



**Department of Information Technology**  
**School of Computing Sciences**  
**Bachelor of Computer Applications**

**PROGRAM SPECIFIC OUTCOMES**

- PSO1:** To shape the students to meet the requirement of Corporate world and Industry standard.
- PSO2:** To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications
- PSO3:** To provide the students about computing principles and business Practices in software solutions, outsourcing services, public and private sectors
- PSO4:** Develop practical skills to provide solutions to industry, society and business.
- PSO5:** Understand the concepts of key areas in computer science
- PSO6:** Analyze and apply latest technologies to solve problems in the areas of computer applications.
- PSO7:** Analyze and synthesis computing systems through quantitative and qualitative techniques
- PSO8:** Communicate effectively in both verbal and written form.

**School of Computing Sciences**  
**Bachelor of Computer Applications**

**Board of Studies Members**

| <b>Sl.No</b> | <b>Name &amp; Address</b>   | <b>Designation</b>           |
|--------------|---|------------------------------|
| 1.           | <b>Dr.P.Swaminathan</b> , Dean,<br>School of Computing Sciences,<br>Vels University, Chennai.   | <b>Chairman</b>              |
| 2.           | <b>Dr.P.Mayilvahanan</b> , Professor,<br>Department of Computer Applications,<br>School of Computing Sciences,<br>Vels University, Chennai. | <b>Internal Board Member</b> |
| 3.           | <b>Dr.S.Prasanna</b> , HOD,<br>Department of Computer Applications,<br>Vels University, Chennai.  | <b>Internal Member</b>       |
| 4.           | <b>Dr.S.Sujatha</b> , HOD,<br>Department of Information Technology,<br>School of Computing Sciences,<br>Vels University, Chennai.           | <b>Internal Member</b>       |
| 5.           | <b>Dr.K.Kalaiselvi</b> , HOD,<br>Department of Computer Science,<br>School of Computing Sciences,<br>Vels University, Chennai.              | <b>Internal Member</b>       |
| 6.           | <b>Dr.K.R.Ananthapadmanaban</b><br>Professor & HOD,<br>Department of Computer Science,<br>SRM Arts and Science College, Chennai.            | <b>External Member</b>       |
| 7.           | <b>Dr.P.Magesh Kumar</b> ,<br>Calibsoft Technologies Pvt Ltd., Chennai.   | <b>Industry Member</b>       |
| 8.           | <b>Dr.JothiVenkateswaran</b> ,<br>HOD,<br>Department of Computer Science,<br>Presidency College, Chennai.                                   | <b>Special Invitees</b>      |
| 9.           | <b>Mr.R.Balamurugan</b> ,<br>SCOPUS Ltd, Chennai.   | <b>Alumni Member</b>         |



**Bachelor**  
**of**  
**Computer Applications**

**Curriculum and Syllabus**  
**(Based on Choice Based Credit System)**  
**Effective from the Academic year**  
**2015 - 2016**  
**(Modified Version)**

**Department of Information Technology**  
**School of Computing Sciences**

# BCA

## CURRICULUM

Total No. of Credits: 140

### SEMESTER I

| CATEGO<br>RY | CODE<br>NUMBER | COURSE                        | HRS / WEEK  |              |               | CREDIT<br>S |
|--------------|----------------|-------------------------------|-------------|--------------|---------------|-------------|
|              |                |                               | LECTUR<br>E | TUTORIA<br>L | PRACTI<br>CAL |             |
| CORE         | 15BCA001       | Programming in C              | 4           | 0            | 0             | 4           |
| CORE         | 15BCA002       | Digital Logic<br>Fundamentals | 5           | 0            | 0             | 4           |
| CORE         | 15BMA00<br>1   | Mathematics I                 | 5           | 0            | 0             | 4           |
| CORE         | 15BCA003       | Programming in C<br>lab       | 0           | 0            | 6             | 3           |
| AECC         | 15-----        | AECC                          | 5           | 0            | 0             | 4           |
| AECC         | 15-----        | AECC                          | 5           | 0            | 0             | 4           |
|              |                | <b>TOTAL</b>                  | <b>24</b>   |              | <b>6</b>      | <b>23</b>   |

### SEMESTER II

| CATEGO<br>RY | CODE<br>NUMBER | COURSE                    | HRS / WEEK  |              |               | CREDI<br>TS |
|--------------|----------------|---------------------------|-------------|--------------|---------------|-------------|
|              |                |                           | LECTU<br>RE | TUTORIA<br>L | PRACTIC<br>AL |             |
| CORE         | 15BCA004       | Programming in C++        | 4           | 0            | 0             | 4           |
| CORE         | 15BCA005       | Data Structures           | 5           | 0            | 0             | 4           |
| CORE         | 15BMA00<br>2   | Mathematics II            | 5           | 0            | 0             | 4           |
| CORE         | 15BCA006       | Programming in C++<br>lab | 0           | 0            | 6             | 3           |
| AECC         | 15-----        | AECC                      | 5           | 0            | 0             | 4           |
| AECC         | 15-----        | AECC                      | 5           | 0            | 0             | 4           |
|              |                | <b>TOTAL</b>              | <b>24</b>   |              | <b>6</b>      | <b>23</b>   |

**SEMESTER III**

| CATEGORY     | CODE NUMBER | COURSE                  | HRS / WEEK |          |           | CREDITS   |
|--------------|-------------|-------------------------|------------|----------|-----------|-----------|
|              |             |                         | LECTURE    | TUTORIAL | PRACTICAL |           |
| CORE         | 15BCA007    | Programming in JAVA     | 5          | 0        | 0         | 4         |
| CORE         | 15BCA008    | Financial Accounting    | 5          | 0        | 0         | 4         |
| CORE         | 15BCA009    | Programming in JAVA Lab | 0          | 0        | 4         | 2         |
| DSE          | 15-----     | DSE                     | 5          | 0        | 0         | 4         |
| GE           | 15-----     | GE                      | 5          | 0        | 0         | 4         |
| SEC          | 15-----     | SEC                     | 4          | 0        | 0         | 4         |
| SEC          | 15-----     | SEC                     | 2          | 0        | 0         | 2         |
| <b>TOTAL</b> |             |                         | <b>26</b>  | <b>0</b> | <b>4</b>  | <b>24</b> |

**SEMESTER IV**

| CATEGORY     | CODE NUMBER | COURSE                            | HRS / WEEK |          |           | CREDITS   |
|--------------|-------------|-----------------------------------|------------|----------|-----------|-----------|
|              |             |                                   | LECTURE    | TUTORIAL | PRACTICAL |           |
| CORE         | 15BCA010    | Visual Programming                | 5          | 0        | 0         | 4         |
| CORE         | 15BMA003    | Statistical and Numerical Methods | 5          | 0        | 0         | 4         |
| CORE         | 15BCA011    | Visual Basic Lab                  | 0          | 0        | 4         | 2         |
| DSE          | 15-----     | DSE                               | 5          | 0        | 0         | 4         |
| GE           | 15-----     | GE                                | 5          | 0        | 0         | 4         |
| AECC         | 15-----     | AECC                              | 2          | 0        | 0         | 2         |
| SEC          | 15-----     | SEC                               | 4          | 0        | 0         | 4         |
| <b>TOTAL</b> |             |                                   | <b>26</b>  | <b>0</b> | <b>4</b>  | <b>24</b> |

## SEMESTER V

| CATEGORY     | CODE NUMBER | COURSE               | HRS / WEEK |          |           | CREDITS   |
|--------------|-------------|----------------------|------------|----------|-----------|-----------|
|              |             |                      | LECTURE    | TUTORIAL | PRACTICAL |           |
| CORE         | 15BCA012    | Operational Research | 5          | 0        | 0         | 4         |
| CORE         | 15BCA013    | DOT Net              | 5          | 0        | 0         | 4         |
| CORE         | 15BCA014    | DOT Net lab          | 0          | 0        | 3         | 2         |
| CORE         | 15BCA015    | Web Technology Lab   | 0          | 0        | 3         | 2         |
| DSE          | 15-----     | DSE                  | 5          | 0        | 0         | 4         |
| DSE          | 15-----     | DSE                  | 5          | 0        | 0         | 4         |
| GE           | 15-----     | GE                   | 4          | 0        | 0         | 4         |
| <b>TOTAL</b> |             |                      | <b>24</b>  | <b>0</b> | <b>6</b>  | <b>24</b> |

## SEMESTER VI

| CATEGORY     | CODE NUMBER | COURSE                            | HRS / WEEK |          |           | CREDITS   |
|--------------|-------------|-----------------------------------|------------|----------|-----------|-----------|
|              |             |                                   | LECTURE    | TUTORIAL | PRACTICAL |           |
| CORE         | 15BCA016    | Data Communication and Networking | 5          | 0        | 0         | 4         |
| CORE         | 15BCA017    | PHP                               | 5          | 0        | 0         | 4         |
| CORE         | 15BCA018    | PHP lab                           | 0          | 0        | 3         | 2         |
| CORE         | 15BCA019    | Software Testing lab              | 0          | 0        | 3         | 2         |
| DSE          | 15-----     | DSE                               | 5          | 0        | 0         | 4         |
| DSE          | 15-----     | DSE                               | 5          | 0        | 0         | 4         |
| DSE          | 15-----     | DSE                               | 4          | 0        | 0         | 4         |
| <b>TOTAL</b> |             |                                   | <b>24</b>  | <b>0</b> | <b>6</b>  | <b>24</b> |

- **TOTAL NO OF PAPERS – 40 (CORE 22, ELECTIVE 18 (AECC -5, DSE - 7,GE -3,SEC -3))**
- **TOTAL CREDITS -140**

## **LIST OF DISCIPLINE SPECIFIC ELECTIVE**

- 15BCA101: Database Management System.
- 15BCA102: Software Engineering.
- 15BCA103: Compiler Design.
- 15BCA104: Operating System.
- 15BCA105: Computer Graphics.
- 15BCA106: System analysis and design.
- 15BCA107: Object Oriented Analysis and Design.
- 15BCA108: Object Oriented Software Engineering.
- 15BCA109: Computer Architecture.
- 15BCA110: System Software.
- 15BCA111: Software Testing.
- 15BCA112: Microprocessor and its Application.
- 15BCA113: Cloud computing Technology.
- 15BCA114: Network security and cryptography.
- 15BCA115: Digital Image Processing.
- 15BCA116: Multimedia Systems.
- 15BCA117: Data Mining.
- 15BCA118: Distributed Computing and Linux.
- 15BCA119: Mobile Computing.
- 15BCA120: Open Source Technology
- 15BCA121: Client /Server Computing.
- 15BCA122: Web Technologies

## **LIST OF GENERIC ELECTIVES**

- 15BCA151: Step up programming level-1
- 15BCA152: Step up programming level-2
- 15BCA153: Office Automation Tools
- 15BCA154: Flash
- 15BCA155: Advanced Excel
- 15BCA156: Internet Basics.
- 15BCA157: My-Sql
- 15BCA158: Web Designing.
- 15BCA159: Client side Scripting Languages.

## **ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)**

- 15LEN001 : Foundation Course English I
- 15LTA001/15LHN001/15LFR001 : Foundation Course Language I
- 15LEN002 : Foundation Course English II
- 15LTA002/15LHN001/15LFR001 : Foundation Course Language II
- 15EVS201 : Environmental Science

## **LIST OF SKILL ENHANCEMENT COURSE (SEC)**

- 15BCA251 : English for Communication –I.
- 15BCA252 : English for Communication –II.
- 15EVB261 : Ethics and values. .
- 15NSS255 : NSS
- 15GPD251 : Personality Enrichment





**UNIT 4            ARRAYS, STRINGS, STRUCTURE AND UNION            11**

Arrays – defining and Processing – Passing arrays to functions – Multi-Dimensional Arrays – Arrays and String. Structures – User defined data types – Passing structures to functions – self-referential structures – Unions – Bit wise operations.

**UNIT 5            POINTERS AND FILES            13**

Pointers – Declarations – Passing pointers to functions – Operation in Pointers – Pointer and Arrays – Arrays and Pointers - Structures and Pointers – Files – Creating, Processing, Opening and Closing a data file.

**TOTAL HOURS: 60**

**TEXT BOOK**

1. E. Balaguruswamy, Programming in ANSI C, TMH publishing Company LTD,2008.

**REFERENCE BOOKS**

1. H. Schildt, The Complete Reference, 4th Edition, TMH,2004.
2. Gottfried, B.S, Programming with C, fourth edition, TMH Pub.Co.Ltd, 2004.
3. Kanetkar Y, Let us C, BPB publications with ANSI & Turbo C, First edition, Pearson Education,New Delhi, 2008.

**15BCA002            DIGITAL LOGIC FUNDAMENTALS            5 0 0 4**

**COURSE OBJECTIVE:**

- This course introduces the fundamental concepts of digital logic.
- This subject deals various number system,code conversions and Boolean algebra.
- To learn the universal gates, flip flops and registers.

**COURSE OUTCOME**

- Contrast and compare digital representation of information with the analog representation.
- Explain fundamental concepts of the decimal number system. Represent number systems in powers of the base.



Asynchronous Counters – Ripple, Mod, Up-Down Counters – Decoding Gates – Synchronous Counters – Ring, Decade, Preset table, Shift Counters. Memory: Basic Terms & Ideas – Magnetic Memories – Memory Addressing – Types of ROMs – Types of RAMs.

**TOTALHOURS: 75**

**TEXT BOOK**

1. M.Moris Mano, Digital Logic and Computer Design, PHI, 2001.

**REFERENCE BOOKS**

1. D.P.Leach & A.P. Malvino, Digital Principles and Applications – TMH – Fifth Edition 2002.
2. T.C.Bartee, Digital Computer Fundamental, 6<sup>th</sup> Edition, Tata McGraw Hill, 2001.

**15BMA001**

**MATHEMATICS-I**

**5 0 0 4**

**COURSE OBJECTIVE:**

To develop the skills of the students in the areas of Trigonometry, Set Theory, calculus and Algebra. The course will also serve as a prerequisite for post graduate and specialized.

**UNIT 1 TRIGONOMETRY**

13

Introduction – Angles – Expansions of  $\sin n$   $\cos n$ ,  $\tan n$ . Expansion of  $\sin$ ,  $\cos$ ,  $\tan$  in terms of Simple

**UNIT 2 SET THEORY**

13

Sets – Operations on sets – Relations – Relations and functions: Equivalence relations – Partial Order

**UNIT 3 MATRICES**

16

Introduction-Basic operations-Symmetric-skew symmetric-Hermitian-Skew Hermitian –Unitary- Orthogonal-Inverse of a matrix -Solution of linear system (Cramer’s rule)- Finding the Eigen roots and Eigen vectors of a matrix-Cayley Hamilton theorem(without proof)

**UNIT 4 THEORY OF EQUATIONS**

17

Polynomial, equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, Transformation of equation by increasing or decreasing roots by a constant, reciprocal equations, Newton's method to find the root approximately.

**UNIT 5 DIFFERENTIAL CALCULUS**

16

Differentiation – Successive differentiation – Partial differentiation – Maxima and Minima of functions of two variables.

**TOTAL HOURS: 75****TEXT BOOK**

1. P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper I, 1st Semester, S.Chand Publishing Pvt. Ltd. 1st Edition, 2003.

**REFERENCE BOOKS**

1. P.R. Vittal, Allied Mathematics, Margham Publications, 4th Edition 2009.
- 2.A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.

**15BCA003 PROGRAMMING IN C LAB****00 6 3****COURSE OBJECTIVE**

- This course introduces the basic concepts of C programming.
- This course practices the student to write simple programs using C.
- This course improves the logical thinking in C programming.

**COURSE OUTCOME**

- Design an algorithmic solution for a given problem.
- Draw flowcharts for the solution.
- Employ good software engineering practices such as incremental development, data integrity checking and adherence to style guidelines.
- Select and model data using primitive and structured types.

- Construct programs that demonstrate effective use of C features including arrays, structures, pointers and files.
- Write a maintainable C program for a given algorithm.
- Debug a given program.
- Execute the C program.

### **List of Experiments**

1. Palindrome
2. Vowel Count
3. String Manipulation
4. Factorial
5. Npr & Ncr
6. Gcd
7. Fibonacci Series
8. Matrix Addition
9. Matrix Transpose
10. Programming Using Structure
11. Programming Using Pointer.
12. Programming Using Files.

**TOTAL HOURS: 90**

**15BCA004**

**PROGRAMMING IN C++**

**4 0 0 4**

### **COURSE OBJECTIVE:**

- This course introduces the basic concepts of programming in C++
- To improve the problem solving skills using OOPS concept
- On successful completion the students should have programming ability on C++

## **COURSE OUTCOME**

- Apply the concept of polymorphism and inheritance.
- Understand functions and parameter passing.
- Be able to do numeric (algebraic) and string-based computation.
- Implement exception handling and templates.
- Develop applications using Console I/O and File I/O
- Understand object-oriented design and programming.
- Understand dynamic memory allocation and pointers.
- Be able to design, implement, and test relatively large C++ programs.

### **UNIT 1 INTRODUCTION TO OOPS 8**

Principles of Object Oriented Programming (OOPS)-Basic concepts of OOPS - Benefits of OOPS-Applications of OOPS-Introduction to C++-Tokens-Keywods-Identifiers-Variables-Operators-Expressions and Control Structures.

