

ALAGAPPA UNIVERSITY

**Accredited with A+ Grade by NAAC (CGPA 3.64) in the Third Cycle
Karaikudi – 630003. Tamilnadu , INDIA**

Directorate of Distance Education



PROGRAMME PROJECT REPORT

for

Master of Computer Applications (M.C.A)

submitted to

**UGC, Distance Education Bureau (DEB),
New Delhi**

for seeking approval to introduce programme through Distance Education Mode

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ALAGAPPA UNIVERSITY, KARAIKUDI

DIRECTORATE OF DISTANCE EDUCATION

MASTER OF COMPUTER APPLICATIONS (M.C.A)

Credit Based System (CBS)

(With effect from June 2018-2019 Onwards)

(a) Programme's Mission and Objectives

Mission

Mission is to offer excellent career opportunities in various industries including software development companies in the areas of System analysis/design/developments/supports, mobile application programming, game programming, web and e-commerce development, database administration, software testing, education and training etc.

Programme Objectives:

- ✓ Discover, investigate the requirements of a problem and find the solution to them using computing principles.
- ✓ Create and evaluate a computer based system, components and process to meet the specific needs of applications.
- ✓ Utilize current techniques and tools necessary for complex computing practices.
- ✓ Develop and integrate effectively system based components into user environment.
- ✓ Identify the need and develop the skill to employ in learning as a computing professional.
- ✓ Execute effectively in a team environment to achieve a common goal.
- ✓ Classify opportunities and use innovative ideas to create value and wealth for the betterment of the individual and society.
- ✓ Proficiency in developing application with required domain knowledge.
- ✓ To facilitate learners to nurture skills to practice their professions competently to meet the ever-changing needs of society such as Digital India, Safety and Privacy.

Programme Outcome:

- ✓ To widen the ability to plan, analyze, design, code, test, implement & maintain a software product for real time system
- ✓ To support learners capability to set up their own enterprise in various sectors of Computer applications
- ✓ To improve the knowledge of the learners in finding solutions and developing system based applications for real time problems in various domains involving technical, managerial, economical & social constraints
- ✓ To develop in problem solving and programming skills in the various computing fields of IT industries.
- ✓ To prepare the learners to pursue higher studies in computing or related disciplines and to work in the fields of teaching and research.

(b) Relevance of the program with HEI's and Alagappa University Mission and Goals

This programme is aligned with HEI's and Alagappa University mission and goals to be offered through distance mode to reach quality higher education to the unreachable and/or rural learners. Higher education in Computer Science offered through distance mode meets the mission of HEI's like digital India and e-cash 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 Commerce, Mathematics, Physics, Chemistry, Biology, Electronics, and Engineering etc. It also includes the learners who want to become entrepreneurs like Web Designers, Software Developers, BPO's, KPO's etc.,

(d) Appropriateness of programme to be conducted in Open and Distance Learning mode to acquire specific skills and competence;

M.C.A Programme through Distance Learning mode is developed in order to give subject-specific skills including i) Knowledge about various kinds of programming languages ii) Digital Logic fundamentals, Operating systems, RDBMS, Data Structure and Software Engineering iii) inter-disciplinary knowledge like Discrete Mathematics and Accounting and Financial Management iv) Concepts like Object Oriented Analysis and Design Compiler Design Data Mining and Ware Housing v) Cutting Edge Technologies like Web Technology and .Net Framework.

(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 96 credits to complete M.C.A. programme.
3. Each theory and practical course carries 4 credits with 75 marks in the University End Semester Examination (ESE) and 25 marks in the Continuous Internal Assessment (CIA).

Programme code

M.C.A	315	M.C.A(Lateral Entry LE)	340
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Courses of Study

S.No	Course Code		Title of the Course	CIA Marks Max	ESE Marks Max	TOT Marks Max	C Max.
	M.C.A	M.C.A (LE)					
FIRST YEAR							
I Semester							
1	31511		Digital Computer Organization	25	75	100	4
2	31512		Object Oriented Programming and C++	25	75	100	4
3	31513		Data Structure and Algorithms	25	75	100	4
4	31514		Data Structure using C++ Lab	25	75	100	4
			Total	100	300	400	16
II Semester							
5	31521		Software Engineering	25	75	100	4
6	31522		Relational Database Management Systems(RDBMS)	25	75	100	4
7	31523		Computer Graphics	25	75	100	4
8	31524		RDBMS Lab	25	75	100	4
			Total	100	300	400	16
SECOND YEAR							
III Semester							
9	31531	34031	Discrete Mathematics	25	75	100	4
10	31532	34032	Operating System	25	75	100	4
11	31533	34033	Object Oriented Analysis and Design	25	75	100	4
12	31534	34034	Operating System Lab	25	75	100	4
			Total	100	300	400	16
IV Semester							
13	31541	34041	Accounting and Financial Management	25	75	100	4
14	31542	34042	Communication Skills	25	75	100	4
15	31543	34043	Internet and Java Programming	25	75	100	4
16	31544	34044	Internet and Java Programming Lab	25	75	100	4
			Total	100	300	400	16
THIRD YEAR							
V Semester							
17	31551	34051	Computer Networks	25	75	100	4
18	31552	34052	Data Mining and Warehousing	25	75	100	4
19	31553	34053	Visual Programming with •NET	25	75	100	4
20	31554	34054	VB•NET Lab	25	75	100	4
			Total	100	300	400	16
VI Semester							
21	31561	34061	Cloud Computing	25	75	100	4
22	31562	34062	Soft Computing	25	75	100	4
23	31563	34063	Big Data Analytics	25	75	100	4
24	31564	34064	Mini Project	25	75	100	4
			Total	100	300	400	16
			Grand Total	600	1800	2400	96

CIA : Continuous Internal Assessment **ESE** : End semester Examination **Max.** Maximum Marks;
C : Credits

Course Code Legend:

3	1	5	S	C
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315 – Programme code for Master of Computer Applications (M.C.A).

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: (Minimum 3 Years, Maximum – 5 Years)

The M.C.A programme shall consist of a period of three years (Six Semesters).

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 is required for this programme.

Staff Category	Required
Core Faculty	3
Faculty for Specialization	2
Laboratory Assistant	1
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 first year of the Master of Computer Applications (M.C.A) programme shall be required to have passed the following examinations. Candidates who have passed any degree with Mathematics at +2 level of any Recognized University or authority accepted by the Syndicate of the Alagappa University as equivalent thereto shall be eligible.

f.1.1 Lateral Entry(LE)

Candidates who have passed any Bachelor degree with P.G.D.C.A (Post Graduate Diploma in Computer Applications) are eligible for admission into the Second Year of M.C.A programme, provided the first year subjects of M.C.A. were studied in P.G.D.C.A. The candidates should appear for examination in subjects which are not covered in P.G.D.C.A.

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 course (1 Course with 4 credits)	120
Total	168

f.3 Evaluation

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.

