

# KANNUR UNIVERSITY

## B.Sc Programme

### OPEN COURSES - COMPUTER SCIENCE

Semester	Code	Theory	Hours / Week	Credit
5	5D01CSC	Introduction to IT and C programming	2	2
5	5D02CSC	Introduction to Information Technology	2	2
5	5D03CSC	Computer Application Packages	2	2
5	5D04CSC	Programming in C++	2	2
5	5D05CSC	Programming in JAVA	2	2
5	5D06CSC	Numerical Methods	2	2
5	5D07CSC	Data Base Management System And SQL	2	2
5	5D08CSC	Web Technology	2	2
6	6D09CSC	Lab - C Programming	2	2
6	6D10CSC	Lab - Programming C++	2	2
6	6D11CSC	Lab – PC Software	2	2
6	6D12CSC	Lab – Java Programming	2	2
6	6D13CSC	Lab – DATABASE Management Systems	2	2
6	6D14CSC	Lab – Numerical Methods	2	2
6	6D15CSC	Data Mining	2	2
6	6D16CSC	Lab – Web Technology	2	2

#### **1. 5D01CSC Introduction to IT and C Programming**

##### **Module I**

information technology: introduction to computer, different classification of computer, I/O devices, commonly used I/O devices Key board, mouse, VDU, different type of printers, Memory organization, primary memory, RAM, ROM, PROM, EPROM, cache memory, secondary storage device, Floppy disk, Hard disk, CD, DVD, etc.

##### **Module II**

Representation of information: number system, binary, octal, hexadecimal system, different code used BCD, ASCII, EBCDIC, GRAY Code, computer languages: machine language, assembly language, high level language, compilers, interpreter. Problem solving using computers algorithm and flow charts examples

##### **Module III**

The C character set, Identifiers and keywords, Classes of Data Types, constants, variable declarations. Expressions, statements, symbolic constants, operators and expressions: arithmetic operators, unary operators, relational operator, logical operators, assignment operator, the conditional operator. Library

functions: data input and output functions like getchar(), putchar(), scanf(), printf(), gets and puts. Control statements: Branching: The if-else statements. Looping: The while, do-while and for loops. The switch statements, Break and continue, comma operator.

#### **Module IV**

Functions

Defining a function, accessing a function, function prototype, passing arguments to a function, Returning from a function, recursion, program structure. Storage classes: automatic, static, register and extern(global). Multi file program.

#### **Module V**

Arrays, Structure and Union : Defining an array, processing an array, passing arrays to functions, multidimensional arrays. Character arrays and strings. Structure and union. Defining a structure, processing a structure. Passing structure to functions, union. Concepts of pointers: Pointers to built in data types only.

#### **Text Book :**

1. ANSI C, E. Balagurusamy, 3<sup>rd</sup> edition McGraw-Hill Publication

#### **Reference books:**

1. Computer Basics and c Programming, V. Rajaraman, PHI, 2008
2. Programming with ANSI and Turbo C, Ashok N. Kamthane, 1<sup>st</sup> edn, Pearson Education.
3. Let us C, Yeshvanth Kanethkar, 3<sup>rd</sup> Edn, BPB,
4. Programming with C in Linux, NIIT, PHI.
5. C by Example, Noel Kalicharan, Cambridge University press.

## **2. 5D02CSC INTRODUCTION TO INFORMATION TECHNOLOGY**

**Contact Hours per Week : 3 Theory + 1 Practical**

**Credit : 4**

**Contact Hours per Semester : 60**

#### **MODULE I**

Introduction and definition of computer, characteristics of a computer, The evolution of computers, the generation of computers, areas of application of computers, Basic computer organization: Input Module, Output Module, storage Module, Arithmetic and logic Module, control Module, CPU, The system concept.

#### **MODULE II**

Processor & Memory: The processor and memory architecture of a computer system, Processor speed, Types of processors: CISC, RISC and EPIC processors; The main memory: Storage evaluation criteria, Data representation, The binary and decimal number system, Main memory organization, fixed and variable length memory, the main memory capacity, RAM, ROM, PROM, EPROM, Cache memory; Secondary storage devices: sequential & Direct access devices, The memory hierarchy, Magnetic tape, magnetic disk, hard disk, floppy disk, Optical disk, Mass storage devices.