### **UNIT 2 FUNCTIONS 15**

Array-Pointers- Access Specifier-Functions-Functions Prototyping-Parameter passing in functions-Value return by functions-Inline Functions-Static data member-Static member function-Friend Function.

### **UNIT 3 CLASSES AND OBJECTS 15**

Classes and objects-Constructors and Destructors-Type of Constructors-copy Constructors-Function Overloading-Operator Overloading-Constructor Overloading-Type Conversion.

### **UNIT INHERITANCE 10**

Inheritance-Types of Inheritance-Virtual Functions-Virtual Base Class –Mapping Console I/O Operation.

### **UNIT 5 FILES 12**

Files-File Streams-File Operations-File Pointer-Error Handling-Command Line arguments.

**TOTAL HOURS: 60**

## **TEXT BOOK**

1. E.BalaGurusamy“Object Oriented Programming with C++”, Tata MC Graw Hill Education.

## **REFERENCE BOOKS**

1. D.Ravichandran-“Oriented Programming with C++”, 2nd ed, TMH.
2. Yashwant Kanetkar-“Let Us C++”, 2<sup>nd</sup> edition,Mc Graw Hill,2000.

**15BCA005      DATA STRUCTURES                      5      0      0      4**

## **COURSE OBJECTIVE:**

- This course introduces the basic concepts and fundamentals of data structures.
- This subject deals various data structures and algorithms for handling the data.
- To learn the data structures and method of data processing from data storages.

## **COURSE OUTCOME**

- Student will be able to choose appropriate data structure as applied to specified problem definition.
- Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc. Students will be able to use linear and non-linear data structures like stacks, queues, linked list etc.
- Be able to design and analyze the time and space efficiency of the data structure.
- Be capable to identify the appropriate data structure for given problem
- Have practical knowledge on the application of data structures
- Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms, min-max algorithm,
- Select basic data structures and algorithms for autonomous realization of simple programs or program parts
- Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.



|   |                            |                       |
|---|----------------------------|-----------------------|
| <b>UNIT 1</b>   | <b>INTRODUCTION</b>        | 14                    |
| Basic Terminology – elementary data organization – Data Structures – Data Structure Operations – Algorithms – Complexity of Algorithms. Array: Linear array – Representation of Linear Array – Traversing Linear Array – Inserting and Deleting – Bubble Sort – Linear Search – Binary Search.    |                            |                       |
| <b>UNIT 2</b>   | <b>STACK</b>               | 16                    |
| Representation of Stack – Operations on Stack – PUSH – POP – Applications of Stack – Infix to postfix expression – Evaluation of Postfix expression – Recursion - Tower of Hanoi – Quick Sort.Queue: Representation of Queue – Applications of Queue – D Queue – Priority Queue – Circular Queue. |                            |                       |
| <b>UNIT 3</b>   | <b>SINGLY LINKED LISTS</b> | 15                    |
| Operation on Singly Linked List – Applications of Singly Linked List – Polynomial Addition.Doubly Linked List: Operations on Doubly Linked List.  |                            |                       |
| <b>UNIT 4</b>   | <b>TREES</b>               | 13                    |
| Basic Terminology – Binary Tree – Representation of Binary Tree – Binary Tree Traversal – Binary Search Tree – Operations on Binary Search Tree – Heap Sort.  |                            |                       |
| <b>UNIT 5</b>   | <b>GRAPH</b>               | 17                    |
| Graph – Terminology – Representation of Graph – Applications of Graph: Shortest Path algorithm – Operations of Graph – Graph Traversal – Topological Sorting. Hashing Technique.  |                            |                       |
|   |                            | <b>TOTAL HOURS:75</b> |

**TEXT BOOK:**

1. Ellis Horowitz and Sartaj Sahni-“Fundamentals of data structures”, Galgotia Book Source, 2009.

**REFERENCE BOOKS**

1. Lipschutz- “Data Structures”, Schaum’s Outline Series.
2. Askok N Kamthane –“Programming And Data Structures” Perason Education, 2004

**COURSE OBJECTIVE:**

- To impart the knowledge of Integral calculus, Differential Equations, Fourier series and Laplace transform. The course will also serve as a prerequisite for post graduate and specialized studies and research.

**UNIT 1 INTEGRAL CALCULUS 15**

Integral calculus: Integration – Definite integrals – Bernoulli's formula -Reduction formula for  $\int \sin^n x dx, \int \cos^n x dx, \int \tan^n x dx, \int x^n e^{ax} dx$ .

**UNIT 2 ORDINARY DIFFERENTIAL EQUATIONS 14**

Ordinary differential equations: First order of higher degree equations – Second order and non-homogenous linear differential equations with constant coefficient – Second order linear differential equations with variable coefficients.

**UNIT 3 PARTIAL DIFFERENTIAL EQUATIONS 16**

Formation of partial differential equations by eliminating arbitrary constants and arbitrary function- Solutions of standard types of first order equations-  $f(p,q)=0$ ;  $f(x,p,q)=0$ ,  $f(y,p,q)=0$ ,  $f(z,p,q)=0$ ,  $z = px +qy +f(p,q)$  -Lagrange method of solving linear partial differential equation  
 $Pp +Qq = r$ .

**UNIT4 FOURIER SERIES 14**

Fourier series of periodic functions on the interval  $[c, c+2\pi]$  –Even and Odd functions- Half range series.

**UNIT 5 LAPLACE TRANSFORM 16**

Laplace transformation: Definition, Laplace transforms of basic trigonometric, exponential and algebraic functions - Inverse Laplace transform- Solving differential equation of second order with constant coefficients using Laplace transform.

**Total Hours: 75****TEXT BOOK**

1. P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper II, 2<sup>nd</sup> Semester, S.Chand Publishing Pvt. Ltd. 1<sup>st</sup> Edition, 2004.

## REFERENCE BOOKS

1. P.R. Vittal, Allied Mathematics, Margham Publications, 4<sup>th</sup> Edition 2009.
2. A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.

**15BCA006 C++ PROGRAMMING LAB 0 0 6 3**

### COURSE OBJECTIVE:

- This course introduces the basic concepts of C++ programming.
- This course practices the student to write simple programs using C.
- This course improves the logical thinking in C programming.

### COURSE OUTCOME:

- Ability to write object-oriented programs of moderate complexity in C++.
- Understanding of the concepts of inheritance and polymorphism.
- Ability to use template classes and the STL library in C++ and Java.
- Ability to overload operators in C++.
- Ability to incorporate exception handling in object-oriented programs.
- Understanding of the difference between function overloading and function overriding.
- Understanding the concepts of Inheritance
- Implement Object Oriented Programs using templates and exceptional handling concepts.

### List of Experiments

1. Write a program to implement an Account Class with member functions to Compute Interest, Show Balance, Withdraw and Deposit amount from the Account.
2. Write a C++ program implement a class 'Complex' of complex numbers. The class should be include member functions to add and subtract two complex numbers. .
3. Write a C++ program to implement a student class having roll no., name, rank, addresses as data members.
4. Write a Program to implement a sphere class with appropriate members and member function to find the surface area and the volume.  
(Surface =  $4 \pi r^2$  and Volume =  $\frac{4}{3} \pi r^3$  )

5. Write a C ++ program to implement matrix class. Add member function to transpose the matrix.
6. Write a program in C++ to create the class shape, and overload the function to return the perimeters of the different shapes.
7. Write a program in C++ to demonstrate constructor with default argument.
8. Write a program in C++ demonstrating the public, protected and private parameters.
9. Write a C ++ program to implement a class for complex numbers with add and multiply as memberfunctions. Overload ++ operator to increment a complex number.
10. Write a program in C++ to demonstrate multiple inheritances.

**TOTAL HOURS:90**

**15BCA007**

**PROGRAMMING IN JAVA**

**5 0 0 4**

**COURSE OBJECTIVE:**

- This course introduces the basic concepts of programming in JAVA.
- Introduce event driven Graphical User Interface (GUI) programming.
- Learn the essentials of the Java class library, and learn how to learn about other parts of the library when you need them.

**COURSE OUTCOME:**

- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.
- Be able to understand better the object-oriented approach in programming. Students should be able to analyze and design a computer program to solve real world problems based on object-oriented principles.
- Be able to write computer programs to solve real world problems in Java
- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- To learn and appreciate the importance and merits of proper comments in source code and API documentations

- Be able to write simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles.

**UNIT 1 INTRODUCTION 12**

Introduction to Java – Features of Java – Object Oriented Concepts – Lexical Issues – Data Types – Variables – Arrays – Operators – Control Statements.

**UNIT 2 CLASSES AND OBJECTS 15**

Classes – Objects – Constructors – Overloading method – Static and fixed methods – Inner Classes – String Class – Inheritance – Method Overriding- Method Overloading – Using super – Abstract class.

**UNIT 3 PACKAGES 16**

Packages – Access Protection – Importing packages – Exception Handling – Throw and Throws – Thread – Synchronizing – Messaging – Runnable Interface – Inner thread Communication – Deadlock – Suspending, Resuming and stopping threads – Multithreading.

**UNIT 4 INPUT-OUTPUT STREAMS 16**

I/O streams – File Streams – Applets-String Buffer-Char Array-Java Utilities-Code Documentation.

**UNIT 5 AWT CONCEPTS 16**

Working with windows using AWT Classes-AWT Controls-Layout Managers and Menus.

**TOTAL HOURS: 60**

**TEXT BOOK**

1. P.Naughton and H.Schildt –Java2 (The Complete References)-Third Edition, TMH 2008.

## REFERENCE BOOKS

1. Cay S.Horstmann, Gary Cornell-Core Java 2 Volume 1 – Fundamentals, 5th PHI, 2006.
2. K.Arnold and J.Gosling- The Java Programming Language – Second Edition,Addison Wesley,2009.

**15BCA008 FINANCIAL ACCOUNTING 5 0 0 4**

### COURSE OBJECTIVE:

- To give an insight into the basics of Accounting Concepts and Principles to Prepare to Students to have the Foot Hold in Accounts.

### **UNIT 1 INTRODUCTION TO ACCOUNTING 15**

Meaning and definition of accounting- functions of accounting – limitations of accounting – accounting concepts and conventions systems of accounting – single entry system – double entry system – subsidiary books including cash book – trial balance – rectification of errors.

### **UNIT 2 PREPARATION OF FINAL ACCOUNTS 15**

Final accounts with adjustments – closing stock, outstanding expenses, unexpired or prepaid expense, accrued income, income received in advance, depreciation, additional bad debts, provision for doubtful debts, provide for a discount on debtors, interest on capital, interest in drawing, discount on creditors and creation of various reserves.

### **UNIT 3BANK RECONCILIATION STATEMENT AND ACCOUNTS 15**

Bank reconciliation statement – insurance claim account – loss of property and stock – average clause.



**COURSE OBJECTIVE:**

- This course introduces the concepts of JAVA programming.
- This course practices the student to write simple programs using JAVA.
- This course improves the logical thinking in JAVA programming.

**COURSE OUTCOME:**

- Students will get the knowledge of object oriented programming and the properties
- Students will get the knowledge of Difference between OOP and other conventional
- Students will get the knowledge of Basic concepts of object oriented programming using Java Implementation
- Students will get the knowledge of Class & Object properties and Basic concepts of java programming
- Students will get the knowledge of Reusability, Exception handling & Multithreading
- Students will get the knowledge of Applet Programming

**LIST OF EXPERIMENTS****40**

1. Finding area and Perimeter of a circle. Use Buffered Reader Class.
2. Substring Removal from a String. Use String Buffer Class.
3. Determining the order of numbers generated randomly using Random Class.
4. Implementation of Point Class for Image Manipulation.
5. Usage of Calendar Class and manipulation.
6. String Manipulation using Char Array.
7. Database Creation for storing e-mail addresses and manipulation.
8. Usage of Vector Classes.
9. Implementation Thread based applications & Exception Handling.
10. Application using synchronization such as thread based, Class based and synchronized
11. Statements.



**APPLET****20**

1. Working with Frames and various controls.
2. Working with Dialogs and Menus.
3. Working with Panel and Layout.
4. Incorporating Graphics.
5. Working with Colors and Fonts.

**TOTAL HOURS: 60****15BCA010VISUAL PROGRAMMING****5 0 0 4****COURSE OBJECTIVE:**

- To inculcate knowledge on Visual Basic concepts and Programming.
- Identify the differences between the procedural languages and event-driven languages.
- To Design, create, build, and debug Visual Basic applications.

**COURSE OUTCOME:**

- Design, create, build, and debug Visual Basic applications.
- Explore Visual Basic's Integrated Development Environment (IDE).
- Implement syntax rules in Visual Basic programs.
- Students will get the knowledge of to apply loop structures to perform repetitive tasks.
- Students will get the knowledge of to Write and apply procedures, sub-procedures, and functions to create manageable code.
- Create one and two dimensional arrays for sorting, calculating, and displaying of data.
- Students will get the knowledge of Windows applications using forms, controls, and events.

|  |                                |                        |
|--|--------------------------------|------------------------|
| <b>UNIT 1</b>  | <b>INTRODUCTION</b>            | <b>16</b>              |
| Customizing a form/ writing simple programs/ tool box/ creating controls/ name property/ command button/ access keys/ image controls / text boxes/ labels / message boxes/ grid/ edit tools/ variables/ data types/ strings /numbers |                                |                        |
| <b>UNIT 2</b>  | <b>LOOP CONCEPTS</b>           | <b>16</b>              |
| Displaying information/ determinate loops /indeterminate loops/ conditionals/ built in functions/ functions and procedures   |                                |                        |
| <b>UNIT 3</b>  | <b>ARRAYS</b>                  | <b>14</b>              |
| Lists /arrays/ sorting and searching/ records/ control arrays/ combo boxes/ grid control/ projects with multiple forms/ do events and sub main/ error trapping   |                                |                        |
| <b>UNIT 4</b>  | <b>OBJECTS</b>                 | <b>14</b>              |
| VB objects/ dialog boxes/ common controls / menus/ MDI forms / testing / debugging / optimization/ working with graphics   |                                |                        |
| <b>UNIT 5</b>  | <b>FILE HANDLING FUNCTIONS</b> | <b>15</b>              |
| Monitoring mouse activity/ file handling/ file system controls/ file system objects/com/ole / automation / DLL servers / ole drag and drop   |                                |                        |
|  |                                | <b>TOTAL HOURS: 75</b> |

**TEXT BOOK**

1. Gary Cornell visual basic 6 from the ground up / TMH,2000

**REFERENCE BOOKS**

1. Noel Jerke / visual basic complete ref / TMH, 2002.
2. Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press, 2004.
3. Evangelos Petroutsos. “Mastering Visual Baisc 6”, BPB Publications, 2005.

**COURSE OBJECTIVE:**

- To develop the skills of the students in the concepts of Statistics and Numerical Methods. The course will also serve as a prerequisite for post graduate and specialized studies and research.

**UNIT 1 INTRODUCTION TO STATISTICS 15**

Introduction to statistics-frequency distribution-Diagrammatic representation-Measures of Central Tendency: Mean, Median, Mode, Geometric mean, Harmonic mean-Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, and Coefficient of Variation.

**UNIT 2 CORRELATION AND REGRESSION 16**

Correlation Analysis: Introduction, Methods of Studying Correlation- Karl Pearson's Coefficient Of Correlation-Spearman's Rank Correlation Coefficient: Ranks are given, Ranks are not given, Equal ranks or Repeated Values.Regression Analysis: Two Regression Equations-Regression Equation of X on Y, Regression Equation of Y on X.

**UNIT 3 TESTING OF HYPOTHESIS 14**

Sampling –Test of hypothesis- Test of Significance for Small Samples: t test- Single Mean, Two Mean, and Paired t-test- F test-Chi Square Test: Goodness of Fit, 2X2 Contingency table.

**UNIT 4 ALGEBRAIC AND TRANSCENDENTAL EQUATIONS 15**

Roots of equations: Graphical Method- Bisection Method- False position Method – Newton –Raphson's Method- Secant Method- Algebraic Equations: Gauss Elimination Method- Gauss- Jordan Method- Matrix Inverse Method- Gauss-Seidel Method.

**UNIT 5 NUMERICAL DIFFERENTIATIONS AND INTEGRATION 15**

Numerical Integration and Differentiation: Trapezoid Rule- Simpson's Rule- Application of numerical methods to differential equations: Runge-Kutta Order Methods.

**TOTAL HOURS: 75**

## **TEXT BOOKS**

- 1.S.P.Gupta, Statistical Methods, Sultan Chand & Sons, 35<sup>th</sup> Revised Edition, 2007.(Unit I,II,III)
2. S. Arumugam, A. Thangapandi Isaac and A. Somsundaram, Numerical Methods, Scitech Publications India Pvt. Ltd.2001.

## **REFERENCE BOOKS**

1. P.R. Vittal and V. Malini, Statistical and Numerical Methods, Margham Publications, 1<sup>st</sup> Edition, 2007.
2. A. Singaravelu, Numerical Methods, Meenakshi Agency, 2008

**15BCA011    VISUAL PROGRAMMING LAB            0       0       4       2**

## **COURSE OBJECTIVE:**

- This course introduces the concepts of VB programming.
- This course practices the student to write simple programs using VB.
- This course improves the logical thinking in VB programming.