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.
- The internal assessment for the practical courses shall be through home assignment which includes 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 and semester.

Division of Internal Marks (Assignment)

Theory		Practical	
Assignment	Marks	Assignment	Marks
Review questions	15	Algorithm Design	15
Workbook, case studies, quiz, multiple choice questions etc	10	Workbook for preparing source code, PL/SQL coding , results etc	10
TOTAL	25	TOTAL	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:

- 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.

All the Blocks Should Be Given Equal Importance

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:

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

f.3.3.1 P.G.D.C.A. Certification

Candidates admitted to M.C.A Degree programme after completing the first year of the MCA course, can opt for discontinuing the programme, will be issued a P.G.D.C.A. (Post Graduate Diploma in Computer Applications) provided he/she passed all the subjects in the First and Second semesters of the M.C.A. programme.

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
96 - 100	10.00	S+	First class – Exemplary
91 - 95	9.5	S	
86 - 90	9.0	D++	First class – Distinction
81 - 85	8.5	D+	
76 - 80	8.0	D	
71 - 75	7.5	A++	First Class
66 - 70	7.0	A+	
61 - 65	6.5	A	
56 - 60	6.0	B	Second Class
50 - 55	5.5	C	
Below 50	0.00	F	Fail
ABSENT	0.00	AAA	Absent

For a semester

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

GPA = Sum of the multiplication of Grade points by the credit of the courses / 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

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

= sum of the multiplication of grade points by the credits of the entire programme / 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
9.6 – 10.00	S+	First class – Exemplary*
9.1 – 9.5	S	
8.6 – 9.0	D++	First class with Distinction*
8.1 – 8.5	D+	
7.6 – 8.0	D	
7.1 – 7.5	A++	First Class
6.6 – 7.0	A+	
6.1 – 6.5	A	
5.6 – 6.0	B+	Second Class
5.0 – 5.5	C	
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.		
	First Year	Second Year	Third Year
Admission Processing Fees	300	--	--
Course Fees	15400	15400	15400
ICT fees	150	150	150
Total Fees	15,850	15,550	15,550

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- equipped 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.

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.

Appendix

Detailed Syllabi FIRST YEAR SEMESTER I

Course Code	Title of the Course
31511	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 - McCluskey 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
31512	OBJECT ORIENTED PROGRAMMING and 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
31513	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
31514	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 STRUCUTURE
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 <ul style="list-style-type: none"> ○ Dijkstra's Algorithm ○ Graphs with Negative Edge costs ○ Acyclic Graphs ○ All Pairs Shortest Paths Algorithm Minimum cost Spanning Trees <ul style="list-style-type: none"> ○ Kruskal's Algorithm ○ Prims's Algorithm ○ Applications □ 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
31521	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, Process assessment, Personal and Team process models.
3	Process model: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
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
31522	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 and 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	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.

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
31523	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
31524	RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS) LAB

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 and 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.

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: Create Views, Partition and locks
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.

SECOND YEAR SEMESTER III

Course Code	Title of the Course
31531 /34031	DISCRETE MATHEMATICS

Course Objectives:

- To understand the concepts and operations Set theory, Graph Theory
- To understand and apply the Mathematical Logic in computer science.

Course Requirements:

- Knowledge about Logics and graphs

Course Outcome:

- Acquire the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems
- Acquire the knowledge of logical operations and predicate calculus needed for computing skill
- Able to design and solve Boolean functions for defined problems

Unit No.	Contents
BLOCK 1 : MATHEMATICAL LOGIC	
1	Mathematical Logic: Statements and Notation - connectives -normal forms – The theory of inference for the statement calculus -
2	Predicate Calculus: The predicate calculus - Inference theory and predicate calculus.
3	Set theory: Sets – Basic concepts – notation - inclusion and equality of sets - the power set
BLOCK 2 : RELATIONS	
4	Relations and ordering properties – relation matrix and graph of a relation
5	Relations Partition – equivalence and compatibility relations
6	Composition and partial ordering: Composition – partial ordering – partially

	ordered set
BLOCK 3 : FUNCTIONS	
7	Functions – definition – composition – inverse – binary and n-ary operations
8	Other Functions : Characteristic function – hashing function.
BLOCK 4 : ALGEBRAIC STRUCTURES	
9	Algebraic Structures: Algebraic Systems: Examples and General Properties
10	Semigroups and Monoids: Definitions and Examples - Homomorphism of Semigroups and Monoids - Subsemigroups and Submonoids
11	Groups: Definitions and Examples - Cosets and Lagrange's Theorem
12	Normal Subgroups – Algebraic Systems with two Binary Operations.
BLOCK 5 : GRAPH AND FINITE PROBABILITY	
13	Graph theory: Basic concepts – definition – paths - reach - ability and connectedness – matrix representation of graphs - trees.
14	Finite Probability – Probability Distributions – Conditional Probability Independence – Bayes' Theorem – Mathematical Expectation

TEXT BOOKS:

1. J.P. Tremblay and R. Manohar Discrete mathematical structures with applications to Computer Science TMH Publishing Company 2003.
2. Judith L. Gersting, Mathematical Structures for Computer Science, 5th Edition, W.H. Freeman and Company, 2003.

REFERENCE BOOKS:

1. Venkatraman M K, Sridharan N and Chandrasekaran N, Discrete Mathematics, The National Publishing Company, 2004.
2. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science PHI, 2003.
3. Ramasamy, Discrete Mathematical Structures with application to combinatorics, Universities Press, 2006.
4. Bernard Kolman, Roberty C. Busby, Sharn Cutter Ross, Discrete Mathematical Structures, Pearson Education, 2006.
5. Richard Johnsonbaugh, Discrete Mathematics, Fifth Edition, Pearson Education. 2001.
6. Garry Haggard and others, Discrete Mathematics for Computer science, Thomson.

Course Code	Title of the Course
31532 /34032	OPERATING SYSTEMS

Course Objective

- Able to understand the operating system principles
- Able to know the Principles of Deadlock, processor scheduling and memory management.

Course Requirements:

- To be aware of the evolution and fundamental principles of operating system, processes and their communication

Course Outcome

- Students have acquired the knowledge about the types of operating systems
- Students have acquired the knowledge about the functions of operating system

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Introduction: Definition of Operating Systems – Computer System Organization
2	Computer System Architecture – Operating System Structure – Operating System Operations
3	System Structures: Operating System Services – System Calls – System Programs – Operating System Design and Implementation.
	BLOCK 2 : PROCESS CONCEPT
4	Process Concept: Process Scheduling – Operations on Processes – Inter Process Communication
5	Process Scheduling: Scheduling Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling
	BLOCK 3 : SYNCHRONIZATION
6	Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Monitors
7	Deadlocks: Deadlocks Characterization – Methods for Handling Deadlocks
8	Deadlock Prevention – Avoidance – Detection – Recovery from Deadlock.
	BLOCK 4 : MEMORY MANAGEMENT
9	Memory Management Strategies: Swapping – Contiguous Memory Allocation – Paging – Segmentation
	BLOCK 5 : FILE SYSTEM
10	File Concept – Access Methods – Directory
11	Structure – File System Mounting – File Sharing – Protection.
12	Implementing File Systems: File System Structure – File System Implementation
13	Directory Implementation – Allocation Methods – Free Space Management
14	Secondary Storage Structure: Overview of Mass Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management.