#### **MODULE III**

Input Output devices: input devices- keyboard, point and draw devices- mouse, trackball, Joystic, electric pen, touch pen, Data scanning devices- image scanner, optical character recognition(OCR) device, Optical mark reader, Bar- code reader, Magnetic ink character recognition(MICR),Digitizer, electronic – card reader, voice recognition devices: vision input system, Output devices: Monitors, Printers- Dot Matrix, Inkjet, Drum, Chain/ Band printers, laser printers, Plotters – Drum plotter, flatbed plotters, Screen image projector, voice response system: voice reproduction system, speech synthesizer.

#### **MODULE IV**

Computer Software: What is software, Relationship between hardware and software, Types of software, logical system architecture, acquiring software, software development steps, firmware, Computer languages: Analogy with natural languages, categories: Machine languages, Assembly languages, high level languages, translators, Linker, OOP languages, some high level languages.

## **MODULE V**

Operating Systems: What is an operating system, main functions of OS, Measuring system performance, Process management, multiprogramming, multi tasking, multi processing, Time sharing, Memory management, file management, security. Command interpretation, operating system capability, enhancement software, some popular operating system: UNIX, MS\_DOS, Microsoft Windows, Microsoft Windows NT, Linux

### **Text Books:**

Computer Fundamentals by Pradeep K. Sinha, Priti Sinha third edition  
Fundamentals of Computers by V. Rajaraman

## **3. 5D03CSC Computer Application packages**

### **MODULE I**

Functional units: Central processing Unit – Control Unit, ALU, Instruction set, Register, Processor, Speed, Memory units, Storage , Memory Organization, Capacity, RAM, ROM, Secondary storage devices – Magnetic disks , CD / DVD, Input devices – Keyboard, Mouse, Trackball, Joystick, Scanner, OMR, Barcode reader, MICR, digitizer, card Reader, Voice recognition, Web cam.

### **MODULE II**

Output devices : Monitors, Printers – Dot-matrix, inkjet, Laser; Plotters, Microfilm, Multimedia Projector, Speech synthesizer, Dumb, smart and intelligent terminals. Multimedia – text, graphics, animation, Audio, Images, Video; Multimedia application in Education, entertainment, and marketing. Computer software – system software, Application software, Compiler, High Level Languages, Free domain software, Operating systems – windows and Linux.

### **MODULE III**

Word processing concepts – saving, closing, opening an existing document, Selecting text, editing text, Find and replace, Printing; Creating and printing merged documents; Character and paragraph design; spelling and other language related features; Graphics, tables, Charts, Margins, Headers and footers, Mail merge, Macros, templates.

### **MODULE IV**

Spread sheet concepts : Creating, saving and editing a work book; inserting and deleting work sheets; Cell : entering data, formatting cell, formula, Copy-cut-paste; functions – mathematical, logical, statistical, text, financial, data and time. Function wizard; Printing; Charts and graphs; Filters; Macros.

### **MODULE V**

Creating, Opening and saving presentations; Views, slides. Adding and formatting text; Formatting paragraphs; Language tools; Drawing/ inserting objects; templates; special effects and animation.

### **Text Books:**

1. Foundations of Computing, by Pradeep K. Sinha, Priti Sinha, 3<sup>rd</sup> edition

## **4. 5D04CSC Programming in C++**

### **Module 1**

C++ Introduction, object-oriented programming, advantage of OOP, characteristics of Object oriented Languages. Objects, Classes, Inheritance, Reusability, creating new data types, polymorphism, abstraction, encapsulation, Data hiding, message communication. **Programming Basics:** Basic program construction, Input and Output using cin and cout. Preprocessor directives, Comments. Data types, Manipulators, Type conversions. Operators and expressions. Library functions. Control Constructs: Branching and Looping. Switch and go to statements. Break and continue.

### **Module II**

#### **Structures and Functions**

Structure, A simple Structure, Specifying the structure, Defining a structure, Accessing Structure members, Enumerated data types. Functions-simple functions.passing arguments to functions.Returning values from functions.reference arguments. Overloaded functions.Inline functions.default arguments. Variables and storage classes. Returning by reference.