## **COURSE OUTCOME:**

- Ability to write programs using forms
- Understanding of the concepts of Multiple forms.
- Ability to use Menu Editor.
- Ability to create window based applications.
- Ability to connect VB with Ms Access.
- Ability to connect VB with ActiveX control.
- Ability to work with file directories.
- Ability to write programs with data control.

## **LIST OF EXPERIMENTS**

1. Building Simple Applications.
2. Working with Intrinsic Controls and ActiveX Controls.
3. Application with multiple forms.
4. Application with Dialogs.

5. Application with Menus.
6. Application using Data Controls.
7. Application using Common Dialogs.
8. Drag and Drop Events.
9. Database Management.
10. Creating ActiveX Controls

**Total Hours : 60**

**15BCA012 OPERATIONS RESEARCH**

**5004**

**COURSE OBJECTIVE:**

- To impart the knowledge of various concepts of Operations Research. This course will also serve as a prerequisite for post graduate and specialized studies and research.

**UNIT 1 INTRODUCTION TO OPERATION RESEARCH 15**

Introduction to OR - Areas of application of OR - Linear programming problems- Formulation & Graphical method of solution - Simplex method.

**UNIT 2 TRANSPORTATION AND ASSIGNMENT PROBLEMS 16**

Transportation Problems: Introduction-Balanced and Unbalanced Transportation Problems- IBFS for finding North West Corner Rule-Least Cost Method- Vogel's Approximation Method-MODI Method.Assignment Problems: Introduction-Balanced and Unbalanced AssignmentProblems-Maximization case in Assignment Problems.

**UNIT 3 NETWORK ANALYSIS 14**

Network Analysis: Introduction – Basic Terminologies –Construction of Network-Critical Path method (CPM)- PE RT- Float analysis-Total Float-Free Float-Independent Float-Difference Between CPM and PERT.

**UNIT 4 SEQUENCING PROBLEMS 16**

Sequencing problems – Processing n jobs on two machines-Processing n jobs on three machines – Processing n jobs on m machines- Processing of two jobs on n machines (Graphical method) -Simulation techniques-Pseudo random numbers.

**UNIT 5 GAME THEORY 14**

Game theory – Introduction- 2 person zero sum games – mixed strategies- arithmetic method – Dominance property – Graphical method.

**TOTAL HOURS: 75**

**TEXT BOOK**

- 1.Kanti swaroop, Gupta P. K, Man Mohan, Operations Research, 14th Edition, Sultan Chand & Game theory.

**REFERENCE BOOKS**

1. Hamdy Taha, Operations Research, 8th Edition, Pearson Education, 2009.
2. Sharma J.K, Operations Research, 3rd Edition, Macmillan Business Books, 2009.
3. Sundaresan V, Ganapathy K.S, Ganesan K, Resource Management Technique- Lakshmi
4. Kalavathy S, Operations Research, 2nd Edition, Vikas Publications, 2009.

**15BCA013 DOT NET PROGRAMMING 5 0 0 4**

**COURSE OBJECTIVE:**

- To inculcate knowledge on .NET Programming and concepts.
- To understand the concepts of C# Windows Controls
- This syllabus is aimed to impart a basic understanding of how computers communicate using different devices and protocols

**COURSE OUTCOME:**

- Display proficiency in C# by building stand-alone applications in the .NET framework using C#.
- Create distributed data-driven applications using the .NET Framework, C#, SQL Server and ADO.NET

- Create web-based distributed applications using C#, ASP.NET, SQL Server and ADO.NET
- Utilize DirectX libraries in the .NET environment to implement 2D and 3D animations and game-related graphic displays and audio.
- Create a Web form with server controls.
- Separate page code from content by using code-behind pages, page controls, and components.
- Display dynamic data from a data source by using Microsoft ADO.NET and data binding.
- Debug ASP.NET pages by using trace.

**UNIT 1 INTRODUCTION 13**

Overview of .Net Framework-Feature Of .Net Framework - .Net framework class library - .NET Framework Components -Overview with Focus on CLR, CTS.-MSIL-JIT-Assembly-DLL-Meta Data –Application Architecture.

**UNIT 2 C# BUILDING BLOCKS 15**

Introduction to C# –Overview-Types –Expressions- Declarations – Statements - Classes and Struts- OOPS –Constructors and Destructors

**UNIT 3 C# WINDOWS CONTROLS 16**

Button -Textbox -RichTextBox -Label, LinkLabel -CheckBox -RadioButton - ListBox -ComboBox -TreeView -CheckedListBox -Panel -GroupBox - PictureBox -ToolTip -ErrorProvider -MainMenu -ContextMenus -Common Dialogs -Date TimePicker -MonthCalendar -Splitter -HelpProvider -StatusBar -NotifyIcon -Print Related

**UNIT 4 ASP.NET 16**

Data list Web server controls : Check box list – radio button list – drop down list – list box – data grid – repeater control – Other Web server controls : Calendar control and Ad Rotator control. Required Field Validator control- Compare Validator – Range Validator – Custom Validator – Validation Summary Control

**UNIT 5 OBJECTS AND ADVANCED CONCEPTS IN ASP.NET 15**

Request Object - Response Object – State Management for Session ,Application, Cookies, Query String –Introduction to ADO.NET – ADO Vs ADO.NET – Connected ADO.NET Architecture – Disconnected ADO.NET Architecture – Data Reader - Data Adapter – ADO.NET Classes.

**TOTAL HOURS: 75**

**TEXT BOOK**

1. Joe Duffy, Professional .NET Framework 2.0 2006 Edition- Wrox Publications

## REFERENCE BOOKS

1. Steven Holzner, Visual Basic.NET Programming – **Black Book 2005** Edition,- Paraglyph Press and DreamTech Press
2. Alex, Professional ASP.NET 1.1 - Homler and Group Wrox Publications
3. Michael Otey and Denielle Otey ADO.NET Complete Reference Tata Macraw Hill Publication

**15BCA014**

**.NET LAB**

**0 0 3 2**

## COURSE OBJECTIVE:

- This course gives an exposure and training in .NET programming.
- To understand the goals and objectives of .NET framework, understand the concept on how software should be developed and deployed.
- To have a working knowledge of C## programming language.

## COURSE OUTCOME:

- Create Simple application using web controls
- Work with States of ASP.NET Pages & Adrotator Control
- Use of calendar control, Tree view control & Validation controls
- Query textbox and Displaying records & Display records by using database
- Data list link control & Data binding using drop down list control
- Inserting record into a database & Deleting record into a database
- Data binding using data list control & Data list control templates
- Data binding using datagrid & Datagrid control template
- Data grid hyperlink & Data grid button column
- Data list event & paging

## LIST OF EXPERIMENTS:

1. To write a C# program for Bank Account Information using all inheritance
2. To write a C# program for student mark list using all type of constructors & Destructors
3. To write a C# program for function overloading and function overriding.
4. To write a program for login page using windows application with ado.net
5. To write a windows program for employee registration form with a validation.
6. To create a window application program for to demonstrate Progress bar
7. To create web page then demonstrate all validation controls.
8. To create Asp.net web page and demonstrate advertisement in your web page.



9. To create asp.net page for employee registration form using all validation control
10. To create web page for View and Session State in Asp.net.
11. To demonstration web page program for cookies in asp.net.
12. To create web page for query string through URL in asp.net.
13. To create a windows C# program for DML operation using ADO.NET
14. Bind Data using DropDownList in asp.net.
  - a. Write a program to demonstrate DataGridView Control in Ado.net

**Total Hours: 45**

**15 BCA015 WEB TECHNOLOGY LAB 0 0 3 2**

**COURSE OBJECTIVE:**

- This course gives training in web design and applications.
- To give practical experience on web technology concepts.
- To inculcate knowledge of web technological and functioning internet.

**COURSE OUTCOME:**

- Ability to write program using Table tag.
- Ability to write program using Image tag
- Ability to write program using List.
- Ability to write program using Frame.
- Ability to create website
- Ability to create style sheet.
- Ability to create program using cookies.
- Ability to create Event handling in javascript.

**LIST OF EXPERIMENTS:**

1. Create a simple page introducing yourself, how old you are, what you do, what you like and dislike. Modify the introduction to include a bullet list of what you do and put a list on the 5 things you like most and dislike is numbered lists. Create another page about your favorite hobby, and link it to (and from) your main page. Center something, and put a quote on one of your pages.

2. Put an existing image on a web page. Create a table, use a heading and at least one use of row span / col span. Colour a page and some text within the page. Link to another site.
3. Create a new file called index.html.
4. Put the normal HTML document structure tags in the file.
5. Give a title.
6. At the bottom of the page (i.e. the last thing between the body tags) put the following:
7. A horizontal rule.
8. A link to your email-address (with your name between the tag); remember to put the link to your email address within address tags.
9. A line break.
10. The Date ( I have this same structure at the bottom of this page)
11. Above this Block (which is called the footer), put a title in heading tags.
12. Add some text describing you. (You can split this into multiple headings and paragraphs if you want).
13. Write a script to create an array of 10 elements and display its contents.

**15BCA016 DATA COMMUNICATION & NETWORKING      5   0   0   4**

**COURSE OBJECTIVE:**

- This course introduces the concepts of Networking.
- Demonstrate understanding about various data communication transmission media, interface and modulation techniques.
- The course provides a unified and fundamental view of the broad field of data communications networks.

**COURSE OUTCOME:**

- Describe the evolution of data communication
- List and describe various data communication protocols of importance and networking standards
- Describe alternative networking approaches and topologies
- Describe various important hardware devices used in networking
- Understand the role of commercial communications companies in networking
- Describe the tasks associated with maintaining network security
- Describe Wired and Wireless configurations and deployments
- Explain how communication works in data networks and the Internet.



## **TEXT BOOK**

1. Behrouz and Forouzan - Introduction to Data Communication and Networking - 2<sup>nd</sup> Edition - TMH-2001

## **REFERENCE BOOKS**

1. Jean Wairand - Communication Networks (A first Course) - Second Edition - WCB/McGraw Hill - 1998.
2. Andrew Tanenbaum," Computer Networks", Pearson Education. - 5th Edition,

**15BCA017**

**PHP**

**5 004**

### **COURSE OBJECTIVE:**

- This course gives an exposure to PHP and its applications.
- To understand PHP variables, functions, and operators in a PHP program.
- To utilize PHP in web forms to access form variables.

### **COURSE OUTCOME:**

- Understand process of executing a PHP-based script on a webserver.
- Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
- Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
- Understand the syntax and use of PHP object-oriented classes.
- Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
- Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.

### **UNIT 1 INTRODUCTION 14**

Introduction – Basic features of PHP – Evolution of PHP – HTML concepts – Introducing Variables – Holding Data – Constants – Introducing Operators.

### **UNIT 2 CONTROL STRUCTURES 16**

Introduction to Control Structures – Using Conditional Statements – Using Loops in PHP – Introduction to Functions – Using Functions. Accessing PHP and HTTP data – Links – HTML web forms.

**UNIT 3      ARRAYS**

15

Introducing Arrays – Create Arrays – Looping through Arrays – Manipulating Arrays – Sorting Arrays – Designing PHP program logic: Problem statement – writing pseudo code – Boolean Logic.

**UNIT 4      DEBUGGING**

15

Testing and Debugging – Debugging PHP script – Debugging and handling errors in PHP5 – Form validation.

**UNIT 5      SQL**

15

Retrieving data using PHP – SQL statement for retrieving Data – Inserting records using PHP – Updating and Deleting Records in tables.

**Total Hours: 75****TEXT BOOK:**

1. Dave W.Mercer, Allan Kent, Steven D. Nowicki ,“Beginning PHP5”,Edition, Wiley Publication,2004.

**REFERENCE BOOKS:**

1. Ashok Appu ,“PHP- A Beginner’s Guide”, Wiley Publication,2006.
2. Programming PHP Rasmus Lerdorf and Levin Tatroe O’Reilly Publications, 2002

**15BCA018****PHP LAB****0032****COURSE OBJECTIVE:**

- This course gives training in PHP design and applications.
- This course practices the student to write simple programs using PHP.
- This course improves the logical thinking in PHP programming.

**COURSE OUTCOME:**

- Create PHP scripts that: use object-oriented PHP,
- Create PHP scripts that: implement business logic within the database,

- Create PHP scripts that: use stored procedures and triggers,
- Create PHP scripts that: Are secure, portable and scalable.
- Create and deploy a portable web-based system.
- Create PHP scripts that: Test and debug object-oriented PHP scripts.

### **List of Experiments**

1. To create login page with check username Password available on database.
2. To write ARRAY program with sorting program on PHP.
3. To write PHP functions with and without parameters.
4. To design web page for student registration page.
5. Create Registration Form with validation.
6. To implement the Session Management.
7. To implement the COOKIES concepts in your web site?
8. To implement E-mail concept on PHP.
9. Display the student information on web site UPDATE, DELETE the information.
10. Create web page for REQUEST and RESPONSE object.
11. To insert the image and display Images randomly.
12. To create web site for File Upload and File Download options.

**Total Hours:45**

**15BCA019**

**SOFTWARE TESTING LAB**

**0 0 3 2**

### **COURSE OBJECTIVE:**

- This course gives training in software testing tools.
- To get knowledge in software testing.
- To know how to develop the software.

### **COURSE OUTCOME:**

- Have an ability to apply software testing knowledge and engineering methods.
- Design and conduct a software test process for a software testing project.
- Identify the needs of software test automation, and define and develop a test tool to support test automation.
- Ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.

- Ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
- Understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems.
- Ability to use software testing methods and modern software testing tools for their testing projects.

### **Practical I**

1. Develop a Software Requirements Specification for “Hotel Management System. / Book Store Management System”.
2. Develop a Software Requirements Specification for “Online ticket booking system”

### **Practical II**

1. To generate unit testing report for Online Ticket booking system

### **Practical III**

Perform black box testing Hotel / Bookstore management system.

1. Using equivalence class partitioning method.
2. Using boundary value analysis (BVA) method

### **Practical IV**

Perform white box testing for Online Ticket booking system

1. Using branch coverage method.
2. Using path coverage method
  - a. Independent paths
  - b. Test Cases table
  - c. Test matrix

### **Practical VI**

1. Introduction of WinRunner
2. Recording and Playback using WinRunner
3. Study GUI Checkpoints in WinRunner





**UNIT 4      DATA STORAGE METHODS      16**

Power of Application Structure - User Interface Features - Transaction - Forms Events  
- Custom Reports - Distributing Application - Table Operations - Data Storage  
Methods - Storing Data Columns - Data Clustering and Partitioning.

**UNIT 5      SECURITY      15**

Database Administration - Development Stages - Application Types - Backup and  
Recovery - Security and Privacy - Distributed Databases - Client/Server Databases  
Web as a Client/Server System - Objects - Object Oriented Databases - Integrated  
Applications.

**Total Hours: 75**

**TEXT BOOK**

1. G. V. Post - Database Management Systems Designing and Building Business  
Application - McGraw Hill International edition - 1999.

**REFERENCE BOOK**

1. Raghu Ramakrishnan - Database Management Systems - WCB/McGraw Hill -  
1998.
2. C.J. Date - An Introduction to Database Systems - 7th Edition - Addison  
Wesley - 2000.

**15BCA102      SOFTWARE ENGINEERING      5      0      0      4**

**COURSE OBJECTIVE:**

- This course introduces the concepts of Life Cycle of Software.
- To Understand the Software Engineering Practice& Process Models.
- To Understand Design Engineering, Web applications and Software Project  
Management.

**COURSE OUTCOME:**

- Able to understand the software engineering factors.

- Able to develop a solution strategy for planning the development process.
- Able to determine the cost estimation of software.
- Able to analyze the different software requirement specification techniques.
- Able to gain knowledge about the software design concepts.
- Able to design the real time and distributed system by using different plans.
- Able to analyze the problem of implementation issues.
- Able to understand the standards and guidelines.
- Able to identify the quality assurance of a developed software product.
- Able to evaluate the software system with various testing strategies.

|  |                                 |    |
|--|---------------------------------|----|
| <b>UNIT 1</b>  | <b>INTRODUCTION</b>             | 14 |
| Introduction to Software Engineering : Definitions – Size Factors- Quality and Productivity Factors – Managerial Issues- Planning a software Project: Defining the Problem – Developing a Solution – Strategy – Planning the Development Process – Planning an Organization Structure – Other Planning Activities.     |                                 |    |
| <b>UNIT 2</b>  | <b>SOFTWARE COST ESTIMATION</b> | 16 |
| Software cost factors – Software Cost Estimation Techniques – Staffing – Level Estimation – Estimating Software Maintenance Costs – The Software Requirements Specification – Formal Specification Techniques – Languages and Processors for Requirements Specification.   |                                 |    |
| <b>UNIT 3</b>  | <b>SOFTWARE DESIGN</b>          | 14 |
| Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real-Time and Distributed System Design – Test Plans – Milestones, Walkthroughs, and Inspections.  |                                 |    |
| <b>UNIT 4</b>  | <b>IMPLEMENTATION ISSUES</b>    | 10 |
| Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation guidelines – Type checking – Scoping Rules – Concurrency Mechanism.   |                                 |    |
| <b>UNIT 5</b>  | <b>QUALITY ASSURANCE</b>        | 16 |
| Quality Assurance – Walkthroughs and Inspections – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification: Enhancing Maintainability during Development – Managerial aspects of Software Maintenance – Source Code Metrics – Other Maintenance Tools and Techniques. |                                 |    |

**Total hours 75**

## **TEXT BOOK**

1. R.S.Pressman,Software Engineering , Fourth Ed , McGraw Hill,2007 1997 Edition

## **REFERENCE BOOKS:**

1. R.E Fairely , “Software Engineering Concepts”, Tata McGraw Hill Publication 2001.
2. Richard Fairley, “Software Engineering Concepts”, TATA Mc GRAW Hill Edition.