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", 7th Edition, Wiley India Edition, 2008.

REFERENCE BOOKS:

1. Andrew S.Tanenbaum, Operating Systems Design and Implementation, 3rd edition, Prentice Hall, 2006.
2. Harvey M. Deitel, An Introduction to Operating Systems, 3rd Edition, Addison Wesley 2007.

Course Code	Title of the Course
31533 /34033	OBJECT ORIENTED ANALYSIS AND DESIGN

Course Objective:

- To demonstrate and apply basic object oriented techniques to create and modify object oriented analysis and design models.
- To understand and apply testing techniques for object oriented software

Course Requirement:

- Basic knowledge about oops concepts

Course Outcome:

- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem
- Understand the concept of analysis, design & testing to develop a document for the project

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Object Oriented System Development : Introduction – Object basics - The Object Model : Evolution – Elements
2	Classes and Objects: Object nature – Relationship among objects – Class nature – Relationships among classes
3	Classes and objects: Building quality classes and objects – System Development Life Cycle
	BLOCK 2 : OBJECT ORIENTED METHODOLOGIES
4	Methodologies : - Rumbaugh Object Modeling Technique, Booch – Jacobson – Shaler/Mellor – Coad/Yardon
5	Patterns : Patterns – Frame Works

6	The Unified Approach – UML – Static and Dynamic Model – UML diagrams
BLOCK 3 : OBJECT ORIENTED ANALYSIS	
7	Object Oriented Analysis - Identifying Use Cases – Use Case Model – Documentation
8	Classification: Identifying Classes – Noun Phrases Approach – Common Class Pattern Approach
9	Use Case Driven Approach – Identifying Object Relationship Attributes and Methods.
BLOCK 5 : OBJECT ORIENTED DESIGN	
10	Object Oriented Design : Introduction – Design Process – Design Axioms – Designing Classes – Visibility – Refining Attributes –
11	Designing Methods - Access Layer Design – View Layer Design
12	Managing Analysis And Design – Evaluation Testing – Impact of object oriented testing -
BLOCK 5 : CODING AND MAINTENANCE	
13	Coding and Maintenance: Coding – Maintenance – Metrics
14	Case Study Foundation Class Library – Client/Server Computing.

Text Books:

1. Grady Booch, Robert A.Maksimchuk et.al, Object Oriented Analysis and Design with applications, Pearson Education, 3rd Edition, 2009.
2. Ali Bahrami, Object Oriented System Development, Tata McGraw Hill Edition, 2008.

Reference Books:

1. James Rumbaugh et.al, Object Oriented Modeling and Design, Addison Wesley, 2006.
2. Larman, Applying UML & Patterns, An Introduction to Object Oriented Analysis and Design, Pearson Education, 2nd Edition, 2003.
3. Martin Fowler, Kendall Scott , UML, Distilled Addison Wesley, 2004.
4. Ivar Jacobson Object Oriented Software Engineering: A Use Case Driven Approach Addison Wesley, 2004.

Course Code	Title of the Course
31534 /34034	OPERATING SYSTEM LAB

Syllabi based on operating system theory

Objective of the course

- To learn and get familiar with unix/ubundo operating system
- To understand the functions unix/ubundo operating system through basic commands

Course outcome

On completion of the course

- Students will attain hands on experience in linux operating system.
- Basic unix commands their syntax and purpose can be well understood by the students
- Shell commands and their syntax and purpose can be well understood by the students

Unit No.	Contents
	BLOCK 1 INTRODUCTION
1	Introduction Operating system ,objective, History, Features of Unix
2	Kernal and shell
3	Unix file system: File and common commands-Shell-More about files-Directories-Unix system-Basics of file-Directories and filenames-
	BLOCK 2 : UNIX PERMISSIONS
4	Permissions- Inodes-Directory hierarchy-Devices-the grep family-Other filters
5	Stream editor sed - awk pattern scanning and processing language-files and good filters.
6	Wild card characters
	BLOCK 3 : UNIX COMMANDS
7	Unix commands with syntax: Syntax and unix commands
8	Unix shells: History of unix shells
9	Deciding on a shell
	BLOCK 4 : SHELL COMMADS - FILES
10	Shell Command files
11	Bourne shell: Bourne shell programming
12	Shell programming files: Shell programming on files
	BLOCK 5 : MENU DRIVEN SHELL PROGRAM:
13	Menu Driven File handling
14	Menu Driven shell program – file: edit, create and delete file using menu

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Principles”, 7th Edition, Wiley India Edition, 2008.
2. Andrew S.Tanenbaum, Operating Systems Design and Implementation, 3rd edition, Prentice Hall, 2006.
3. Harvey M. Deitel, An Introduction to Operating Systems, 3rd Edition, Addison Wesley 2007.

SEMESTER IV

Course Code	Title of the Course
31541 /34041	ACCOUNTING AND FINANCIAL MANAGEMENT

Course Objectives:

- To understand the process of estimating the cost of a particular product.
- To Prepare the estimate for various business activities such as purchase, sale, production and cash budgets

Course Requirements:

- Basic principles of Accounting

Course Outcome:

- Able to do balance sheet preparation and do analysis
- Able to do the budget preparation and control of a company

Unit No	Contents
	BLOCK 1 : INTRODUCTION - Financial Accounting:
1	Financial Accounting: Meaning and Scope – Principles – Concepts – Conventions
2	Accounting process: Journal - Ledger – Trail Balance – Trading Account – Profit and Loss Account – Balance Sheet
3	Accounting Ratio Analysis – Funds Flow Analysis –Cash Flow Analysis – Computerized account.
	BLOCK 2 : COST AND MANAGEMENT ACCOUNTING
4	Introduction: Meaning Scope and uses of cost and management accounting – Elements of Cost
5	Cost Sheet – Marginal Costing and Cost Volume Profit Analysis
6	Break Even Analysis: Concept, Applications and Limitations
	BLOCK 3 : STANDARD COSTING AND BUDGETING:
7	Introduction : Concept and importance standard costing - Variance Analysis – Material – Labor – Overhead – Sales – Profit Variances -
8	Budgets and Budgetary Control – Meaning and Types of budgets – Sales Budget – Production Budget
9	Budgets: Cash Budget – Master Budget – Flexible budgeting – Zero Base Budgeting.

