:	Member
3.	Dr.P.Prabhu	:	Member
4.	Mr.S.Balasubramanian	:	Member
5.	Dr.P.Eswaran	:	Member
6.	Dr.P.Thiyagarajan	:	Member
7.	Dr.R.Indra	:	Member
8.	Dr.A.Veera Ravi	:	Ex-Officio 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 Diploma in Computer Applications, Certificate Course in Computer Fundamentals, Certificate Course in Web Designing and Certificate Course in C Programming programmes to be offered from 2020-2021 academic year onwards by the Directorate of Distance Education, Alagappa University, Karaikudi.

29/6/2020
Dr.V.PALANISAMY

29/6/2020
Dr.T.MEYYAPPAN

29/6/2020
Dr.P.PRABHU

Mr.S.BALASUBRAMANIAN

29/6/2020
Dr.P.ESWARAN

Dr.P.THIYAGARAJAN

Dr.R.INDRA

29/6/20
Dr.A.VEERA RAVI