**15BCA103**

**COMPILER DESIGN**

**5**

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**4**

## **COURSE OBJECTIVE:**

- This course introduces the basic concepts and applications of compiler design.
- To understand, design and implement a parser.
- To understand, design code generation schemes.

## **COURSE OUTCOME:**

- To design & conduct experiments for Intermediate Code Generation in compiler.
- To design & implement a software system for backend of the compiler.
- To deal with different translators.
- To develop program to solve complex problems in compiler
- To learn the new code optimization techniques to improve the performance of a program in terms of speed & space.
- To acquire the knowledge of modern compiler & its features.
- To learn & use the new tools and technologies used for designing a compiler.
- To introduce the major concept areas of language translation and compiler design.
- To develop an awareness of the function and complexity of compilers.
- To provide practical, hands on experience in compiler design
- Identify the similarities and differences among various parsing techniques and grammar transformation techniques

## **UNIT 1 INTRODUCTION TO COMPIERS**

15

Compilers and Translator– Need of Translator – The structure of a Compiler – Lexical analysis – Syntax analysis – Intermediate code generation – optimization – code generation – Compiler – writing tools. Finite automata and lexical Analysis: The

role of the lexical analysis – A simple approach to the design of lexical analyzers  
Regular expressions to finite automata – Minimizing the number of states of a DFA.

**UNIT 2      SYNTACTIC      SPECIFICATION      OF      PROGRAMMING  
LANGUAGES** 14

Context free grammars – derivations and parse trees – capabilities of context free grammars. Basic parsing techniques: Parsers – shift – reduce parsing – operator – precedence parsing – top down parsing – predictive parsers – automatic construction of efficient parsers: LR parsers – the canonical collection of LR (o) items constructing SLR parsing tables – constructing canonical LR parsing tables.

**UNIT 3      SYNTAX – DIRECTED TRANSLATION** 16

Syntax – directed translation schemes – Implementation of syntax – directed translators – intermediate code – postfix notation – parse trees and syntax trees – 3 address code – quadruples and triples – translation of assignment statements – Boolean expressions – statements that alter the flow of control. Symbol tables: the contents of a symbol table – data structures for symbol table – representing scope information.

**UNIT 4      RUN TIME STORAGE ADMINISTRATION:** 15

Implementation of a simple stack allocation Scheme – implementation of block structured languages – storage allocation in block structured languages. Error deduction and recovery: errors – lexical phase errors – syntactic phase errors – semantic errors.

**UNIT 5      INTRODUCTION OF CODE OPTIMIZATION** 15

The principle sources of optimization – loop optimization – the DAG representation of basic blocks – value numbers and algebraic laws – Global data flow analysis. Code generation: Object programs – problems in code generation – a machine model – a simple code generator – register allocation and assignment – code generation from DAG's – peephole optimization.

**TOTAL HOURS 75**

## **TEXT BOOK**

1. Alfred V.Aho, Jeffrey D.Ullman “Principles of Compiler Design” by , Narosa Pub House.2007.

## **REFERENCE BOOK**

1. Allen I. Holub “Compiler Design in C”, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003.
3. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.

**15BCA104**

**OPERATING SYSTEMS**

**5004**

### **COURSE OBJECTIVE:**

- This course introduces the functions of operating systems.

### **COURSE OUTCOME:**

- Master functions, structures and history of operating systems
- Master understanding of design issues associated with operating systems
- Master various process management concepts including scheduling, synchronization, deadlocks
- Be familiar with multithreading
- Master concepts of memory management including virtual memory
- Master system resources sharing among the users
- Master issues related to file system interface and implementation, disk management
- Be familiar with protection and security mechanisms
- Be familiar with various types of operating systems including Unix

## **UNIT 1 INTRODUCTION**

15

Views – Goals – Types of system – OS structures – Components – Services – System Structure – Layered Approach – Virtual Machines – System Design and Implementation. Process Management: Process – Process Scheduling – Cooperating Process – threads – Inter-process communication CPU Scheduling: CPU schedulers – Scheduling Criteria – Scheduling Algorithms.

## **UNIT 2 PROCESS SYNCHRONIZATION**

16

Critical- Section Problem – Synchronization Hardware – Semaphores – Classical Problems of synchronizing – Critical Region – Monitors. Deadlock: Characterization – Methods for Handling Deadlocks – Deadlocks Prevention – Avoidance – Detection – Recovery.

**UNIT 3 MEMORY MANAGEMENT 14**

Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space – Contiguous Allocation – Internal & External Fragmentation. Non-Contiguous Allocation. Paging and Segmentation Schemes – Implementation – Hardware-Protection – Sharing – Fragmentation.

**UNIT 4 VIRTUAL MEMORY 16**

Demand paging – Page Replacement – Page Replacement Algorithms – Thrashing. File system: File concepts – Access Methods – Directory Structures – Protection Consistency Semantics – File System Structures – Allocation Methods – Free Space Management.

**UNIT 5 I/O SYSTEM 14**

Overview – I/O Hardware – Application I/O Interface – Kernel I/O Subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures: Protection – Goals – Domain – Access matrix – The Security Problem – Authentication – Threats – Threat Monitoring – Encryption.

**Total hours 75**

**TEXT BOOK**

1. Silberschatz P.B Galvin, Gange., “Operating System Concepts”, 6th Edn., Addison –Wesley Publishing Co.,2002.

**REFERENCE BOOK**

1. H.M. Deital, An Introduction to Operating System, second edition, Addison Wesley, 2000.

**15BCA105 COMPUTER GRAPHICS 5 0 0 4**

**COURSE OBJECTIVE:**

- The main objective of this module is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer Graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3-D graphics.

**COURSE OUTCOME:**

- Have a basic understanding of the core concepts of computer graphics.
- Identify the core concepts of computer graphics.
- Be capable of using OpenGL to create interactive computer graphics.
- Understand a typical graphics pipeline.

- Understand the structure of modern computer graphics systems
- Understand the basic principles of implementing computer graphics primitives
- Familiarity with key algorithms for modelling and rendering graphical data
- Develop design and problem solving skills with application to computer graphics
- Gain experience in constructing interactive computer graphics programs using OpenGL.
- Apply graphics programming techniques to design, and create computer graphics scenes.

**UNIT 1 INTRODUCTION 12**

Introduction to graphic devices - picture representation, display devices , display adapters , Types of printers , Plotters & input devices

**UNIT 2 TRANSFORMATIONS 16**

Transformations - Basic 2D & 3D transformations - translation , scaling , rotation , reflection, shearing, Multiple transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and perspective Geometry , Orthographic projections and Axonometric projections

**UNIT 3 LINE AND CIRCLE 16**

Raster Scan Graphics - Bresenham's line and circle drawing algorithms, scan conversion, RLE, Frame buffer, Scan converting polygons - Edge fill and Seed fill algorithms, Anti aliasing and Half toning

**UNIT 4 ALGORITHM 16**

Clipping and Display file Compilation - Sutherland - Cohen line clipping algorithm, Windowing and View porting - Segmented display file, structure and compilation. - Hidden Surface and hidden Line Removal - Backface removal algorithm, Z- buffer, Warnock algorithm, Hidden line elimination.

**UNIT 5 CURVES 15**

Plane Curves and Space Curves - Curve Representation, Non-parametric and parametric curves, representation of space curves, Cubic Spline, Parabolic Blended curves, Bezier curves and B-spline curves.

**Total hours 75**

**TEXT BOOKS:**

- 1.D. F. Rogers, J. A. Adams, 2002, Mathematical elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill, New Delhi.
2. D. F. Rogers, Procedural elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill, 2001, New Delhi.

**REFERENCE BOOKS:**

- 1.W.M. Neumann and R. F. Sproull, Principles of Interactive Computer Graphics, Tata McGraw-Hill, New Delhi.
2. D. Hearn and M. P. Baker, 2004, Computer Graphics (C Version), 2nd Edition, Pearson Education.
3. S. Harrington, 2001, Fundamentals of Computer Graphics, Tata McGraw-Hill, New Delhi.

**15BCA106    SYSTEM ANALYSIS AND DESIGN    5    0    0    4**

**COURSE OBJECTIVE:**

- Define various systems analysis and design concepts and terminologies.
- Describe the stages of the system development life cycle model.
- Describe different methodologies and state-of-the-art developments in SA&D techniques and methods.

**COURSE OUTCOME:**

- Learn the terminology of systems analysis and design
- Apply the object-oriented approach to systems development
- Demonstrate and develop problem-solving skills in a team environment
- Become functionally knowledgeable of UML modeling techniques and tools
- Develop and document a web-based prototype
- Gather data to analyse and specify the requirements of a system.
- Design system components and environments.
- Design a database for storing data and a user interface for data input and output, as well as controls to protect the system and its data.



- Produce design documents that demonstrate their understanding of the role of each major software development phase.
- Produce and evaluate a software design.
- Describe a software design using UML diagrams.
- Produce a test plan for a software system.
- Discuss the professional and social responsibilities of software engineers.

|   |   |           |
|---|---|-----------|
| <b>UNIT 1</b>   | <b>BUSINESS PROBLEM &amp; COMPUTERS</b> | 15        |
| Overview of Business Organization – information needs & systems – Some typical problems – System life cycle– System study – Feasibility Study   |   |           |
| <b>UNIT 2</b>   | <b>SYSTEM ANALYSIS</b>                  | 14        |
| Initiation of Analysis – The Process of Analysis – System Design – Design factors – Design Constraints – Processing Techniques – The Process of design – Output Design – input Design – Process Design – File Data Base Design  |   |           |
| <b>UNIT 3</b>   | <b>ANALYSIS &amp; DESIGN TOOLS</b>      | 16        |
| Data Flow Diagram – Data Dictionary – Entity Relationship Diagram – Decision Tree – Decision Table – Structured English – Structure Charts – Grid Charts – Layout Charts – Configuration Selection & Acquisition – Detailing the configuration – Storage requirements – Internal Memory – Processors – Terminals – Printers |   |           |
| <b>UNIT 4</b>   | <b>FILE ORGANIZATION &amp; DESIGN</b>   | 16        |
| Functional Classification of Files – File structure – File Organization – Inverted File – Security & Controls – Risk management – Physical Security – Access Control – Data Control – Other Security & control measures   |   |           |
| <b>UNIT 5</b>   | <b>PHASES</b>                           | 14        |
| Post – Design phases – Develop Software – Installation & Changes-over-System Operation & maintenance – Systems Applications – Financial Accounting – Inventory Accounting System – Equipment Maintenance – Bank Operations – Production Planning & control – Process Control – Robotics                                     |   |           |
| <b>TOTAL HOURS</b>  |   | <b>75</b> |

**TEXT BOOK:**

1. Rajesh Nalk & Swapna Kishore, System Analysis & Business Applications – Wheeler Publishing – 1<sup>st</sup> edition 2000.

**REFERENCE BOOK:**

1. Introducing Systems Analysis & Design – Ellas M.Awad – Galgotia Publications (P) Ltd., (Second Edition)

**15BCA107 OBJECT ORIENTED ANALYSIS AND DESIGN 5 0 0 4**

**COURSE OBJECTIVE:**

- This course introduces to UML, object oriented analysis and design of any application.
- Describe Object Oriented Analysis and Design concepts and apply them to solve problems
- Prepare Object Oriented Analysis and Design documents for a given problem using Unified Modeling Language

**COURSE OUTCOME:**

- Master the fundamental principles of OO programming,
- Master key principles in OO analysis, design, and development ,
- Be familiar with the application of the Unified Modeling Language (UML) towards analysis and design,
- Master common patterns in OO design and implement them,
- Be familiar with group/team projects and presentations.
- Be exposed to technical writing and oral presentations.
- Able to use an object-oriented method for analysis and design
- Able to analyze information systems in real-world settings and to conduct methods such as interviews and observations
- Know techniques aimed to achieve the objective and expected results of a systems development process
- Know how to use UML for notation.

**UNIT 1 INTRODUCTION 15**

System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

**UNIT 2 OBJECT 15**

Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and Object responsibilities - Case Studies.



central to learning on the course both in supervised sessions and during the participants own time.

### **COURSE OUTCOME:**

- To learn and understand various O-O concepts along with their applicability contexts.
- Identify domain objects, their properties, and relationships among them.
- Identify and model/represent domain constraints on the objects and (or) on their relationships.
- Develop design solutions for problems on various O-O concepts
- To learn various modeling techniques to model different perspectives of object-oriented software design.
- To learn software development life cycle for Object-Oriented solutions for Real-World Problems
- To learn O-O design solutions for the recurring problems

### **UNIT 1 INTRODUCTION**

15

Introduction to objects-module-cohesion-coupling-data encapsulation-abstract data types-information hiding-objects-inheritance-polymorphism & dynamic binding-cohesion & coupling of objects. Reusability, portability & interoperability-reuse concepts-impediments to reuse, reuse case studies-objects & productivity-reuse during design & implementation phases-reuse & maintenance, portability, why portability, techniques for achieving portability-interoperability-future trends in interoperability.

### **UNIT 2 PLANNING AND ESTIMATION**

16

Planning and estimation-planning and the software process-estimating duration and cost-components of a software project management plan-software project management plan framework-IEEE software project management plan-planning of testing-planning of object oriented projects-training requirements-documentation standards-CASE tools for planning and estimating-testing the software project management requirement phase-requirements analysis techniques-reusing the prototyping-human factors-rapid prototyping as a specification techniques-reusing the rapid prototyping-other uses of rapid prototyping-management implication of the application design(JAD)-comparison of requirement analysis techniques-testing during requirement phase-CASE tools for the requirement phase-metrics for the

requirement phase-obsertoglesby case study: requirements phase-obsertoglesby case study-rapid prototype-object oriented requirements.

### **UNIT 3 SPECIFICATION PHASE**

14

Specification phase-specification document-informal-specification-structured, system analysis-other semi formal techniques-entity relationship modeling-finite state machines –Petri nets z357-other formal techniques-comparison of specification techniques-testing during specification phase--CASE tools for the specification phase-metrics for the specification phase-obvert oglesey case study:structured systems analysis-software project management. Object oriented analysis phase-object oriented versus structured paradigm-object oriented analysis-elevator problem-use case modeling-dynamic modeling-testing during object oriented analysis phase-case tools-software project management.

### **UNIT 4 DESIGN PHASE**

15

Design phase – design and abstraction –action oriented design- data flow analysis-transaction analysis – data oriented design – object oriented design- elevator problem – formal techniques for detail designs- real time design techniques – testing – case tools –metrics – object oriented design – implementation phase: choice of programming language – forth generation language – good programming practices – coding standards- module reuse – module test case selection- black box – glass box module testing techniques- comparison – clean room- potential problems when testing objects – management aspects of module testing- CASE tools for implementation phase.

### **UNIT 5 INTEGRATION PHASE**

15

Implementation and integration phase – testing – graphical user interfaces product testing – acceptance testing – case tools for this phase – integration environment for business application- public tools infrastructure – potential problem with environment. Maintenance phase – why maintenance is necessary – case study – management – maintenance of object oriented software –maintenance skills versus development skills –reverse engineering –testing –case tools.

**Total hours 75**

## **TEXT BOOK**

1. Stephen R.Schach-classical and object oriented software engineering- 4<sup>th</sup> edition – McGraw hill.

## **REFERENCE BOOK**

- 1 .Ivar Jacobson – object oriented software engineering – Addison Wesley.

**15BCA109      COMPUTER ARCHITECTURE      5      0      0      4**

### **COURSE OBJECTIVE:**

- This course introduces the architecture of various computers and its organization.
- To identify high performance architecture design.
- To identify the problems in components of computer.

### **COURSE OUTCOME:**

- Describe the major components of a computer system and state their function and purpose
- Describe the microstructure of a processor
- Ability to know about memory.
- Describe how conventional machine instructions operate in conjunction with the components of a computer.
- Demonstrate the ability to program a microprocessor in assembly language.
- Classify and describe the operation of parallel computer architectures.

**UNIT 1      COMPUTER EVOLUTION      16**

Pentium and Power PC Evolution. Computer System: Components – Function – Interconnection Structures – Bus Interconnection – Basics of PCI Bus. Memory: Characteristics – Hierarchy – Cache Memory – Principles – Cache Design – Locality of Reference.

**UNIT 2      MAIN MEMORY      14**

Static RAM – Dynamic RAM – Types of ROM – Memory Chip Organization – Types of DRAM. External Memory: Magnetic Disk – Basics of RAID – Optical Memory – Magnetic Tapes

**UNIT 3      INPUT/OUTPUT      16**

External Devices – I/O Module – Programmed I/O – Interrupt Driven I/O – DMA – I/O Channels & Processors. Computer Arithmetic: ALU – Integer Representation and Arithmetic – Floating Point Representation and Arithmetic. Instruction Set: Characteristics – Operand Types – Operation Types – Addressing Modes – Instruction Formats – Pentium and Power PC Operands, Operations, Addressing Modes (Simple Examples).