BLOCK 4 : FINANCIAL MANAGEMENT	
10	Introduction: Objectives and Functions of Financial Management – Risk – Return Relationship –Time Value of Money
11	Capital Budgeting: Basic Methods of Appraisal of investments –
12	Working Capital: Concepts of working Capital ,Factors Affecting working Capital – Estimation of working capital requirements
BLOCK 5 : COST OF CAPITAL	
13	Cost of Capital Capital Structure and Dividend: Meaning and types of Cost of Capital – computation of cost for debt and equity sources of capital and weighted average cost of capital
14	Capital Structure Meaning and types of capital structure – determinants of capital structure – types of Dividend Policy – Types of Dividend decision.

TEXT BOOKS:

1. Maheswari S N, Financial and Management Accounting, Sultan Chand & Sons, 2003.
2. Pandey I M, Financial Management, 4th Edition, Vikas Publications, 2002.

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, 2005
2. S.P. Iyengar, “Cost and Management Accounting”, Sultan Chand & Sons.
3. I. M. Pandey, “Elements of Management Accounting”, Vikas Publishing House.
4. Shula and T.S.Grewal, “Advanced Accounting”, S.Chand and Company, 2010
5. S.N.Maheswari, “Management Accounting & Financial Accounting”, Vikas Publications 2010
6. Ravi M Kishore, Management Accounting and Financial Analysis”, Taxmons 2010
7. Khan and Jain, Management accounting: Text, problems and cases, 2011

Course Code	Title of the Course
31542 /34042	COMMUNICATION SKILLS

Course Objectives:

- To enable the students to learn the basics of communication skills, soft skills and quantitative aptitude.
- To improve the written communication skills so as to write reports and letters.
- To enable the students to speak English with correct accent and pronunciation.
- Interact efficiently in real life situation in work place

Course Requirements:

- Basic English knowledge in grammar

Course Outcome:

- Understood the basics of communication skills and soft skills
- Acquired knowledge in quantitative aptitude
- Take part in professional and social communication
- Make oral presentations
- Engage in debates
- Face Interviews
- Participate in Group Discussion

Unit No	Contents
BLOCK 1 : IMPORTANCE OF COMMUNICATION	
1	Communication: Importance of Communication: – Principles of effective communication
2	Levels of communication (Extrapersonal, Interpersonal, Intrapersonal and Mass Communication)
3	Channels of communication (Downward communication, Upward communication, Horizontal communication and Diagonal communication) Barriers to communication
BLOCK 2 : CONVERSATIONS SKILLS	
4	Soft Skills (Importance, Definition and attributes) – Verbal and Non-Verbal Communications
5	Telephone conversations: Do's and Don'ts – Modes of conversation – Greeting, Requesting, Thanking, Congratulating, Introducing, Apologizing, Agreeing/Disagreeing, permitting/Not permitting
BLOCK 3 PRESENTATION SKILLS	
6	Introduction: Planning (Analyzing audience and locale)
7	Preparing (Introduction, Middle and End) Practice and presentation
8	(Nuances and Delivery – Kinesics, Proximics, paraliquistics, chronemics) Audio visual Aids.
BLOCK 4 : GROUP COMMUNICATION	
9	Group Communication: Group discussion – Purpose - Process of Group Discussion - Presentation - Getting Started - Art of Guiding and Controlling Discussion - Personality test through Group Discussion - Lateral thinking - Participation techniques - Mock Group Discussion.
10	Interviews and job interviews What and Why? - Types of Interviews -

	Understanding the intricacies - Planning for Interviews - Answering Skills - Effective Communication during Interviews - IPS - Mock Interview.
11	Meetings Meaning - Importance - Objectives - Leading and participating in meetings - Communication skills for meetings - Mock Meetings - Seminars. Skills Needed for Team Work.
	BLOCK 5 : WRITING SKILLS
12	Writing Letters (Job Application, resume, curriculum vitae) Effective writing - Report writing - Speech writing
13	E-mail and Advertising – Writing of Agenda, Agenda writing - Letters - Articles writing - Improving English language writing - When to write and when not to write.
14	Minutes and memos – report writing.

TEXT BOOK:

1. Green Level (1984) Building English Skills USA: MC Dougal, Little.
S.R.Sharma (2006) Communication Skills in English Jaipur: Mark Publishers

REFERENCE BOOKS:

1. Green Rajeevan and P.Kiranmani Dutt. (2006) Basic Communication Skills
New Delhi: Foundation Books
2. Martin Hewings(2004) Pronunciation Practice Activities United kingdom: The
Cambridge University Press.

Course Code	Title of the Course
31543 /34043	INTERNET AND JAVA PROGRAMMING

Course Objectives:

- To provide an overview of working principles of internet, web related functionalities
- To understand and apply the fundamentals core java, packages, database connectivity for computing

Course Requirements:

- Basic knowledge of internet and programming principles

Course Outcome:

- Able to understand the internet standards and recent web Technologies
- Able to implement, compile, test and run Java program,
- Able to make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Basic Internet Concepts: Connecting to the Internet – Domain Name System – E-mail
2	The World Wide Web – Internet Search Engines – Web Browsers – Chatting and conferencing on the Internet
3	Online Chatting –Messaging – Usenet Newsgroup – Internet Relay chat (IRC) – FTP – Telnet.
	BLOCK 2 : FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING
4	Basic concepts of OOP – Benefits – Applications . Java Evolution: Features – how java differs from C and C++ - java and internet- java support system – java environment
5	Overview of Java Language –Introduction – Simple Java Program – Comments – Java Program Structure – Tokens – Java Statements – Implementing a Java Program – JVM – Command Line Arguments. Constants – Variables – Data Types – Type Casting.

6	<p>Operators and Expressions: Arithmetic Operators – Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special Operators – Arithmetic Expressions, Evaluation of Expression – Precedence of Arithmetic Operators – Type Conversions – Operator Precedence and associativity – Mathematical Functions.</p> <p>Decision Making and Branching: If –if....else –Nesting of if..... Else – else if–switch. Decision Making and Looping: While – do – for – jump in loops – labeled loops.</p>
BLOCK 3 : CLASSES, OBJECTS AND METHODS	
7	<p>class: Defining a class –fields –methods –creating objects – accessing class members – constructors – methods overloading –static members –nesting of methods – Inheritance –overriding methods –final variables-classes –methods</p>
8	<p>Arrays, Strings and Vectors :One dimensional Arrays –creating of array – Two dimensional arrays- strings –vectors –Wrapper classes – Enumerated Types - Interfaces: Multiple Inheritance</p>
9	<p>Packages: Defining interface –Extending interfaces – Implementing Interfaces - Putting Classes Together</p>
BLOCK 4: MULTITHREADING , EXCEPTION AND APPLETS	
10	<p>Multithreaded Programming – Creating Threads –Extending the thread class – Stopping and Blocking a thread –Life cycle of a thread –using thread methods – Thread Exceptions –Priority –Synchronization –Implementing the ‘Runnable’ Interface</p>
11	<p>Managing Error and Exceptions: Types of errors –Exceptions –Syntax of Exception Handling code – Multiple Catch statements –using finally statement – Throwing our own Exceptions – using exceptions for Debugging - Graphics Programming: The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.</p>
12	<p>Applet Programming: How applets differ from Applications – preparing to write applets – Building Applet Code – Applet life cycle – creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to HTML file – Running the Applet – Passing parameters to Applets – Displaying Numerical values – Getting input from the user</p>
BLOCK 5 : MANAGING INPUT/OUTPUT FILES IN JAVA	
13	<p>Introduction – concept of streams –stream classes – byte stream classes – character Stream</p>
14	<p>I/O classes: –using stream –using the file class –Input / output Exceptions – creation of files – Reading / writing characters – reading writing bytes Random access files- Interactive input and output –Other stream classes</p>

Text Books:

1. R. Krishnamoorthy and S. Prabhu, Internet and Java Programming, New Age International Publishers, 2004 (Unit I).
2. Programming with Java, 4e, E. Balagurusamy, Tata McGraw-Hill, 2010.