### **Module III**

#### **Classes and Arrays.**

Classes and Objects, C++ objects as physical objects. C++ objects as data types. Constructors, Objects as function arguments, Returning objects from functions. Array Fundamentals, Arrays as Class member data. Arrays of objects, Strings.Address and Pointers. Pointer and Arrays, pointers and functions, pointers and strings, memory management: new and delete, Pointers to Objects.

### **Module IV**

#### **Operator Overloading and Inheritance**

Overloading unary operators, overloading binary operators, data conversion, pitfalls of operator Overloading and conversion.

Inheritance- Derived class and base class. Derived class' constructors, overriding member functions. Public and private inheritance. Types of Inheritance. Container ship: class within class.

### **Module V**

Virtual functions. Static functions, Friend functions. Assignment and copy initialization. This pointer Files and Streams: Streams: String I/O, character I/O ,Object I/O, I/O with multiple objects. File pointers. Disk I/O with member functions. Error handling. Redirection, commandline arguments, .

### **Text book :**

- 1.Object Oriented Programming in C++, Robert Lafore, Techmedia

### **Reference Books: .**

1. Object Oriented Programming with C++; E. Balagurusamy; 3<sup>rd</sup> Edn; TMH 2006
2. Programming in C++, M.T. Somashekara, Prentice Hall of India, New Delhi
3. Object Oriented Programming with ANSI & Turbo C++, Ashok N. Kamthane, Pearson Education
4. Let us C++, Yeshwanth Kanethkar, BPB

## **5. 5D05CSC Java Programming**

### **Module I:**

Overview, Features of java, Data types- Control Statements, Operators- Byte code. Introducing class: class fundamentals, objects, reference variables, methods, constructors, instance variable hiding, this keyword, overloading methods and constructors, returning objects, static members, final, String class,

### **Module II:**

Inheritance: Inheritance basics, creating multilevel hierarchy, constructor invocation, Method overriding, dynamic method dispatch, abstract class, final. Packages & Interfaces: Package-Definition, Classpath, Import, access protection. Interfaces-Definition, implementation, extending interfaces.

### **Module III:**

Exception Handling: Fundamentals, Exception types, uncaught exception, try-catch, multiple catch, nested try, throw, throws, finally, creating own exception.

### **Module IV**

Multi threaded programming: Java thread model, the main thread, creating a thread-using Thread class and Runnable interface. Life cycle of a thread, creating multiple threads, isAlive() and join() methods.

### **Module V:**

Applet fundamentals-Applet skeleton.HTML Applet tag.Event handling: Delegation event model. Event Classes-ActionEvent , Adjustment Event , FocusEvent, ItemEvent, KeyEvent, MouseEvent, WindowEvent.,Event Listeners ActionListener , ItemListener , KeyListener , MouseListener , WindowListener , FocusListener, Event Sources. Handling Mouse and Keyboard events. Introducing AWT:Window fundamentals, -Button,Listbox,Choice,Checkbox,Scrollbars,Menu..

Text :

1. Java2 Complete Reference -Herbert Schildt

References:

2. .JDBC & Java -O Reilly

3. Enterprise Java in a Nutshell

## 6. 05D06CSC Numerical Methods

### Module I

Introduction to Numerical methods: Nature of numerical problems; computer based solutions; number representations; notions of accuracy, convergence, efficiency, complexity; solutions of Non-linear equations : Bisection method; Regula-Falsi; Newton Raphson; secant; Successive approximation method.

### Module II

Interpolation techniques: Linear interpolation; Newton's forward and backward formulae; Lagrange's interpolation; Bessel Functions; Linear Regression; Cubic splines; Chebyshev Polynomial.

### Module III

Concept of differentiation and integration; Graphical Interpretation; Cubic Spline based Numeric differentiation; Numeric integration; trapezoidal, Simpson's Romberg, Gaussian and Filon's methods.

### Module IV

Matrix based solutions of simultaneous linear equations: Gauss Jordan Method; Gauss elimination with Back - substitution; LU decomposition method.

### Module V

Differential equations: Picard's method; Euler's and modified Euler's method; Runge-Kutta; Predictor - Corrector methods; partial differential Equations; Jacobi and Gauss-Siedel methods.