**UNIT 4      CPU      14**

Organization of Processors and Registers – Instruction Cycle – Instruction Pipelining – Pentium Processor. RISC: Characteristics – Large Register File – Register Optimization – Architecture – RISC Vs CISC Characteristics – Pipelining.

**UNIT 5      CONTROL UNIT      15**

Micro-Operations – Control of Processors – Hardwired Implementation - Micro Programmed Control Concepts – Microinstruction Sequencing – General Microinstruction Execution.

**TOTAL HOURS 75**

**TEXT BOOK**

1.W. Stallings, Computer Organization and Architecture, 6<sup>th</sup> Edition- PHI, New Delhi, 2003.

**REFERENCE BOOK**

1.C. Hamacher, Z. Vranesic, S.Zaky, 2002, Computer Organization, 5<sup>th</sup> Edition, McGraw Hill.

**COURSE OBJECTIVE:**

- To understand the relationship between system software and machine Architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macroprocessors.
- To have an understanding of system software tools.

**COURSE OUTCOME:**

- Student will understand the role played by system software such as assembler, interpreter, linker, loader and compilers in the development of IT solutions.
- Students will use regular expressions, deterministic finite automata for solving problems involving pattern matching.
- Able to know about Loaders and Linkers
- Student will be able to develop elementary assembler and interpreter.
- Ability to know about Assemblers

**UNIT 1 INTRODUCTION 15**

System software and machine architecture–The Simplified Instructional Computer(SIC)-Machine architecture-Data and instruction formats- addressing modes- instruction sets- I/O and programming.

**UNIT 2 ASSEMBLERS 16**

Basic assembler functions – A simple SIC assembler –Assembler algorithm and data structures-Machine dependent assembler features-Instruction formats and addressing modes–Program relocation-Machine independent assembler features-Literals– Symbol-defining statements– Expressions-One pass assemblers and Multipass assemblers- Implementation example- MAS Massembler.

**UNIT 3 LOADERS AND LINKERS 16**

Basic loader functions – Design of an Absolute Loader–A Simple Boot strap Loader- Machine dependent loader features -Relocation–Program Linking–Algorithm and Data Structures for Linking Loader -Machine-independent loader features-Automatic Library Search –Loader Options-Loader design options-Linkage Editors–Dynamic Linking–Boot strap Loaders- Implementation example- MSDOS linker.



**UNIT4      MACROPROCESSORS**

14

Basic macro processor functions-Macro Definition and Expansion–Macro Processor Algorithm and data structures - Machine- independent macroprocessor features- Concatenation of Macro Parameters–Generation of Unique Labels –Conditional Macro Expansion – Keyword Macro Parameters- Macro within Macro- Implementation example- MASM Macro Processor–ANSIC Macro language.

**UNIT5      SYSTEMSOFTWARETOOLS**

14

Texteditors- OverviewoftheEditing Process-UserInterface –EditorStructure.- Interactivedebuggingsystems-Debuggingfunctionsandcapabilities–Relationship withother partsofthesystem – User-InterfaceCriteria.

**Total hours 75****TEXTBOO**

Leland L.Beck, “SystemSoftware – An Introduction to Systems Programming”,3<sup>rd</sup>Edition,PearsonEducationAsia, 2000.

**REFERENCE BOOKS**

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second RevisedEdition,TataMcGraw-Hill, 2000.
2. JohnJ.Donovan“SystemsProgramming”,TataMcGraw-Hill Edition,1972.
3. JohnR.Levine, Linkers&Loaders– HarcourtIndiaPvt.Ltd.,MorganKaufmann Publishers, 2000.

**15BCA111      SOFTWARE TESTING****5****0****0****4****COURSE OBJECTIVE:**

- This course introduces the basic concepts of software testing.
- To make sure that the end result meets the business and user requirements.
- To ensure that it satisfies the BRS that is Business Requirement Specification and SRS.
- To gain the confidence of the customers by providing them a quality product.

## **COURSE OUTCOME:**

- Able to understand the testing and debugging concepts.
- Able to know the types of bugs and testing styles.
- Able to determine the Flow/Graphs and Path Testing
- Able to analyze Transaction Flow Testing Techniques.
- Able to gain knowledge about Testing Strategies.
- Able to design the Domains and Interface Testing.
- Able to analyze the problem of implementation issues.
- Able to understand the structural metrics.
- Able to analyse Transition Testing

### **UNIT 1 INTRODUCTION 15**

Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

### **UNIT 2 TESTING TECHNIQUES 15**

Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques .

### **UNIT 3 STRATEGIES 15**

Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.

### **UNIT 4 METRICS 15**

Linguistic – Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.

### **UNIT 5 TABLES/STATES 15**

Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

**Total hours 75**

### **TEXT BOOKS:**

- 1.B. Beizer , Software Testing Techniques, II Edn., DreamTech India, New Delhi, 2003.
- 2.K.V.KK. Prasad,X Software Testing Tools, DreamTech. India, New Delhi, 2005,.

### **REFERENCE BOOKS:**

1. Burnstein, Practical Software Testing, Springer International Edn. 2003
2. E. Kit, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi1995.
3. R.Rajani, and P.P.Oak, Software Testing, Tata McGraw Hill, New Delhi2004.

## **15BCA112MICROPROCESSOR AND ITS APPLICATIONS 5 0 0 4**

### **COURSE OBJECTIVE:**

- This course introduces the basic concepts of microprocessor.
- The objective of this course is to provide extensive knowledge of microprocessor based systems and interfacing techniques.

### **COURSE OUTCOME:**

- Understand the architecture of 8085
- Impart the knowledge about the instruction set
- Understand the basic idea about the data transfer schemes and its applications
- Develop skill in simple program writing for 8085 and applications.
- Distinguish between RISC and CISC processors.
- Understand the basic idea of Interrupts.
- Able to analyze about counters.
- Acquire knowledge about DMA

## **UNIT 1 INTRODUCTION**

14

Introduction to Micro Computers, Microprocessors and Assembly Languages – Microprocessor architecture and its operations – 8085 MPU – 8085 Instruction set and classifications.

**UNIT 2      TECHNIQUES      15**

Writing assembly levels programs – Programming techniques such as looping, counting and indexing addressing nodes – Data transfer instructions – Arithmetic and Logic operations – Dynamic debugging.

**UNIT 3      COUNTERS/TIME DELAYS      14**

Counters and Time delays – Hexadecimal counter – Modulo 10 counter – Pulse Timings for flashing lights – Debugging counter and time delay program – stack – Subroutine – conditional call and return instructions.

**UNIT 4      CONVERSIONS      16**

BCD to Binary and Binary to BCD conversions – BCD to HEX and HEX to BCD conversions ASCII to BCD and BCD to ASCII conversions – BCD to seven segment LED Code conversions – Binary to ASCII and ASCII to Binary conversions – Multibyte Addition – Multibyte subtraction – BCD addition – BCD Subtraction – Multiplication and Division.

**UNIT 5      INTERRUPT      16**

Interrupt – Implementing interrupts – Multiple interrupt – 8085 – trap – Problems on implementing 8085 interrupt – DMA – Memory interfaces – Ram & Rom – I/O interface – Direct I/O – Memory mapped I/O.

**Total hours 75**

**TEXT BOOK**

1. R.S. Gaonkar, “Microprocessor Architecture, programming and Application with 8085/8085A”, Wiley Eastern Limited, 2000.

**REFERENCE BOOK:**

1. Mathur, “Introduction to Microprocessor”, Third Edition, Tata McGraw- Hill Publishing Co.

**COURSE OBJECTIVES:**

- To understand the concept of cloud and utility computing.
- To understand the various issues in cloud computing.
- To appreciate the emergence of cloud as the next generation computing paradigm.
- To be able to set up a private cloud

**COURSE OUTCOME:**

- Understand various basic concepts related to cloud computing technologies
- Understand the architecture and concept of different cloud models: IaaS, PaaS, SaaS
- Understand big data analysis tools and techniques
- Understand the underlying principle of cloud virtualization, cloud storage, data management and data visualization.
- Understand different cloud programming platforms and tools
- Be familiar with cloud programming using Google's 'Go' programming language
- Have details knowledge on reading and writing in cloud storage
- Be familiar with application development and deployment using cloud platforms
- Create application by utilizing cloud platforms such as Google app Engine and Amazon Web Services (AWS)
- Learn to develop scalable applications using AWS features.
- Learn basic concepts of Map Reduce programming models for big data analysis on cloud.

**UNIT 1 INTRODUCTION**

16

Evolution of Cloud Computing –System Models for Distributed and Cloud Computing

–NIST Cloud Computing Reference Architecture -IaaS–On-demand Provisioning - Elasticity inCloud –E.g.of IaaS Providers -PaaS –E.g.of PaaS Providers –SaaS –E.g. of SaaS Providers–Public , Private and Hybrid Clouds.

**UNIT 2 VIRTUALIZATION:**

15

Basics of Virtualization -Types of Virtualization -Implementation Levels of Virtualization -Virtualization Structures -Tools and Mechanisms -Virtualization of CPU, Memory, I/O Devices -Desktop Virtualization –Server Virtualization.

**UNIT 3 CLOUD INFRASTRUCTURE** 15  
Architectural Design of Compute and Storage Clouds –Layered Cloud Architecture  
Development –Design Challenges -Inter Cloud Resource Management–Resource  
Provisioning and Platform Deployment –Global Exchange of Cloud Resources.

**UNIT 4 PROGRAMMING MODEL** 16  
Parallel and Distributed Programming Paradigms –Map Reduce, Twister and  
Iterative Map Reduce –Hadoop Library from Apache –Mapping Applications  
Programming Support -Google App Engine, Amazon AWS -Cloud Software  
Environments -Eucalyptus, Open Nebula, OpenStack.

**UNIT 5 SECURITY IN THE CLOUD** 13  
Security Overview –Cloud Security Challenges –Software-as-a-Service Security –  
Security Governance –Risk Management –Security Monitoring –Security  
Architecture Design –Data Security –Application Security –Virtual Machine Security.

**Total hours 75**

**TEXT BOOKS:**

- 1.Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
- 2.John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press,2010.

**REFERENCE BOOKS:**

- 1.Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
2. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud”O'Reilly, 2009.
- 3.James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.

**15BCA114 NETWORK SECURITY AND CRYPTOGRAPHY 5 0 0 4**

**COURSE OBJECTIVE:**

- This course introduces the basic concepts and applications of networks.
- To understand the various issues in Networks.
- To understand the concept of Cryptography

## **COURSE OUTCOME:**

- Identify some of the factors driving the need for network security
- Identify and classify particular examples of attacks
- Define the terms vulnerability, threat and attack
- Identify physical points of vulnerability in simple networks
- Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.
- Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
- Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
- Analyze existing authentication and key agreement protocols, identify the weaknesses of these protocols. (ABET Outcomes: c, e, k)
- Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages.
- Develop SSL or Firewall based solutions against security threats, employ access control techniques to the existing computer platforms such as Unix and Windows NT.
- Write an extensive analysis report on any existing security product or code, investigate the strong and weak points of the product or code.

### **UNIT 1 INTRODUCTION 15**

Types of Physical Medium-Topologies-Wireless Networking: Wireless Protocols. Data Link Layer: Layered Data Link Protocols-SLIP and PPP-MAC and ARP. Network Layer: Routing Risks-Addressing-Fragmentation-Security.

### **UNIT2 INTERNET PROTOCOL 16**

IP Addressing-ICMP-Security options. Transport Layer: Common Protocols-Transport Layer Functions-Gateways. TCP: Connection Oriented Protocols-TCP Connections-UDP. Session Layer: Session State Machine-Session and Stacks. SSL: SSL Functionality-Certificates. SSH: SSH and Security-SSH Protocols. STMP: Email Goals-Common servers. HTTP: HTTP Goals-URL.

### **UNIT 3 CRYPTOGRAPHY 16**

Importance-Threat Models-Concepts-Common Mitigation Methods. Network theory: Standards Bodies-Network Stacks-Multiple Stacks-Layers and Protocols-Common Tools. Cryptography: Securing Information-Necessary Elements-Authentication and Keys-ryptography and Randomness-Hashes-Ciphers-Encryption-Steganography.

**UNIT 4      TECHNIQUES**

15

Data Encryption Techniques-Data Encryption Standards-Symmetric ciphers. Public key Cryptosystems-Key Management.

**UNIT5      SECURITY**

13

Authentication-Digital Signatures-E-Mail Security-Web Security-Intrusion-Firewall.

**Total hours 75****TEXT BOOKS:**

1. Neal Krawetz, Introduction Network Security, India Edition, Thomson Delmar Learning. 2007
2. V.K.Pachghare, Cryptography and Information Security, PHI Learning Private Limited 2009.

**REFERENCE BOOK:**

1. William Stallings, Cryptography and Network Security, Prentice –Hall of India, 2008

**15BCA115      DIGITAL IMAGE PROCESSING      5      0      0      4****COURSE OBJECTIVE:**

- This course introduces the basic concepts of digital image processing.
- To explore the algorithms and techniques involved in Digital Image Processing.
- To know the key concepts in image file formats.

**COURSE OUTCOME:**

- Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
- Analyze and implement image processing algorithms.
- Gain hands-on experience in using software tools for processing digital images.
- The fundamentals of digital image processing
- Image transform used in digital image processing
- Image enhancement techniques used in digital image processing
- Image restoration techniques and methods used in digital image processing
- Image compression and Segmentation used in digital image processing



|  |   |    |
|--|---|----|
| <b>UNIT 1</b>  | <b>INTRODUCTION</b>                           | 15 |
| What is Digital Image Processing? – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image processing System – Digital Image Fundamentals: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels. |   |    |
| <b>UNIT 2</b>  | <b>THE IMAGE, ITS MATHEMATICAL BACKGROUND</b> | 16 |
| Overview – Linear Integral Transforms. Data Structures for Image Analysis: Level of Image Data Representation – Traditional Image Data Structures – Hierarchical Data structures. Image Pre-processing: Pixel Brightness Transformations - Geometric transformations – Local pre-processing: Image smoothing, Edge Detectors – Image Restoration.  |   |    |
| <b>UNIT 3</b>  | <b>SEGMENTATION</b>                           | 16 |
| Thresholding – Edge Based Segmentation : Edge Image Thresholding, Border tracing - Region Based Segmentation – Matching – Shape Representation and Description:Region Identification – Contour Based Shape Representation and Description- Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description, Simple Scalar Region Descriptors.              |   |    |
| <b>UNIT 4</b>  | <b>OBJECT RECOGNITION</b>                     | 13 |
| Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems- Mathematical Morphology – Basic Morphological concepts – Binary Dilation and Erosion.  |   |    |
| <b>UNIT 5:</b>   | <b>IMAGE DATA COMPRESSION</b>                 | 15 |
| Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchical and Progressive Compression Methods – Comparison of Compression Methods – Coding –JPEG Image Compression.  |   |    |

**Total hours 75**

**TEXT BOOKS**

1. Rafael C. Gonzalez, Richard E.Woods, Digital Image Processing, Prentice Hall, Third Edition, 2008.
2. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, Cengage Learning, 2009

## **REFERENCE BOOKS**

1. Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.
2. Chanda&Maunder, Digital Image Processing and Analysis, Prentice Hall ,3rd Edition

**15BCA116**

**MULTIMEDIA SYSTEMS**

**5 0 0 4**

### **COURSE OBJECTIVE:**

- This course gives an exposure to Multimedia and its applications.
- Collaborating efficiently and effectively on teams to produce professional-caliber content for the Web.
- To gain an ability to use Photoshop.

### **COURSE OUTCOME:**

- Know the basic concept of multimedia information representation and its applications.
- Describe different multimedia data in digital formats. Compare text, audio, image and video data.
- Describe data compression principle.
- Fundamentals of audio and video data compression.
- Identify different multimedia data types such as image, audio, and video
- Understand basic image data representations
- Learn fundamental concepts in video
- Understand basics of digital audio representation.
- Familiarize with basic audio, image, and video coding/compression techniques such as MPEG, JPEG, etc
- Learn how to capture, digitize, store, and manipulate a variety of multimedia data
- Use some multimedia authoring tools and systems
- Design and development of a multimedia application

**UNIT 1 INTRODUCTION 15**

Definitions –Introductory concepts: Multimedia-Definition-CD ROM and the Multimedia Highway ,Uses of Multimedia -Introduction to Making Multimedia: The stages of a Project –Requirement to make good multimedia, Multimedia skill and Training, Training opportunities in multimedia. Motivation for multimedia usage,Frequency Domain Analysis, Application Domain.

**UNIT 2 BASIC TOOLS 15**

Multimedia-Hardware and Software: Multimedia hardware-Macintosh and Windows production Platforms-Hardware peripherals-Connections,Memory and storage devices,Media software-Basic Tools,Making Instant Multimedia-Multimedia Software and Authoring Tools and Production Standards.