Reference books:

1. Deitel, Deitel and Nieto, Internet and World Wide Web – How to program, Pearson Education, 2000.
2. Naughton and H.Schildt, Java 2 - The complete reference, Tata McGraw-Hill, Fourth edition, 2006.
3. Elliotte Rusty Harold, Java Network Programming, O'Reilly Publishers, 2000.
4. B.Mohamal Ibrahim , Java : J2SE – A Practical Approach, Firewall media, 2006.
5. Cay S. Horstmann, Gary Cornell, Core Java, Volume I and II, 5th Edition, Pearson Education, 2003.
6. Topley, J2ME in A Nutshell, O'Reilly Publishers, 2002.
7. Hunt, Guide to J2EE Enterprise Java, Springer Publications, 2004.
8. Ed Roman, Enterprise Java Beans, Wiley Publishers, 1998.

Course Code	Title of the Course
31544 /34044	INTERNET AND JAVA PROGRAMMING LAB

Course Objective:

- To understand and practice markup languages
- To understand and practice embedded dynamic scripting on client side Internet Programming
- To understand and practice web development techniques on client-side

Course Requirement:

- Basic concepts of Web and Java programming

Course Outcome:

- Explore markup languages features and create interactive web pages using them
- Learn and design Client side validation using scripting languages
- Acquire knowledge about Open source JavaScript libraries
- Able to design front end web page and connect to the back end databases.

Experiments based on Internet Programming Theory

Unit No.	Contents
	BLOCK 1 : JAVA FUNDAMENTAL PROBLEMS:
1	Simple Java Problems
2	class and objects
3	Conditional control using java
4	Looping using java
	BLOCK 2 : OOP CONCEPTS
5	Function overloading programs
6	Operator overloading programs
7	Inheritance programs, Packages
8	Polymorphism programs Message passing programs
	BLOCK 3 : THREAD & VIRTUAL FUNCTION
9	Threads
10	Virtual function programs
	BLOCK 4 : I/O AND EXCEPTION HANDLING
11	Exception handling programs
12	I/O manipulation programs,
	BLOCK 4 :NETWORK PROGRAMMING
13	Applet programs
14	Implementation of simple network programs using java

Reference books:

1. R. Krishnamoorthy and S. Prabhu, Internet and Java Programming, New Age International Publishers, 2004 (Unit I).
2. Programming with Java, 4e, E. Balagurusamy, Tata McGraw-Hill, 2010.

3. Deitel, Deitel and Nieto, Internet and World Wide Web – How to program, Pearson Education, 2000.
4. Naughton and H.Schildt, Java 2 - The complete reference, Tata McGraw-Hill, Fourth edition, 2006.
5. Elliotte Rusty Harold, Java Network Programming, O’Reilly Publishers, 2000.
6. B.Mohamal Ibrahim , Java : J2SE – A Practical Approach, Firewall media, 2006.
7. Cay S. Horstmann, Gary Cornell, Core Java, Volume I and II, 5th Edition, Pearson Education, 2003.
8. Topley, J2ME in A Nutshell, O’Reilly Publishers, 2002.
9. Hunt, Guide to J2EE Enterprise Java, Springer Publications, 2004.
10. Ed Roman, Enterprise Java Beans, Wiley Publishers, 1998.

**THIRD YEAR
SEMESTER V**

Course Code	Title of the Course
31551 /34051	COMPUTER NETWORKS

Course Objectives:

- To understand networking concepts and basic communication model
- To understand network architectures and components required for data communication.

Course Requirements:

- Basic knowledge of networking

Course Outcome:

- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

Unit No.	Contents
BLOCK 1 : INTRODUCTION & PHYSICAL LAYER	
1	Introduction; Computer Networks - Applications - Line configuration - Topology - Transmission Modes
2	Categories of Network: LAN, MAN, WAN - OSI Layer.
3	Physical Layer: Analog and Digital Signals Performance - Transmission Media
BLOCK 2 : DATA LINK LAYER	
4	Data Link Layer: Error Detection and correction – Introduction – Block Coding – Cyclic Redundancy Check – Framing – Flow and error Control –
5	Data link layer protocols: stop - wait protocol and sliding window protocol - ARQ, Go-back-n ARQ, selective - repeat ARQ.

6	Multiple Access Protocols: ALOHA – CSMA – CSMA/CD – CSMA/CA.
BLOCK 3 : NETWORK LAYER	
7	Introduction: Circuit switching - packet switching - message switching - Virtual circuit and Datagram subnets
8	Routing algorithm : Static routing -shortest path routing, Flooding, Flow based routing - Dynamic routing - distance vector routing, link state routing
9	Other Routing Algorithms: Hierarchical routing, Broad cast, Multi cast routing - Congestion, Control Algorithms
BLOCK 4 : TRANSPORT LAYER	
10	Introduction: Process to process delivery – UDP – TCP - Connection oriented Vs connectionless services.
11	Applications and services: Domain name system - Remote Logon – Mail Exchange - File Transfer
12	Remote Procedure Call - Remote File Access – WWW and HTTP – SNMP.
BLOCK 5 : NETWORK SECURITY	
13	Introduction: Cryptography – Encryption model – Transposition and Substitution Chipers – Cryptographic principles
14	Symmetric key cryptography: DES – AES – Asymmetric key cryptography: RSA – Security services.

Text Books:

- 1.Computer Networks, 3rd Edition, Andrew S Tanenbaum, Pearson Education, 2010.
- 2.Data Communications and Networking, 4th Edition, Behrouz A. Forouzan, TMH, 2009.