Text books:

1. Numerical Techniques in C, Kameshwar, BPB Publications.
1. Computer Oriented Numerical Methods, Datta, Vikas.
2. Computer Oriented numerical Methods, Rajaraman V., 3<sup>rd</sup> Edn, PHI

## 7. 5D07CSC Data Base Management System & SQL

### Module 1

Introduction-Field,Record,Entity,Attribute,Relation,Domain,Tuple-Advantages of database systems- data models (Network model, Hierarchical Model, DBTG CODASYL model,Relational Model(E-R)) - system structure

### Module 2

Database administrator- data base users, Constraints(Primary, Foreign, Candidate, Unique)-Relational Algebra (Union, Intersection, Difference, Product, Project, Selection)

### Module 3

Normalization(First, Second, Third, Fourth, BCNF),SQL: Introduction To SQL-Tables-DDL,DML,DCL(In Detail),Data Types.

### Module 4

SQL Functions(Different Types of Functions),Operators(Arithmetic, Relational, Logical), Sub Quires (in Detail),Clauses(Having, Group By),

### Module 5

Joins(Different Types of Join Statements),View, Introduction to Sequence, Index and Triggers

## **Textbook**

1. Data Base Concept 3<sup>rd</sup> edition Abraham Silberschatz, Henry F. Korth McGraw Hill
2. A Guide to the SQL Standard, C. J. Date and Hugh Darwen, 1997, Addison-Wesley

## **Reference:**

1. An Introduction to Database Systems, C. J. Date, 1994, Addison-Wesley
2. Understanding the New SQL, Jim Melton and Alan R. Simon, 1993, Morgan Kaufmann.
3. Principles of Database & Knowledge Jeffrey D. Ullman, Computer Science Press, 1988

## **8. 5D08CSC WEB TECHNOLOGY**

### **Module -1:**

Introduction to internet and web, An overview of internet programming –WWW design issues. Introduction to HTML-structure of HTML,tags,attributes,syntax of tags ,starting and ending tags,html doc elements-<html>,<title>,<body>,physical style tags,listing,labeling,grouping- <img>- <a>-

### **Module-2:**

Table tags-<tr>,<td>,<th> attributes-height,width,rowspan,colspan,border,color. Form-tag ,attributes-type-passwd,submit,radio,check,method,action. <textarea>-Frame-<frame>,<frameset>,<iframe>,<noframe> and other important tags and attributes.

### **Module-3**

Javascript-datatypes,variables,function,object,array.Client-side object hierarchy and document.object Model,<script>,event handlers,javascript in urls.

### **Module-4:**

Windows and frames-dialog boxes,status line,navigator object,opening Windows,closing windows,Location object,history object. Date object- Math Object- Accessing Form object

### **Module-5**

Client-server model, introduction to cgi, environment variables, request-response model, Simple programming in CGI

**BOOKS:** HTML-Definitive Guide O'reilley  
Programming in CGI O'reille  
Javascript-Definitive Guide O'reilley

## **9. 6D15CSC Data mining**

### **Module I**

Introduction; data warehousing – what is, Multidimensional data model, OLAP operations, warehouse schema, Data warehousing Architecture, warehouse server, Metadata, OLAP engine, data warehouse Backend Process.

### **Module II**

Data mining – what is, KDD vs data mining, DBMS vs data mining, DM Techniques, issues and challenges, Applications. (Case studies) \*

### **Module III**

Association rules – What is, Methods, a priori algorithm, partition algorithm, Pincer-search algorithm, FP-tree growth algorithm, incremental and Border algorithms, Generalized Association rule.

### **Module IV**

Clustering techniques – Paradigms, Partitioning Algorithms, k – Medoid algorithms, CLARA, CLARANS, hierarchical clustering, DBSCAN, Categorical Clustering, STIRR.

### **Module V**

Decision trees – what is, tree construction principles, Best split, Splitting indices, Splitting criteria, decision tree construction algorithms, CART, ID3, C4.5, CHAID. Introduction to web, spatial and temporal data mining.

**Text book :**

1. Data mining techniques, A K Pujari, University press.

**Reference :**

1. J. Han, M. Kamber, "Data Mining Concepts and Techniques", Harcourt India Pvt Ltd.
2. M. Dunham, " Data Mining : introductory and Advanced Topics", Pearson Pub.