**UNIT 3 MAKING IT WORK 15**

Multimedia – Making it work-Multimedia Building Blocks-Text, Sound , Images , Animation and Video ,Digitization of Audio and Video objects , Data Compression : Different algorithms concerned to Text , Audio , Video , Images and etc., Working exposure on Tools like Dream Weaver , Flash ,Photoshop and etc.,

**UNIT 4 MULTIMEDIA AND INTERNET 15**

Multimedia and the Internet:History , Internet working,Connections,Internet Services , The World Wide Web , Tools for the WWW – Web Servers ,Web Browsers , Web page Makers and Editors , Plug-ins and Delivery Vehicles,HTML,VRML,Designing for the WWW-Working on the web.

**UNIT 5 MULTIMEDIA AND FUTURE 15**

Multimedia-Looking towards future:Digital Communication and new Media,Interactive Television ,Digital Broadcasting , Digital Radio , Multimedia Conferencing , Assembling and Delivery a Project –Planning and Costing, Designing and Producing, Content and talent ,Delivering , CD-ROM Technology.

**TEXT BOOKS**

1. S.HEATH,1999, Multimedia and Communication Systems,Focil Press,UK.
2. T.VAUGHAN ,2007,Multimedia Making it Work,7<sup>th</sup> Edition,Tata McGraw Hill.

**REFERENCE BOOKS:**

1. Walter worth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.
2. John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

**TOTAL HOURS 75**

**15BCA117    DATA MINING    5                          0                          0                          4**

**COURSE OBJECTIVE:**

- This course introduces the fundamental concepts of Data Mining
- To teach the students the approaches and the informatics tools necessary to perform effective Data Mining and Knowledge Management.
- To initiate the students to the theoretical and/or applied research methodologies in this field.

**COURSE OUTCOME:**

- Design a data mart or data warehouse for any organization
- Develop skills to write queries using DMQL
- Extract knowledge using data mining techniques
- Adapt to new data mining tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining
- Differentiate OnLine Transaction Processing and OnLine Analytical processing
- Learn Multidimensional schemas suitable for data warehousing
- Understand various data mining functionalities
- Inculcate knowledge on data mining query languages.
- Know in detail about data mining algorithms

**UNIT 1    INTRODUCTION    13**

Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction.

**UNIT 2    PRIMITIVES AND SYSTEM ARCHITECTURE    16**

Data Mining – Primitives – Data Mining Query Language,. Architectures of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description, Data Generalization and Summarization, Analytical Characterization, Mining Class Comparison – Statistical Measures.

**UNIT 3 MINING ASSOCIATION RULES**

15

Basics Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

**UNIT 4 CLASSIFICATION AND PREDICTION**

16

Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.

**UNIT 5 CLUSTER ANALYSIS**

15

Introduction – Types of Data in Cluster Analysis, Partitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

**TOTAL HOURS:75****TEXT BOOK**

1. J.Han and M. Kamber, Data Mining Concepts and Techniques, Harcourt India Pvt. Ltd - New Delhi, 2001.

**REFERENCE BOOK**

1. K.P. Soman, Shyam Diwakar, V. Ajay, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi, 2006.

**15BCA118 DISTRIBUTED COMPUTING AND LINUX 5 0 0 4****COURSE OBJECTIVE:**

- This course introduces the basic concepts of distributed computing using linux.
- To understand advantages and limitations of Distributed computing.
- This course extends the study of the design and implementation of Distributed computing.

**COURSE OUTCOME:**

- The differences among: concurrent, networked, distributed, and mobile.
- Resource allocation and deadlock detection and avoidance techniques.
- Remote procedure calls.

- IPC mechanisms in distributed systems.
- Knowledge and understanding
- Outline the potential benefits of distributed systems
- Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security
- Apply standard design principles in the construction of these systems
- Practical and subject specific skills (Transferable Skills).

## **UNIT 1           INTRODUCTION** 15

Definition of a Distributed System- Goals- Connecting Users and Resources – Openness – Scalability – hardware Concepts: Multiprocessors – Homogeneous multicomputer systems – Heterogeneous Multicomputer Systems – Software Concepts: Distributed operating Systems - Network Operating Systems – Middleware- the Client-Server model: Client and Servers – Application layering – Client Server Architectures.

## **UNIT 2           PROCESSES** 15

Threads - clients – code migration: Approaches to code migration – Migration and Local Resources – Migration in Heterogeneous Systems – Software agents – Naming: naming Entities: names, identifiers and Addresses – Name resolution - The implementation of a namespace – Locating Mobile entities: Naming versus Locating entities – Simple solutions – Removing unreferenced entities.

## **UNIT 3           SYNCHRONIZATION** 16

Clock Synchronization - Physical Clock – Synchronization algorithms – use of Synchronized clocks – logical clocks- Global State –Election algorithms - Mutual Exclusion – Distributed Transactions– consistency and Replication – Data Centric Consistency Models: Linearizability and Sequential Consistency – Weak Consistency – Distribution protocols: Replica placement – Update Propagation.

## **UNIT 4           FAULT TOLERANCE:** 13

Introduction to fault tolerance – Process resilience: design issues – Failure Masking and replication – Reliable Client-Server Communication: Point to Point Communication – RPC semantics in the presence of failures – Reliable group of Communication : basic Reliable – multicasting Schemes – Overview of CORBA – Overview of DCOM - Overview of NFS - Overview of WWW.

## **UNIT 5 LINUX OPERATING SYSTEMS**

16

Introduction –History of UNIX and Linux – System Features – Software Features – Differences between Linux and Other Operating System – hardware requirements - sources of Linux In formation – Linux Start up and Setup : User accounts – Accessing the linux system – Unix Commands – Linux File Structure: Linux file types – File structures – managing Files - Managing Directories – File and Directory operation – File Management Operation: File and Directory permissions – Jobs – System Administration – Shells in Linux - Shell operations: Command Line – Standard Input/Output- Redirection – Pipes – Shell Scripts – Shell Variables - Arithmetic Shell Operations – Control Structures.

**TOTAL HOURS: 75**

### **TEXT BOOKS:**

- 1.Andrew S.Tanenbaum and Marten Van Steen, Distributed Systems – Principles and Paradigms , PHI, 2004.
2. Richard Petersen , The Complete Reference – Linux , TMH, 1998.

### **REFERENCE BOOKS:**

- 1.Pradeep K.Sinha, Distributed Operating Systems , PHI, 2001.
- 2.George couloirs, Jean Dollimore and Tim Kindberg, Distributed Systems – Concepts and Design , 3<sup>rd</sup> Edition, Pearson Education,2002.
3. NIIT, Operating Systems – Linux ,PHI, 2003

**15BCA119**

**MOBILE COMPUTING**

**4 0 0 4**

### **COURSE OBJECTIVE:**

- This course introduces the basic concepts and applications of mobile computing.
- To explore both theoretical and practical issues of mobile computing;
- To develop skills of finding solutions and building software for mobile computing applications

## **COURSE OUTCOME:**

- An ability to function on multidisciplinary teams.
- A recognition of the need for, and an ability to engage in life-long learning.
- To impart fundamental concepts in the area of mobile computing.
- To provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software.
- To introduce selected topics of current research interest in the field.
- A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities.
- The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
- A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.
- An awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behavior.

### **UNIT 1 INTRODUCTION 10**

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

### **UNIT 2 WIRELESS CONCEPTS 13**

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

### **UNIT 3 METHODS 12**

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

### **UNIT 4 SECURITY 12**

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.



**UNIT 5 NETWORKS**

13

Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

**Total Hours: 60****TEXT BOOKS**

- 1.J. Schiller, Mobile Communications, Addison Wesley.
- 2.A. Mehrotra , GSM System Engineering.

**REFERENCE BOOKS**

- 1.M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- 2.Charles Perkins, Mobile IP, Addison Wesley.
- 3.Charles Perkins, Ad hoc Networks, Addison Wesley.

**15BCA120 OPEN SOURCE TECHNOLOGY****4004****COURSE OBJECTIVE:**

- This course introduces the basic concepts of open source technology.
- To create a quality object-oriented software solution that meets specified requirements.
- Contribute to and actively participate in the open source community.

**COURSE OUTCOME:**

- To develop android applications.
- To install and work on Linux.
- To perform Shell Programming.
- Ability to install and run open-source operating systems.
- Ability to gather information about Free and Open Source Software projects from software releases and from sites on the internet.
- Ability to build and modify one or more Free and Open Source Software packages.
- Ability to use a version control system and to interface with version control systems used by development communities.
- Ability to contribute software to and interact with Free and Open Source Software development projects.
- Able to recognize the benefits and features of Open Source Technology.
- Interpret, Contrast and compare open source products among themselves

- Understand and demonstrate Version Control System along with its commands.

**UNIT 1 INTRODUCTION 12**

Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and the GNU Project.

**UNIT 2 METHODOLOGIES 13**

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copyleft, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

**UNIT 3 CASE STUDIES 12**

Case Studies: Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

**UNIT 4 PROJECT DEVELOPMENT 12**

Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Open source Teaching and Open source media.

**UNIT 5 OPEN SOURCE ETHICS 10**

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source

**TOTAL HOURS: 60**

**TEXT BOOK**

1. “Open Source Software:Implementation and Management”, Paul Kavanagh, Elsevier Digital Press, 2004.

**REFERENCE BOOK**

1. Open Source 2.0:The Continuing Evolution, O’Reilly,DiBona, Cooper and Stone, 2005.

**COURSE OBJECTIVE:**

- This Subject deals with the C/S Computing, GUI.
- To apply the techniques and features of a client/server development language to construct a moderately complex client/server application.
- To learn the advantages of client-server systems over monolithic systems.

**COURSE OUTCOME:**

- To introduce the client server architecture and fundamentals of distributed systems.
- Define a client/server network.
- Describe how the hardware and software are combined to implement client/server computing.
- Implement the current client/server standards.
- Describe the basic client/server models.
- Demonstrate the concepts of a typical client operating system.
- Implement typical client software.
- Demonstrate the difference between client and server hardware technology.
- Demonstrate the uses of client/server productivity software.
- Demonstrate the relationship between client/server productivity software and client/server resource management.

**UNIT 1 INTRODUCTION**

12

What is Client/Server Computing – Benefits of Client/Server Computing – Evolution of C/S Computing – Hardware Trends – Software Trends-Evolution of Operating Systems – N/w Trends – Business Considerations.

**UNIT 2 OVERVIEW OF C/S APPLICATIONS**

10

Components of C/S Applications – Classes of C/S Applications – Categories of C/S Applications . Understanding C/S Computing: Dispelling the Myths – Obstacles – Upfront & Hidden – Open Systems & Standards – Standards – Setting Organizations – Factors of Success.

**UNIT 3 THE CLIENT HARDWARE & SOFTWARE**

12

Client Component – Client Operating Systems – What is GUI – Database Access – Client Software Products : GUI Environments – Converting 3270/5250 Screens –



- Explain the functions of clients and servers on the Web, and describe the strengths and weaknesses of the client-server internet approaches to web design and implementation
- Program, access, and manipulate data through the adoption of accepted standards, mark-up languages, client-side programming, and server-side programming
- Design and implement an interactive web site(s) with regard to issues of usability, accessibility and internationalization
- Design and implement a client-server internet application that accommodates specific requirements and constraints, based on analysis, modelling or requirements specification
- Justify and explain particular internet application concepts, relevant alternatives and decision recommendations, including design considerations for internet security

## **UNIT I INTRODUCTION 12**

Internet Basic – Introduction to HTML – PRE- List:Ordered and Unordered- Creating Table – Linking document – Frames -Graphics to HTML Doc – - Forms.

## **UNIT II Style Sheet 12**

Style sheet – style sheet basic – Add style to document – Creating style-sheet rules – Inline Style sheet – External style sheet-Import style sheet

## **UNIT III Style Sheet Properties 12**

Style sheet properties – Font – Text – List – Color - Background color – Margin – Padding - Box & Display properties.

## **UNIT IV JAVASCRIPT 12**

Introduction to JavaScript – Advantage of JavaScript – JavaScript syntax – Data type – Variable –Array – Operator and Expression – Looping Constructor – Function – Dialog box.

## **UNIT V DOM 12**

JavaScript document object model – Introduction – object in HTML – Event Handling – Window object – Document object – Browser Object – Form

Object – Navigator object – Screen object –Build in object – User defined object – Cookies.

**Total Hours:60**

### **TEXT BOOKS**

1. Bayross, Web Enable Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI, BPB Publications.
2. HTML Complete Reference.

### **REFERENCE BOOKS**

1. Jaworski, Mastering JavaScript, BPB Publications, 2006

### **GENERIC ELECTIVES**

**15BCA151      STEP UP PROGRAMMING LEVEL-1      50      0      4**

#### **COURSE OBJECTIVE:**

- To know the concepts in basic programming
- To learn about the common programming techniques
- To write step by step procedure for writing a program

#### **COURSE OUTCOME:**

- To understand the structured programming
- Impart the knowledge about variables and assignments
- To write algorithm that represent programming logic
- To understand notations/symbols to draw a flowchart
- To create flowchart that represent programming logic
- To understand the basic idea about decision making statement
- To know about repetition and looping statement

**UNIT 1      BASIC CONCEPTS      15**

Design process, problem-solving, structured programming logic and techniques, algorithm development, program design. Variables. Identifiers, constants and tokens. Variable assignments. Calculation, Totaling and Counting, Input and Output techniques.

**UNIT 2      FLOWCHART      15**

Seven steps in program development cycle, flowchart to represent the program's logic, breaking down the programming problems into modules, shapes and symbols to draw the flowchart, example for flowchart.

**UNIT 3      CONTROL STRUCTURES      15**

Introduction to control structures, sequence, selection, decision making, repetition and looping Selection, simple IF, IF THEN ELSE, ELSE IF, nested IF, CASE OF OTHERWISE ENDCASE.

**UNIT 4      LOOPING      15**

Looping / Iterative Statements, while, do while, for loop, Break Statement, Continue Statement, Go to, For To Next, Repeat Until, While Do End while

**UNIT 5 ARRAYS      15**

Understand how modularization is used in designing a computer program. Define and manipulate single-dimensional and multiple-dimensional arrays. Describe how to develop and utilize a menu-driven program.

**TOTAL HOURS: 75**

**TEXT BOOK**

1. Gary Willough "Pure basic: A Beginner's Guide to Computer Programming",Aardvark Global Publishing, 2006.

**REFERENCE BOOK**

1. P. K. Sinka, "Computer Fundamentals", Sixth Edition BPB Publications, 2004.

**15BCA152STEP UP PROGRAMMING LEVEL-2      5    0    0    4**

**COURSE OBJECTIVE:**

- To practice the students how to write program for the concepts arrays, functions and recursion.
- To describe the concepts of decision making utilized in programming.

## **COURSE OUTCOME:**

- To know about designing tools to code a program
- Master understanding of the computer programming process
- To understand the concept of decision making in programming
- Impart knowledge of looping structures
- To know about converting design logic into code
- To learn the syntax of programming languages

### **UNIT 1 PROGRAMMING PROCESS 15**

Demonstrate a basic understanding of the computer programming process, Demonstrate skill using various design tools to design and code a computer program.

### **UNIT 2 DECISION MAKING AND LOOPING 15**

Describe the concepts of decision making utilized in programming. Describe the concepts of looping structures utilized in programming.

### **UNIT 3 PROGRAMMING LOGIC 15**

Convert the programming logic solution into code. Learn the basic syntax of programming languages. Learn how use a compiler to create, edit, compile, execute and test a program.

### **UNIT4 RECURSION 15**

Define and describe recursion. Define basic concepts used in object-oriented programming. Describe the use of Classes and Object in an object-oriented program.

### **UNIT 5 EVENT –DRIVEN PROGRAM 15**

Describe the concepts of an Event-driven program and the object-oriented concept of Inheritance.

**TOTAL HOURS: 75**

## **TEXT BOOK**

1. Gary Willough "Purebasic: A Beginner's Guide to Computer Programming", Aardvark Global Publishing, 2006.



## REFERENCE BOOK

1. P. K. Sinka, "Computer Fundamentals", Sixth Edition BPB Publications, 2004.

**15BCA153OFFICE AUTOMATION TOOLS    5    0    0    4**

### COURSE OBJECTIVE:

- To know the common applications available for office work.
- To learn how to work in MS-OFFICE.
- To learn how to work in MS-EXCEL and POWERPOINT.

### COURSE OUTCOME:

- To understand basic computer operations and the principal components of a computer and connected peripheral devices
- To understand and examine current operating systems, software utilities and application software
- To become proficient in using:
  - Windows
  - Word Processing Applications
  - Spreadsheet Applications
  - Presentation Graphics Applications
- To understand the basics of e-mail and newsgroups
- To introduce networking concepts including the Internet and its components and web browser basics.

## UNIT 1        MSWORD-I

15

Text Manipulations- font size, style, color. Alignment- left, right and justify, paragraph alignment, Usage of Numbering, Bullets, Footer and Headers, Usage of Spell check, and Find & Replace, Text Formatting, Picture insertion and alignment.



**COURSE OBJECTIVE:**

- To know the concepts in flash
- To learn about the common tools available in flash.
- To learn the steps for tweening and masking.