Reference Books:

1. Data and Computer Communications, 8th Edition, William Stallings, Prentice Hall.
2. An Engineering Approach to Computer Networks, 2nd Edition, S.Keshav, Pearson Education, 2008

Course Code	Title of the Course
31552 /34052	DATA MINING AND WAREHOUSING

Course Objective:

- This course presents on depth of to data mining techniques; association rule, clustering, classification, web mining, temporal and sequential data mining and provide a practical exposure using data mining tool orange.
- To enable the students to learn the basic functions, principles and concepts of Data Mining
- To understand the fundamentals of Big Data Analytics

Course Requirements:

- Basic Concepts of Database

Course Outcome:

On successful completion of the course the students should have:

- Understand the data mining techniques, classification and web mining

Unit No.	Contents
	BLOCK 1 : DATA MINING and WAREHOUSING INTRODUCTION
1	Data Warehousing Introduction – Definition-Architecture-Warehouse Schema-Warehouse server-OLAP operations. Data Warehouse technology – Hardware and operating system
2	Data Mining - Definition – DM Techniques – current trends in data mining - Different forms of Knowledge – Data selection, cleaning, Integration, Transformation, Reduction and Enrichment.
3	Data: Types of data - Data Quality - Data Preprocessing - Measures of similarity and dissimilarity. Exploration: Summary statistics – Visualization.
	BLOCK 2 : ASSOICATION RULE MINING AND CLASSIFICATION
4	Association rules: Introduction – Methods to discover association rule – Apriori algorithm Partition Algorithm
5	AR Algorithms: Pincher search algorithm – Dynamic Item set algorithm – FP Tree growth algorithm.
6	Classification: Decision Tree classification – Bayesian Classification – Classification by Back Propagation.
	BLOCK 3 : CLUSTERING TECHNIQUES AND MACHINE LEARNING
7	Introduction – Clustering Paradigms – Partitioning Algorithms – K means & K Mediod algorithms – CLARA – CLARANS – Hierarchical clustering – DBSCAN – BIRCH – Categorical Clustering algorithms – STIRR – ROCK – CACTUS.
8	Introduction to machine learning – Supervised learning – Unsupervised learning – Machine learning and data mining.
9	Neural Networks: Introduction – Use of NN – Working of NN Genetic Algorithm: Introduction –Working of GA.
	BLOCK 4 : WEB MINING AND VISUAL DATA MINING
10	Introduction –Web content mining – Web structure mining –Web usage mining –Text mining –Text clustering, Temporal mining -Spatial mining
11	Visual data mining – Knowledge mining – Various tools and techniques for implementation using weka, Rapidminer and Matlab.
	BLOCK 5 : INTRODUCTION TO BIG DATA ANALYTICS
12	Big Data Characteristics- Types of Big Data- Traditional Versus Big Data Approach
13	Technologies Available for Big Data
14	Hadoop – Introduction - What is Hadoop? - Core Hadoop Components - Hadoop Ecosystem - Physical Architecture - Hadoop Limitations

Text Books:

1. Arun K Pujari, “Data Mining Techniques”, University press, 2008.
2. C S R Prabhu, “Data Warehousing – concepts, techniques and applications “, 2nd Edition, Prentice Hall of India, 2002.
3. Radha Shankarmani, M Vijayalakshmi, “Big Data Analytics”, Wiley Publications, first Edition, 2016

Reference Books:

1. Jaiwei Han, Michelinne Kamber, “Data Mining: Concepts and Techniques”, Harcourt India / Morgan Kauffman publishers, 2008.
2. Alex Berson, Stephen J.Smith , “Data Warehousing , Data Mining & OLAP”, Tata McGraw Hill, 2004.
3. Seema Acharya, Subhashini Chellappan, “Big Data and Analytics”, Wiley Publication, first edition. Reprint in 2016
4. DT Editorial Services, “Black Book- Big Data (Covers Hadoop 2, MapReduce, Hive, Yarn, PIG, R, Data visualization)”, Dream tech Press edition 2016.

Course Code	Title of the Course
31553 /34053	VISUAL PROGRAMMING WITH .NET

Course Objective:

To develop an understanding of Visual Basic .Net

To develop the skills necessary to create software solutions using VB with .Net

To learn how to analyze certain types of problems with a software solution in mind

Course Requirements:

- Basic knowledge of Visual Basic

Course Outcome:

- Able to understand and design the solution to a problem using VB. Net
- Understand and implement the features of .Net for providing programmed solutions to complex problems

Unit No	Contents
	BLOCK 1 : INTRODUCTION
1	Introduction - What Is Visual Studio ? - Navigating the Visual Studio - The Menu

	- Toolbar - Work Area
2	Toolbox - Solution Explorer - Status Bar - Managing VS Windows
3	Visual Studio Project Types - Windows Projects - Web Projects - Office Projects - SharePoint Projects - Database Projects
	BLOCK 2 : C# AND VB.NET
4	Basic Syntax - Code Skeleton - The Main Method - The Program Class - The First Program Namespace - VS Code Editor - Class and Member Locators – Bookmarks - Running Programs - Primitive Types and Expressions - Enums - Branching Statements - Loops
5	Creating Classes - Class Inheritance – Class Snippet - Writing Methods - Parameters Passing - Returning Data
6	Method Snippets - Coding Fields and Properties - Declaring and Using Properties - The Property Snippet
	BLOCK 3 : UNDERSTANDING DELEGATES AND EVENTS
7	Events - Delegates - Handler Code - Implementing Interfaces - The interface Snippet - Applying Arrays and Generics -
8	Creating and Building Projects - Constructing Solutions and Projects - Navigating the Solution Explorer - Examining Property Settings - Assembly Name - Default Namespace - Target Framework - Output Type
9	Building Projects :Startup Object - Icon and Manifest - Compiling Applications - Rebuilding Solutions/Projects - Cleaning Solutions/Projects - Managing Dependencies, Compilation Settings - Navigating with Class View - Using the Class Designer - Class Designer Code Generation
	BLOCK 4 : DEBUGGING WITH VISUAL STUDIO
10	Debugging methods: Breakpoints - Stepping Through Code – Inspecting Application State - Locals and Autos Windows - Watch Windows - The Immediate Window - The Call Stack Window - The Quick Watch Window - Watching Variables with Pin To Source - Working with IntelliTrace
11	Working with Databases - Server Explorer - Creating a Database - Adding Tables - Relating Tables with Foreign Keys - Adding Stored Procedures - Configuring Database Options
	BLOCK 5 : BUILDING PROGRAMS WITH VS 2010
12	Building Desktop Applications with WPF - Starting a WPF Project - Understanding Layout - Grid Layout - StackPanel Layout - DockPanel Layout - WrapPanel Layout - Canvas Layout
13	Using WPF Controls - Managing Windows for Controls - Setting Properties - Handling Events - Coding Event Handlers - Working with Data in WPF - Data Source - Configuring a ComboBox
14	Reading and Saving Data - Using the DataGrid - Summary -Creating Web Applications with ASP.NET MVC - Designing Silverlight Applications - Deploying Web Services with WCF

Text Book:

1. Joe Mayo, Visual Studio 2010 - A Beginner's Guide, Tata Mc Graw Hill Edition, 2010.

Reference Books:

1. Nick Randolph, David Gardner, Professional Visual Studio 2010, Wiley Publishing 2010.
2. Andrew Moore, Visual Studio 2010 All-in-One For Dummies, Wiley Publishing, 2010.