**COURSE OUTCOME:**

- Identify and recognize Flash terminology, features and techniques
- Identify the process, tools and techniques involved in adding graphical, textual, and navigational content to using Flash.
- Identify the process, tools and techniques involved in creating Flash web animations
- Identify the steps, tools and techniques involved in preparing and manipulating bitmap graphics using Flash
- Demonstrate Flash skills and knowledge to draw vector objects, create symbols, create buttons, create animations, and add special effects to a Flash movie

**UNIT 1 INTRODUCTION 15**

Working with flash, drawing with flash, drawing with the pencil, modifying lines, drawing with the pen, the oval and rectangle tools, free transform tool, envelope modifier, the brush tool, using the mixer.

**UNIT 2 WORKING WITH COLORS 15**

Adding custom colors to color palette, importing color palettes, working with multiple objects, grouping objects

**UNIT 3 ANIMATION 15**

Basic animation and working in the timeline, the timeline, movie properties, frames vs. key frames, deleting, copying, and reversing frames, frame-by-frame vector animation, Animation on an image, Quiz program.





**TEXT BOOK**

1. Jordan Goldmeyer, “Advanced Excel Essentials” , APress, 2015 edition.

**REFERENCE BOOK**

1. John Walkenbach, “Microsoft Excel 2013 Bible”, Wiley Publications, 2013

**15BCA156                      INTERNET BASICS                      5           0           0           4**

**COURSE OBJECTIVE:**

- To make the student understands the overall view of internet.
- To inculcate the students about the various facilities available in internet.
- To gain practical knowledge about internet.

**COURSE OUTCOME:**

- Learn basic principles of using Windows operation system.
- Learn and practice basic keyboarding and mouse use.
- Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
- Be able to find and evaluate information on the Web
- Learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books.
- Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts.
- In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.

**UNIT 1 INTRODUCTION 15**

Internet and its history, defining and describing the Internet, Brief history, discussing the future of the Internet, Internet Resources. Describe the important features of the Web and Web browser software, Evaluate e-mail software and Web-based e-mail services

**UNIT 2 EMAIL 15**

Email , Parts of email ,Email software , Web based email , Email address , List servers , Newsgroups ,Newsgroups names , Newsgroups readers ,Chat rooms , Conferencing .

**UNIT 3 INTERNET RESOURCES 15**

Internet Resources, Games, File transfer protocol, Telnet, World Wide Web, Behavior on the Internet , Accessing the Internet , Types of access , Online services , Internet services providers , How and where to look for the service Browsing the Web , Browsing the Web.

**UNIT 4 FTP 15**

Use FTP and other services to transfer and store data, Demonstrate the use of real-time chat and briefly describe the history of the wireless Internet. Use mailing lists, newsgroups, and newsfeeds, Create HTML documents and enhance them with browser extensions

**UNIT 5 APPLICATIONS 15**

Applications of Internet- education, business, government, Communication , Job searches, Health and medicine, Travel, Entertainment, Shopping, Stock market updates, Research.

**TOTAL HOURS: 75**





**UNIT 4      FILES SYSTEMS AND DATABASES      15**

The Relational Database Model, Structured Query Language (SQL), Entity Relationship Modeling (ERD) , Normalization of Database Tables , Database Design.

**UNIT 5      SQL QUERIES      15**

SQL Queries- Basic SQL Queries & Modification Commands , SQL functions,SQL JOIN, Table Creation and Normalization , DDL functions , Database Project

**TOTAL HOURS: 75**

**TEXT BOOK**

1. Paul DuBois, “MySQL Developer's Library,5th Edition,2013.

**REFERENCE BOOK**

1. Michael Kruckenberg, “Pro MYSQL”, Apress Publications,2005.

**15BCA158                      WEB DESIGNING                      5      0      0      4**

**COURSE OBJECTIVE:**

- To explain the student the major concepts of web designing.
- This course explains the graphics and animation.
- This course Introduce basics concept of CSS.

**COURSE OUTCOME:**

- Employ fundamental computer theory to basic programming techniques.
- Use fundamental skills to maintain web server services required to host a website.
- Select and apply markup languages for processing, identifying, and presenting of information in web pages.
- Use scripting languages and web services to transfer data and add interactive components to web pages.
- Create and manipulate web media objects using editing software.
- Incorporate aesthetics and formal concepts of layout and organization to design websites that effectively communicate using visual elements.
- Conceptualize and plan an internet-based business that applies appropriate business models and web technologies.
- Combine multiple web technologies to create advanced web components.
- Design websites using appropriate security principles, focusing specifically on the vulnerabilities inherent in common web implementations.
- Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek.



**COURSE OBJECTIVE:**

- To explain the student the need of scripting languages in programming environment.
- This subject deals various tags available in scripting language.
- This course explains about the intrinsic event handlers.

**COURSE OUTCOME:**

**UNIT 1 SCRIPT AND HTML 15**

What is a script anyway?, Scripts and name-calling, Scripting Ethics, Embedding scripts into HTML documents, hiding scripts with HTML comments, specifying the scripting language

**UNIT 2 SCRIPT EXECUTION 12**

Deferring script execution, Providing alternate content , Defining the default scripting language , Intrinsic event handlers

**UNIT 3 JAVASCRIPT 18**

JavaScript, History of JavaScript, Basic JavaScript language syntax, Script Elements, Variables, Statements, Functions, Operators and Expressions , Arrays, Loops, and Conditional Statements , Objects and Methods.

**UNIT 4 DATA TYPES 12**

Data Types , on event processing , External JavaScript Files , Debugging Tools and Techniques , Document Object Model (DOM) , Objects , Properties , Methods , Mouse events , Animating Menus , Forms, Form Fields, and Validation

**UNIT 5 VB SCRIPT 18**

Introduction :VBScript , Using and placing VBScript in a HTML page , VBScript in the body of the HTML file , VBScript in heading , Variables , Assignments and expressions , Procedures and functions , Decisional (conditional/alternative) statements , Repeating Structure , Conditional Loop , Counted Loop.

**TOTAL HOURS: 75**

## TEXT BOOK

1. Ivan Bayross , “Teach Yourself Web Technology: part- 1”, BPB publications ,2003

## REFERENCE BOOK

1. Miraz Jordan, “Web Design Reference Guide” , Pearson Edition,2003

## ABILITY ENHANCEMENT COMPULSORY COURSE

**15LTA001** தமிழ்மொழி, இலக்கியவரலாறு - அறிமுகம்- 5 0 0 4

**நோக்கம்:**தமிழ்மொழிமற்றும்இலக்கியத்தின்வரலாற்றைஅறிமுகம்செய்யும்நோக்கில்இப்பாடம்வடிவமைக்கப்பட்டுள்ளது.

தமிழ்மொழியின்வரலாற்றைஅறிவியல்கண்ணோட்டத்துடனும்மொழிக்குடும்பங்களின் அடிப்படையிலும்விளக்குகிறது. சங்க இலக்கியம் தொடங்கி, இக்காலஇலக்கியம்வரையிலானதமிழிலக்கியவரலாற்றைஇலக்கியவரலாறுஅறிமுகப்படுத்துகின்றது. அரசுவேலைவாய்ப்பிற்கானபோட்டித்தேர்வுகளுக்குப்பயன்படும்வகையிலும்இப்பாடம்அமைந்துள்ளது.

**அலகு 1** தமிழ்மொழிவரலாறு

13 மணிநேரம்

மொழிக்குடும்பம் - இந்தியமொழிக்குடும்பங்கள் - இந்தியஆட்சிமொழிகள் - திராவிடமொழிக்குடும்பங்கள் - திராவிடமொழிகளின்வகைகள் - திராவிடமொழிகளின்சிறப்புகள் - திராவிடமொழிகளின்வழங்கிடங்கள் - திராவிடமொழிகளுள்தமிழின்இடம் - தமிழ்மொழியின்சிறப்புகள் - தமிழ்பிறமொழித்தொடர்புகள்.

**அலகு 2** சங்கஇலக்கியம்

12 மணிநேரம்

சங்கஇலக்கியம் - எட்டுத்தொகை - நற்றிணை - குறுந்தொகை - ஐங்குறுநூறு - பதிற்றுப்பத்து - பரிபாடல் - கலித்தொகை - அகநானூறு - புறநானூறு - பத்துப்பாட்டு - திருமுருகாற்றுப்படை - சிறுபாணாற்றுப்படை - பெரும்பாணாற்றுப்படை - பொருநராற்றுப்படை - மலைபடுகடாம் - குறிஞ்சிப்பாட்டு, முல்லைப்பாட்டு, பட்டினப்பாலை - நெடுநல்வாடை - மதுரைக்காஞ்சி.

**அலகு 3 அறஇலக்கியங்களும்காப்பியங்களும்**

11 மணிநேரம்

களப்பிரர்காலம்விளக்கம் - நீதிஇலக்கியத்தின்சமூகத்தேவை -  
 பதினெண்கீழ்க்கணக்குநூல்கள்அறிமுகம் - திருக்குறள், நாலடியார்.காப்பியங்கள் -  
 ஐம்பெருங்காப்பியங்கள்மற்றும்ஐஞ்சிறுங்காப்பியங்கள்அறிமுகம்-காப்பியஇலக்கணம்  
 - சிலப்பதிகாரம் - மணிமேகலை - சீவகசிந்தாமணி - வளையாபதி - குண்டலகேசி.

**அலகு 4 பக்திஇலக்கியங்களும்சிறிலக்கியங்களும்**

11 மணிநேரம்

தமிழகப்பக்திஇயக்கங்கள் - பக்திஇலக்கியங்கள் - சைவஇலக்கியம் -  
 நாயன்மார்கள்அறுபத்துமூவர் - சமயக்குரவர்நால்வர் - வைணவஇலக்கியம் -  
 பன்னிருஆழ்வார்கள் - முதல்மூன்றுஆழ்வார்கள்.சிறிலக்கியக்காலம் -  
 சிறிலக்கியங்கள் - வகைகள் - பரணி - கலிங்கத்துப்பரணி - குறவஞ்சி -  
 குற்றாலக்குறவஞ்சி - பிள்ளைத்தமிழ் - மீனாட்சியம்மைப்பிள்ளைத்தமிழ் - தூது -  
 தமிழ்விடுதூது - கலம்பகம் - நந்திக்கலம்பகம் - பள்ளு - முக்கூடற்பள்ளு.

**அலகு 5 இக்காலஇலக்கியங்கள்**

13 மணிநேரம்

நவீனகாலம் - நவீனஇலக்கியம் - உள்ளடக்கம் - புதுக்கவிதை -  
 தோற்றமும்வளர்ச்சியும்- நாவல் - முதல்மூன்றுநாவல்கள் - நாவலின்வகைகள் -  
 பொழுதுபோக்குநாவல்கள் - வரலாற்றுநாவல்கள் - சமூகநாவல்கள் - இக்காலநாவல்கள்  
 - மொழிபெயர்ப்புநாவல்கள் - சிறுகதை -வகைகளும்வளர்ச்சியும் - நாடகம் -  
 காலந்தோறும்நாடகங்கள் - புராணஇதிகாசநாடகங்கள் - சமூகநாடகங்கள் -  
 வரலாற்றுநாடகங்கள் - மொழிபெயர்ப்புநாடகங்கள் - நகைச்சுவைநாடகங்கள்.

**மொத்தம்: 60 மணிநேரம்****பார்வைநூல்கள்**

1. அகத்தியலிங்கம். ச., “திராவிடமொழிகள்தொகுதி 1”, மணிவாசகர்பதிப்பகம், முதற்பதிப்பு, 1978.
2. சக்திவேல். ச., “தமிழ்மொழிவரலாறு”, மணிவாசகர்பதிப்பகம், முதற்பதிப்பு 1998.
3. பூவண்ணன், “ தமிழ்இலக்கியவரலாறு”, சைவசித்தாந்தநூற்பதிப்புக்கழகம், முதற்பதிப்பு, 1998.
4. வரதராசன். மு., ”இலக்கியவரலாறு”,சாகித்யஅகாதெமி, ஒன்பதாம்பதிப்பு, 1994.
5. விமலானந்தம். மது.ச., “இலக்கியவரலாறு”, பாரிநிலையம், மறுபதிப்பு, 2008.

**COURSE OBJECTIVE:**

- To enable the students to develop their communication skills effectively. To make students familiar with the English Language.
- To enrich vocabulary in English
- To develop communicative competent

|  |           |
|--|-----------|
| <b>UNIT 1 DETAILED POEMS I</b>                 | <b>15</b> |
| 1. On His Blindness - John Milton              |           |
| 2. The Village Schoolmaster - Oliver Goldsmith |           |
| 3. The Daffodils - William Wordsworth          |           |
| <b>UNIT 2 DETAILED POEMS II</b>                | <b>15</b> |
| 1. Night and Death - Joseph Blanco White       |           |
| 2. The Ballad of Father Gilligan - W.B.Yeats   |           |
| <b>UNIT 3 PROSE</b>                            | <b>15</b> |
| 1. Martin Luther King Jr. - Coretta s King     |           |
| 2. Albert Schweitzer - Norman Wymar            |           |
| 3. Stanley Finds Livingstone - Lawrence Wilson |           |
| 4. Srinivasa Ramanujan - C.P. Snow             |           |
| 5. My Days - R.K. Narayan                      |           |
| <b>UNIT 4 GRAMMAR</b>                          | <b>15</b> |
| 1. Articles                                    |           |
| 2. Prepositions                                |           |
| 3. Tenses                                      |           |
| 4. Wh - Questions                              |           |
| 5. Synonyms and Antonyms                       |           |
| 6. One Word Substitution                       |           |
| <b>UNIT 5 COMPOSITION</b>                      | <b>15</b> |
| 7. Reading Comprehension                       |           |
| 8. Filling up Forms                            |           |
| 9. Railway Reservation/ Cancellation Forms     |           |
| 10. Bank-Chalan                                |           |

11. Convocation Form
12. Money Order Form

**TOTAL HOURS:75**

**TEXT BOOK**

1. Mahadevan, Usha. *Empower with English, Sun Beams - I*. Emerald Pub: Chennai. 2012. Print.

**15LHN001**

**HINDI I**

**5 0 0 4**

**COURSEOBJECTIVE:**

- To train the students in the use of Karyalayin Basha. To enable the students to develop the communication skill in Hindi language .

**Unit 1. - Gadya aur Karyalayin Basha**

15

Mamata, -Yogyatha evam vyavasay kaa Chunaav Paribashik shabdavalil prashasanik vakyansh,padanam

**Unit 2 - Gadya aur Sarkari Patra**

15

Rajneethi kaa Bhantwara, , Samanya sarkari patra,gyapan,karyalay gyapan

**Unit 3- Gadya aur Sarkari Patra**

15

Computer nayi krantee kee dastak, , Karyalay aadesh,Ardha sarkari patra paripatra,Adhisoochana

**Unit 4 - Gadya aur Samanya Patra**

15

Raspriya, Samanya patra- chutti patra,sampadak ke naam patra, shikayati patra, pustak vikretha ke naam patra

**UNIT 5 VYAVASAAYIK PATRA**

15

Bankon mein bach khaata kholne ke liye – chek buk ke liye, run lene hetu, chek buk gum ho jane hetu, kitaabon kaa krayadesh

**TOTAL HOURS: 75**





**UNIT 5 Composition**

15

A écrire une lettre à un ami l'invitant à une célébration différente ex : mariage – A faire le dialogue - A lire le passage et répondre aux questions

**TOTAL HOURS : 60****TEXT BOOK**

1. Jacky GIRARDER & Jean Marie GRIDLIG, Méthode de Français PANORAMA, Clé Internationale , Goyal Publication, New Delhi., Edition 2004

**REFERENCE BOOKS**

1. DONDO Mathurin, "Modern French Course", Oxford University Press. New Delhi., Edition 1997
2. Nitya Vijayakumar, "Get Ready French Grammar – Elementary", Goyal Publications, New Delhi., Edition 2010

**15LFR002 FRENCH II 5 0 0 4****COURSE OBJECTIVE:**

- To fortify the grammar and vocabulary skills of the students.
- Enable the students have an idea of the French Culture and Civilization

**UNIT 1 Leçons 10 – 11****15**

Leçons : 10. Les affaires marchent,- 11. Un après midi à problèmes- Réponses aux questions tirés de la leçon - Grammaire : Présent progressif, passé récent ou future proche - Complément d'objet directe - Complément d'objet indirecte .

**UNIT 2 Leçons 12 – 13****15**

Leçons : 12. Tout est bien qui fini bien,- 13. Aux armes citoyens – Réponses aux questions tirés de la leçon - Grammaire : Les pronoms « en ou y » rapporter des paroles - Les pronoms relatifs que, qui, ou où ,

**UNIT 3 Leçons 14 – 15****15**

Leçons 14. Qui ne risqué rien n'a rien,- 15. La fortune sourit aux audacieux – Réponses aux questions tirés de la leçon - Grammaire : Comparaison – Les phrases au passé composé

**UNIT 4 Leçons 16 – 18****15**

Leçons 16 La publicité et nos rêves 17 La France le monde 18 Campagne publicitaire  
Réponses aux questions tirés de la leçon - Grammaire :- Les phrases à l'Imparfait -  
Les phrases au Future

**UNIT 5 Composition****15**

A écrire une lettre de regret// refus à un ami concernant l'invitation d'une  
célébration reçue- A écrire un essai sur un sujet générale - A lire le passage et  
répondre aux questions

**TOTAL HOURS: 75****TEXT BOOKS**

1. Jacky GIRARDER & Jean Marie GRIDLIG, « Méthode de Français
2. PANORAMA », Clé Internationale , Goyal Publication, New Delhi., Edition 2004

**REFERENCE BOOKS**

1. DONDO Mathurin, “ Modern French Course”, Oxford University Press, New Delhi., Edition 1997
2. Paul Chinnappane “ Grammaire Française Facile” , Saraswathi House Pvt Ltd, New Delhi, Edition 2010

**15LHN002****HINDI II****5 0 0 4****COURSE OBJECTIVE:**

To enable the students to have the knowledge in contemporary literature of the modern era. It also provides an idea how translation to be effected.