Course Code	Title of the Course
31554 /34054	VISUAL BASIC .NET LAB

Course Objective:

To develop an understanding of Visual Basic .Net

To develop the skills necessary to create software solutions using VB with .Net

To learn how to analyze certain types of problems with a software solution in mind

Course Requirements:

- Basic knowledge of Visual Basic

Course Outcome:

- Able to understand and design the solution to a problem using VB. Net
- Understand and implement the features of .Net for providing programmed solutions to complex problems

Experiments based on Visual Programming with .NET Theory

Unit No.	Contents
BLOCK 1 : SIMPLE APPLICATIONS	
1	Simple Applications: Developing simple applications using VB.NET <ol style="list-style-type: none"> a. Finding factorial Value b. Money Conversion c. Quadratic Equatin d. Temperature Conversion e. Login control
2	Login form: Create and Validate Login Form, Program to design Class, Program to demonstrate Inheritance, Polymorphism and Interfaces.
BLOCK 2 : CONTROLS	
3	Controls: Advance Controls, Common Dialog Controls. <ol style="list-style-type: none"> 2. Adrotator Control 3. Calendar control

	<ol style="list-style-type: none"> a. Display messages in a calendar control b. Display vacation in a calendar control c. Selected day in a calendar control using style d. Difference between two calendar dates <ol style="list-style-type: none"> 4. Treeview control a) Treeview control and datalist b) Treeview operations 5. Validation controls
4	Active X Controls: Working with intrinsic controls and ActiveX controls
	BLOCK 3 : MDI AND DATA CONTROLS
5	MDI: Application with multiple forms
6	Data controls: Application using data controls
	BLOCK 3 : DIALOGS AND MENU
7	Dialogs: Application with dialogs
8	Common Dialogs: Application using Common Dialogs
9	Menus: Application with Menus
	BLOCK 4 : EVENTS AND DATABASE
10	Events and Database: Drag and Drop Events Database Management Creating ActiveX Controls
11	DataGridView: ADO.NET Code to show records in DataGridView Control. <ol style="list-style-type: none"> 1. Databinding using datalist control 2. Datalist control templates 3. Databinding using datagrid 4. Datagrid control template 5. Datagrid hyperlink 6. Datagrid button column 7. Datalist event 8. Datagrid paging
12	Database operations: ADO.NET Code to perform Insert, Delete, Update and Select operations.
	BLOCK 5 : CRYSTAL REPORTS AND WEB APPLICATION
13	Crystal Reports
14	Web Application using ASP.NET that uses validation controls.

Reference Books:

1. Joe Mayo, Visual Studio 2010 - A Beginner's Guide, Tata Mc Graw Hill Edition, 2010.
2. Nick Randolph, David Gardner, Professional Visual Studio 2010, Wiley Publishing 2010.
3. Andrew Moore, Visual Studio 2010 All-in-One For Dummies, Weiley Publishing, 2010.

SEMESTER VI

Course Code	Title of the Course
31561 /34061	CLOUD COMPUTING

Course Objective:

Lets learner to understand how to access all applications and documents from everywhere in the world, freeing from the confines of the desktop and making it easier for group members in different locations to collaborate.

Course Requirements:

Basic knowledge about internet and its application.

Course Outcome:

Understood the importance of cloud computing and its services.

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Fundamentals :Cloud Computing – History – Working of cloud computing – Cloud computing today – Pros and cons of Cloud Computing – Benefits of cloud computing
2	Non users of Cloud computing – Developing cloud services – Pros and Cons of Cloud service Development
3	Types of Cloud Service Development – Discovering Cloud Services development services and tools.
	BLOCK 2 : CLOUD COMPUTING FOR EVERYONE
4	Centralizing Email Communications – Collaborating of Grocery lists – Collaborating on To-Do lists –
5	Collaborating on Household budgets – Collaborating on Contact lists – Communicating across the community – Collaborating on Schedules
6	Collaborating on group projects and events – Cloud computing for corporation.
	BLOCK 3 : CLOUD SERVICES
7	Exploring online calendar applications – Exploring online scheduling applications – Exploring online planning and task management – Collaboration on event management –
8	Collaboration on Contact Management – Collaboration on Project Management –
9	Collaborating on Word Processing and Databases – Storing and Sharing files and other online content.
	BLOCK 4 : ISSUES IN CLOUD
10	Federation in cloud – Four levels of federation – Privacy in cloud

11	Security in Cloud –Software as a security service – Case Study: Aneka – service level agreements
12	Cloud Storage: Over view of cloud storage – Cloud storage providers – Amazon S3 – Cloud file system – Map Reduce – Hadoop
	BLOCK 5 : CLOUD DEPLOYMENT TOOLS:
13	Study of open source cloud platforms – Eucalyptus
14	Nimbus – Open Nebula

Text Books:

1. Michael Miller, “Cloud computing – Web based applications that change the way you work and collaborate online”, Pearson Education Inc., 2008
2. John W.Rittinghous, James F.Ransome, “Cloud Computing: Implementation, Management and Security”, CRC Press 2010.

Books for Reference:

1. Danielle Ruest and Nelson Ruest, “Virtualization: A Beginners’s Guide”, McGraw Hill,2009.
2. Tom White, “Hadoop: The Definitive Guide”, O’RIELLY Media 2009.
3. Rajkumar Buyya, James Broberg, Andrezj Goscinski, “Cloud computing – Principles and Paradigms”, John Wiley and Sons, 2011.

Course Code	Title of the Course
31562 /34062	SOFT COMPUTING

Course Objective:

- To learn the key aspects of Soft computing
- To know about the components and building block hypothesis of Genetic algorithm.
- To study the fuzzy logic components

Course Requirements:

- Basic concepts of Fuzzy Set and Neural Network

Course Outcome:

- Write Genetic Algorithm to solve the optimization problem
- Understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.