**Unit 1 Kahani Aur Ekanki****15**

Poos Kee Raat., - **Duzhazar**

**Unit 2 Ekanki aur Kahani .Vaapasi, Akeli, .Akbhari vigyapan****15****Unit 3 Kahani Aur Anuvad**

Sharandatha - Anuvad anuched angreji se hindi me karne ke liye.

**15**

Raat ke Raahi Main Bhi Maanav hoon Anuvad anuched angreji se hindi me karne ke liye.

Parda -Yeh Meri Janma Bhoomi Hai -anuvad anuched angreji se hindi me karne ke liye.

**TOTAL : 60 HRS****TEXT BOOK**

1. Sankalan Kahani evam Ekankied by Dr.N.Lavanya, Mayura Publishers, edition 2010

**15LTA002 தமிழிலக்கியம் -****5 0 0 4****நோக்கம்:**

- சங்ககாலம் தொடங்கி தற்காலம் வரையிலும் தமிழில் உள்ள படைப்பிலக்கியங்களை இப்பாடம் அறிமுகம் செய்கின்றது. தமிழ் இலக்கியத்தில் தேர்ந்தெடுக்கப்பட்ட மிக முக்கியமான செய்யுட்கள், கவிதைகள், கதைகள், உரைநடை ஆகியவற்றைக் கொண்டு இப்பாடம் கட்டமைக்கப்பட்டுள்ளது. மாணாக்கரிடம் இலக்கியத்தேடலை உருவாக்குவதும், தற்சார்புடைய அறிவை மேம்படுத்துவதும் இப்பாடத்தின் நோக்கமாகும்.

**அலகு 1 செவ்வியல் இலக்கியங்கள்****12 மணிநேரம்**

திருக்குறள்- அன்புடைமை, ஒழுக்கமுடைமை, பெரியாரைத்துணைக்கோடல் – மூன்று அதிகாரங்கள் முழுமையும்.

புறநானூறு- பாடல் எண். 18, 55, 182, 183, 192 – ஐந்து பாடல்கள்.

குறுந்தொகை- பாடல் எண். 2, 167, 27, 202, 184 - ஐந்து பாடல்கள்.

**அலகு 2 காப்பியங்கள்****12 மணிநேரம்**

சிலப்பதிகாரம்- கனாத்திறம் உரைத்தக்காதை முழுவதும்.

மணிமேகலை- பவத்திறம் அறுகனப்பாவை நோற்றகாதை முழுவதும்.

கம்பராமாயணம் - மந்தரைச்சூழ்ச்சிப்படலம் (தேர்ந்தெடுக்கப்பட்ட ஒன்பது பாடல்கள்).

**அலகு 3 கவிதையும் புதுக்கவிதையும்****11 மணிநேரம்**

பாரதிதாசனின் 'தமிழியக்கம்' - (i) நெஞ்சுபதைக்கும் நிலை - (ii) இருப்பதை விட இறப்பது நன்று - இரண்டுகவிதைகள்.

ஈரோடுதமிழன்பனின், “அந்தநந்தனைஎரித்தநெருப்பின்மிச்சம்”  
என்னும்தொகுதியில்இடம்பெற்றுள்ள ‘விடிகிறது’ என்னும்புதுக்கவிதை.

**அலகு 4 சிறுகதைகள்**

12 மணிநேரம்

தி. ஜானகிராமனின் ‘சக்திவைத்தியம்’

கி. ராஜநாராயணனின் ‘கதவு’ - இரண்டுகதைகள்

**அலகு 5 உரைநடை**

13 மணிநேரம்

வைரமுத்துஎழுதிய ‘சிற்பியேஉன்னைச்செதுக்குகிறேன்’ முழுவதும்

**மொத்தம்: 60 மணிநேரம்**

**பாடநூல்கள்**

1. இரவிச்சந்திரன். சு. (ப.ஆ), “செய்யுள்திரட்டு”, வேல்ஸ்பல்கலைக்கழகம், முதற்பதிப்பு, 2008.

2. வைரமுத்து. இரா., “சிற்பியேஉன்னைச்செதுக்குகிறேன்”, திருமகள்நிலையம், பதினேழாம்பதிப்பு, 2007.

**பார்வைநூல்கள்**

1. பாலச்சந்திரன்.சு., “இலக்கியத்திறனாய்வு”, நியூசெஞ்சரிபுக்ஹவுஸ், பத்தாம்பதிப்பு, 2007.

2. மாதையன்.பெ., “தமிழ்ச்செவ்வியல்படைப்புகள்”, நியூசெஞ்சரிபுக்ஹவுஸ், முதல்பதிப்பு, 2009.

3. வரதராசன்.மு., “குறள்காட்டும்காதலர்”, பாரிநிலையம், மறுபதிப்பு, 2005.

**15LEN002**

**ENGLISH-II**

**5 0 0 4**

### **COURSE OBJECTIVE**

- To enable the students to develop their communication skills effectively. To make students familiar with the English Language.
- To enrich vocabulary in English
- To develop communicative competent

**UNIT 1**

**PROSE-I**

**15**

1. On Saying ‘Please’ - A.G. Gardiner

2. Women, Not the Weaker Sex - M.K. Gandhi

3. The Sky is the Limit - Kalpana Chawla

**UNIT 2**

**PROSE-II**

**15**

1. Polluting the World - Edgar I. Baker

2. Dimensions of Creativity - Dr. A. P. J. Abdul Kalam

3. The Message of Visva - Bharati

|               |                                      |    |
|---------------|--------------------------------------|----|
| <b>UNIT 3</b> | <b>SHORT STORIES</b>                 | 15 |
|               | 1. Open Window - H. H. Munro (Saki)  |    |
|               | 2. The Lion's Share - Arnold Bennett |    |
|               | 3. The Sparrows - K.A. Abbas         |    |
|               | 4. The Cop and The Anthem - O- Henry |    |
|               | 5. The Necklace - Guyde Maupassant   |    |
| <b>UNIT 4</b> | <b>FUNDAMENTAL GRAMMAR SKILLS</b>    | 15 |
|               | 1. Question Tags                     |    |
|               | 2. Concord                           |    |
|               | 3. Reported Speech                   |    |
|               | 4. Idiom and Phrases                 |    |
| <b>UNIT 5</b> | <b>ADVANCED GRAMMAR SKILLS</b>       | 15 |
|               | 1. Conditional Clauses               |    |
|               | 2. Cause and Effect                  |    |
|               | 3. Simple, Complex, Compound         |    |
|               | 4. Framing Questions                 |    |

**TOTAL HOURS:75**

**TEXT BOOK**

1. Rao, Shoba B. *Empower with English, Sun Beams - II*. Emerald Pub: Chennai. 2012. Print.

**15 EVS201 ENVIRONMENTAL STUDIES 2 0 0 2**

**COURSE OBJECTIVE**

- To train students to locate and comprehend relationships between the natural, social and cultural environment.
- To develop an understanding based on observation and illustration, drawn from lived experiences and physical, biological, social and cultural aspects of life, rather than abstractions.
- To create cognitive capacity and resourcefulness to make the students curious about social phenomena.

**UNIT 1 INTRODUCTION & NATURAL RESOURCES 10**

The multidisciplinary nature of Environment of studies – Definition - Scope and Importance - Need for Public Awareness. Natural resources and associated problem - Renewable and Non- Renewable resources:-Forest Resources-Mineral Resources-Food Resources - Energy Resources - Land Resources; Role of an individual in conservation of natural resources- Equitable use of resources of sustainable lifestyles.

**UNIT 2 ECO SYSTEM & BIODIVERSITY AND ITS CONSERVATION 10**

Concepts of an Ecosystem - Structure and Functions of an Ecosystem - Procedures, Consumers and Decomposers - Energy flow in the ecosystem - Food chains, Food webs and ecological pyramids - Introduction, types, Characteristics features - Structures and functions of the following ecosystem :Forest ecosystem, Grass land ecosystem, Desert ecosystem, Aquatic ecosystem. Bio-geographical classification of India - Value of Bio-diversity - Bio-diversity at global, National and Local levels - India s a mega-diversity nation - Hot-Spots of diversity - Threats to diversity: Habitats loss, poaching of Wild life, man wild life conflicts.

**UNIT 3 ENVIRONMENTAL POLLUTION AND HUMAN RIGHTS 10**

Definition - Causes, effects and control measures of : Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution - Soil pollution management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution – Case studies -Disaster Management – Flood, earthquakes, cyclone of landslides Environment and human health - Human rights - Value education - HIV/AIDS - Women and child welfare - Role of information technology in Environment and Human health - Case study.

**TOTAL HOURS: 30 Hours**

**TEXTBOOK**

1. Dr. Shradha sinha, Dr.Manisha shukula, Dr. Ranjana Shukla

## REFERENCE BOOK

1. R. Venugopala Rao, "Text Book Of Environmental Engineering", Eastern Economy Edition.

## SKILL ENHANCEMENT COURSE

**15BCA251          English for Communication –I          4   0   0   4**

### COURSE OBJECTIVE:

- To train the students in the use of the english language in varied literary and non literary context
- To teach them soft skills and strength their foundation in grammar and composition
- To elevate their comprehension skills

**UNIT 1 PROSE I          12**

1. Spoon Feeding - W. R. Inge
2. Reading for Pleasure - L. A. G. Strong
3. The Challenge of our Time - E. M. Forster

**UNIT 2 PROSE II          12**

1. Human Values in Education - V. K. Gokak
2. Human Rights - Sivagami Paramasivam

**UNIT 3 SHORT STORIES          12**

1. Comrades - Nanine Gordimer
2. Games at Twilight - Anita Desai
3. The Gateman's Gift - R.K. Narayan

**UNIT 4 PRIMARY COMPOSITION EXERCISES 12**

1. Letter Writing
2. Comprehension

**UNIT 5 ADVANCED COMPOSITION EXERCISES 12**

1. Precis-Writing
2. Resume Writing
3. Report Writing

**TEXT BOOKS**

1. Subramanian, S. Dr. *Words of Wisdom*. An Anthology of Modern Prose. Anu Chitra Pub., Chennai. 2003. P.
2. Subramanian, A, E. *Gifts to Posterity*. An Anthology of Modern Short Stories. Anu Chitra Pub., Chennai. 2003. P

**15BCA252 English for Communication –II 4 0 0 4**

**COURSE OBJECTIVE**

- To train the students in the use of the english language in varied literary and non literary context
- To teach them soft skills and strength their foundation in grammar and composition
- To elevate their comprehension skills

**UNIT 1 PROSE I 12**

1. The Complete Man - Prince Philip
2. Try Prayer Power - Norman Vincent Peale
3. On Not Answering The Telephone - W. Plomer



|  |                       |
|--|-----------------------|
| <b>UNIT 2 PROSE II</b>                                 | <b>12</b>             |
| 1. Science, humanities and religion - S. Radhakrishnan |                       |
| 2. The Reason - E. V. Lucas                            |                       |
| <b>UNIT 3 SHORT STORIES</b>                            | <b>12</b>             |
| 1. The Ant and the Grasshopper - W. Somerset Maugham   |                       |
| 2. How much land does a man need - Leo Tolstoy         |                       |
| 3. The Dying Detective - Sir Arthur Conan Doyle        |                       |
| <br>   |                       |
| <b>UNIT 4 PRIMARY COMPOSITION EXERCISES</b>            | <b>12</b>             |
| 1. Business Letters                                    |                       |
| 2. Hints Development                                   |                       |
| <b>UNIT 5 ADVANCED COMPOSITION EXERCISES</b>           | <b>12</b>             |
| 1. Paraphrasing  |                       |
| 2. Writing Abstract                                    |                       |
| 3. Dialogue Writing                                    |                       |
|  | <b>TOTAL HOURS:60</b> |

#### **TEXT BOOKS**

1. Subramanian, S. Dr. *Words of Wisdom*. An Anthology of Modern Prose. Anu Chitra Pub., Chennai. 2003. P.
2. Subramanian, A, E. *Gifts to Posterity*. An Anthology of Modern Short Stories. Anu Chitra Pub., Chennai. 2003. P

**COURSE OBJECTIVE**

- To understand the community in which they work
- To understand themselves in relation to their community
- To identify the needs and problems of the community and involve them in problem-solving
- To develop among themselves a sense of social and civic responsibility
- To utilise their knowledge in finding practical solutions to individual and community problem

**Unit 1SPECIAL CAMPING PROGRAMME****12**

Nature and its objectives-Selection of camp site and physical arrangement - Organization of N.S.S. camp through various committees and discipline in the camp. Activities to be undertaken during the N.S.S. camp. Use of the mass media in the N.S.S. activities

**Unit 2CONTRIBUTION OF SOCIAL REFORMS****6**

Mahatma JotibaPhule- RajarshiShahuChhatrapati-Dr.B.R.Ambedkar

**Unit 3SOCIAL PROBLEMS & NATIONAL INTEGRATION****12**

Water scarcity -Women harassment-Need of National integration -Various obstacles in the way of National Integration; such as caste, religion, language and provisional problems etc-Variou solutions for the building of the National Integration.

**TOTAL HOURS 30****TEXT BOOKS:**

1. ChhatrapatiShahu – The Pillar of Social Democracy,Ed.P.B.Salunkhe
2. National Service Scheme Manual, Govt.of India.

**REFERENCE BOOKS:**

1. KapilK.Krishan ,Social service opportunities in Hospitals, TISS
2. J.B.Reddy ,Women and Law.

**COURSE OBJECTIVE**

- To increase ethical sensitivity.
- To increase ethical knowledge.
- To improve ethical judgment.

**UNIT 1 INTRODUCTION****6**

Why Value Education – Ethical Reflections – What is Ethics? Swami Vivekananda

**UNIT 2 APPROACH TO LIFE****6**

Approach to Life - Happiness as Goal - Historical Perspective – Life in the Past and Present

**UNIT 3 KINDS OF VALUES****6**

Kinds of Values S.Ignacimuthu S.J – Living Excellence Anthony Robbins – Concern for Others – Student’s Definition why Concern.

**UNIT 4 GOALS AND HUMAN RIGHTS****6**

Use Goals to help you grow David J.Schwartz – essential Characteristics of Human Rights.

**UNIT 5 INFLUENCE OF SCIENCE AND TECHNOLOGY****6**

Social Relevance of Science and Technology – Economic Awareness – Economic Features – Status of Women – Mass Media and Values.

**TOTAL HOURS 30****TEXT BOOK**

1. Touchstone: Synergy of Values – University of Madras.

**REFERENCE BOOK**

1. In harmony- Value Education at College Level- Dept. of Ethics and Religious Studies Loyolla College, Madras.

**COURSE OBJECTIVE**

- To make students understand the concept and components of personality, thereby to apply the acquired knowledge to themselves and to March towards excellence in their respective academic careers.
- To enable students to keep themselves abreast of general knowledge and current information.

**UNIT 1 INTRODUCTION****12**

Definition of Personality - Determinants of Personality- biological, psychological and socio- cultural factors. - Misconceptions and clarifications - Need for personality development

**UNIT 2 SELF-AWARENESS AND SELF MOTIVATION****13**

Self analysis through SWOT and Johari window - Elements of motivation - Seven rules of motivation - Techniques and strategies for self motivation - Motivation checklist and Goal setting based on principle of SMART - Self motivation and life - Importance of self-esteem and enhancement of self-esteem.

**UNIT3 MEMORY AND STUDY SKILLS****13**

Definition and importance of memory - Causes of forgetting - How to forget (thought stopping), how to remember (techniques for improving memory) - The technique of passing exams-management of examination fear.

**UNIT4 POWER OF POSITIVE THINKING****10**

Nurturing creativity, decision-making and problem solving. - Thinking power- seven steps for dealing with doubt - Traits of positive thinkers and high achievers - Goals and techniques for positive thinking - Enhancement of concentration through positive thinking - Practicing a positive life style.

**UNIT 5 GENERAL KNOWLEDGE AND CURRENT AFFAIRS****12**

Regional, national and international events - Geographical, political and historical facts - Information on sports and other recreational activities -Basic knowledge with regard to health and health promotion

**TOTAL HOURS 60**

**TEXT BOOKS**

1. Mile, D.J (2004). Power of positive thinking. Delhi: Rohan Book Company.
2. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.

**REFERENCE BOOKS:**

- 1.Dudley, G.A. (2004). Double your learning power. Delhi: Konark Press. Thomas Publishing Group Ltd.
- 2.Lorayne, H. (2004). How to develop a super power memory. Delhi: Konark Press. Thomas Publishing Group Ltd.