Unit No.	Contents
	BLOCK 1 : INTRODUCTION
1	Introduction: Soft Computing Constituents – Soft Computing Vs Hard Computing – Characteristics - Applications

2	Artificial Neural Network (ANN): Fundamental Concept – Application Scope - Basic Terminologies – Neural Network Architecture – Learning Process
3	Fundamental Models of ANN: McCulloch-Pitts Model – Hebb Network – Linear Separability.
BLOCK 2 : SUPERVISED AND UNSUPERVISED LEARNING NETWORKS	
4	Perceptron Network – Adaline and Madaline Networks – Back Propagation Network
5	Radial Basis Function Network. Associative Memory Networks – BAM - Hopfield Network - Boltzmann Machine.
6	Unsupervised Learning Networks: Kohonen Self Organizing Network – Counter Propagation Network – ART Network.
BLOCK 3: FUZZY SETS	
7	Fuzzy Sets: Basic Concept – Crisp Set Vs Fuzzy Set - Operations on Fuzzy Set – Properties of Fuzzy Sets
8	Fuzzy Relations: Concept – Fuzzy Composition – Fuzzy Equivalence and Tolerance Relation
9	Membership Functions: Features – Fuzzification – Methods of Membership value assignments – Defuzzification – Methods.
BLOCK 4 : FUZZY ARITHMETIC	
10	Fuzzy Arithmetic – Extension Principle – Fuzzy Measures
11	Fuzzy Rules and Fuzzy Reasoning: Fuzzy Propositions – Formation of Rules – Decomposition of Rules – Aggregation of Rules – Approximate Reasoning
12	Fuzzy Inference and Expert Systems – Fuzzy Decision Making – Fuzzy Logic Control Systems.
BLOCK 5 : GENETIC ALGORITHM	
13	Genetic Algorithm: Fundamental Concept – Basic Terminologies – Traditional Vs Genetic Algorithm - Elements of GA - Encoding - Fitness Function
14	Genetic Operators: Selection – Cross Over - Inversion and Deletion - Mutation – Simple and General GA - The Schema Theorem - Classification of Genetic Algorithm – Genetic Programming – Applications of GA.

Text Book:

1. S.N. Sivanandam, S.N. Deepa, “Principles of Soft Computing”, Wiley India, 2007.

Reference Books:

1. J.S.R. Jang, C.T. Sun, E. Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice Hall India, 2004
2. S. Rajasekaran, G.A.V. Pai, “Neural Networks, Fuzzy Logic, Genetic Algorithms”, Prentice Hall India, 2004.

Course Code	Title of the Course
31563 /34063	BIG DATA ANALYTICS

Course Objective:

Able to understand the characteristics of Big Data.
To know about the link analysis, mapreduce and social networks

Course Requirement:

Basic Knowledge about data mining

Course Outcome:

Understood the importance of Big Data Analytics and social networks

Unit No.	Contents
	BLOCK 1 : INTRODUCTION TO BIG DATA
1	Big Data Characteristics - Types of Big Data- Traditional Versus Big Data Approach
2	Technologies Available for Big Data
3	Hadoop – Introduction - What is Hadoop? - Core Hadoop Components - Hadoop Ecosystem - Physical Architecture - Hadoop Limitations
	BLOCK 2 : MapReduce
4	MapReduce and The New Software Stack- MapReduce- Algorithms Using MapReduce -
5	Finding Similar Items – Introduction - Nearest Neighbor Search - Applications of Nearest Neighbor Search- Similarity of Documents
6	Collaborative Filtering as a Similar-Sets Problem - Recommendation Based on User Ratings- Distance Measures.
	BLOCK 3 : MINING DATA STREAMS
7	Introduction - Data Stream Management Systems- Data Stream Mining - Examples of Data Stream Applications -
8	Stream Queries - Issues in Data Stream Query Processing - Sampling in Data Streams - Filtering Streams - Counting Distinct Elements in a Stream
9	Querying on Windows – Counting Ones in a Window -Decaying Windows.
	BLOCK 4 : LINK ANALYSIS
10	Introduction - History of Search Engines and Spam –
11	PageRank - Efficient Computation of PageRank - Topic-Sensitive PageRank- Link Spam- Hubs and Authorities
12	Recommendation Systems : A Model for Recommendation Systems - Collaborative-Filtering System - Content-Based Recommendations - Mining Social Network Graphs .
	BLOCK 5 : SOCIAL NETWORKS

13	Introduction - Applications of Social Network Mining - Social Networks as a Graph - Types of Social Networks
14	Social Graphs: Clustering of Social Graphs - Direct Discovery of Communities in a Social Graph - SimRank-Counting Triangles in a Social Graph

Text Book:

1.“Big Data Analytics”, Radha Shankarmani, M Vijayalakshmi, Wiley Publications, first Edition, 2016

Books for Reference:

1. Seema Acharya, Subhashini Chellappan, “Big Data and Analytics”, Wiley Publication, first edition. Reprint in 2016
2. DT Editorial Services, “Black Book- Big Data (Covers Hadoop 2, MapReduce, Hive, Yarn, PIG, R, Data visualization)”, Dream tech Press edition 2016.

Course Code	Title of the Course
31564 /34064	MINI PROJECT

Course Objective:

- To help the student to develop his/her ability to apply multi-disciplinary concepts, cutting edge technologies, software tools and techniques to solve programming problems.

Course Requirement:

- Basic concepts of Web and C/ Java /VB /ASP .NET programming

Course Outcome:

- Explore markup languages features and create interactive web pages
- Able to design front end web page and connect to the back end databases.
- Able to study, design, develop , implement and maintain software applications

Syllabi

Student should be able to design, develop and implement mini project based on latest cutting edge technologies using latest software.

Unit No	Contents
	BLOCK 1 : INTRODUCTION AND STUDY PHASE

1.	Define the Abstract of the project
2.	System Analysis :Identify the Problem (Aim & Objectives)
3.	Problem description
4.	Scope of the Problem
5.	Motivation
6.	Identify the existing system and its Limitations, Feasibility study
7.	Proposed system to overcome limitations
BLOCK 2 : SYSTEM DESIGN	
8.	System Design : Prepare Input / Output Design, Prepare Form Design
9.	Prepare software design (UML Diagram, Data Dictionary, Use case, Activity diagram, E-R diagram)
BLOCK 3 : SYSTEM DEVELOPMENT	
10.	System Development and Implementation the project
BLOCK 4 : SYSTEM TESTING	
11.	System Testing and maintenance of the project
BLOCK 5 : DOCUMENTATION	
12.	Prepare the mini project documentation.
13.	Sample Source Code
14.	Reports/Screen Layouts

Reference Books:

1. Grady Booch, Robert A.Maksimchuk et.al, Object Oriented Analysis and Design with applications, Pearson Education, 3rd Edition, 2009.
2. Ali Bahrami, Object Oriented System Development, Tata McGraw Hill Edition, 2008.
3. James Rumbaugh et.al, Object Oriented Modeling and Design, Addison Wesley, 2006.
4. Larman, Applying UML & Patterns, An Introduction to Object Oriented Analysis and Design, Pearson Education, 2nd Edition, 2003.
5. Martin Fowler, Kendall Scott , UML, Distilled Addison Wesley, 2004.
6. Ivar Jacobson Object Oriented Software Engineering: A Use Case Driven Approach, Addison wesley, 2004.

MINUTES OF THE MEETING OF THE BOARD OF STUDIES FOR MASTER OF COMPUTER APPLICATIONS (M.C.A) 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

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

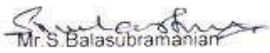

Dr. T. Meyyappan


Dr. S. S. Dhenakaran


Dr. K. Mahesh


Dr. A. Padmapriya


Dr. P. Prabhu


Mr. S. Balasubramanian