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# UNIVERSITY OF MYSORE

Estd. 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

No.AC.2(S)/31/18-19

Dated: 15.06.2018

## NOTIFICATION

**Sub:** Revision of syllabus for Computer Science (UG) as per CBCS pattern from the academic year 2018-19.

**Ref:** 1. Decision of Board of Studies in Computer Science (UG) meeting held on 28.02.2018.
2. Decision of the Faculty of Science & Technology Meeting held on 21.04.2018.
3. Decision of the Deans Committee meeting held on 22.05.2018.

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The Board of Studies in Computer Science (UG) which met on 28.02.2018 has recommended to revise the syllabus for B.Sc. Computer Science as per CBCS pattern from the academic year 2018-19.

The Faculty of Science and Technology and the Deans committee meetings held on 21-04-2018 and 22-05-2018 respectively have approved the above said proposal with pending ratification of Academic Council and the same is hereby notified.

The CBCS syllabus of B.Sc. Computer Science course is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Draft approved by the Registrar

15/6

**Deputy Registrar(Academic)**

To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DOS in Physics, Manasagangotri, Mysore.
3. The Chairperson, BOS in Computer Science, DOS in Computer Science, Manasagangotri, Mysore.
4. The Chairperson, Department of Studies in Computer Science, Manasagangotri, Mysore.
5. The Director, College Development Council, Moulya Bhavan, Manasagangotri, Mysore.
6. The Principals of the Affiliated Colleges where UG Program is running in Science stream.
7. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
9. Office file.

**B Sc Programme (CBCS): Computer Science; 2018-19 onwards**

| Semester | Core DSC | Credits | Elective DSE | Credits | SEC | Credits |
|---|---|---|---|---|---|---|
| I | DSC-3 A | 6 | | | | |
| II | DSC-3 B | 6 | | | | |
| III | DSC-3 C | 6 | | | | |
| IV | DSC-3 D | 6 | | | | |
| V | | | DSE-3 A | 6 | SEC-1<br>SEC-2 | 2<br>2 |
| VI | | | DSE-3 B | 6 | SEC-3<br>SEC-4 | 2<br>2 |

**Discipline Specific Courses:**

DSC-3 A : Computer Concepts and C Programming (L;T:P::4:0:2)

DSC-3 B : Data Structures and File Processing (L;T:P::4:0:2)

DSC-3 C : Object Oriented Programming with Java (L:T:P::3:1:2)

DSC-3 D : Database Management Systems (L:T:P::4:0:2)

**List of electives for both Vth and VIth semesters ( DSE-3 A and DSE-3 B )**

Select one of the following electives in both Vth and VIth semester, without repetition.

i) Numerical and Statistical Analysis (L;T:P::4:0:2)
ii) Computer Graphics and Animation (L;T:P::4:0:2)
iii) Data Communication and Computer Networks (L;T:P::4:1:1)
iv) Web Programming (L;T:P::3:1:2)
v) .NET Programming (L;T:P::3:1:2)
vi) Software Engineering (L;T:P::4:2:0)
vii) System Software and Operating Systems (L;T:P::4:0:2)

**Skill Oriented Course**

SEC-1 :: DTP (Page Maker and CorelDraw) (L;T:P::1:0:1)

SEC-2 :: Cyber Security (L;T:P::1:0:1

SEC-3 :: Accounting Software (Tally) (L;T:P::1:0:1)

SEC-4 :: Android Programming (L;T:P::1:0:1)

**BSc**

**DSC-3 A: Computer Concepts and C Programming (LTP::4:0:2) 6 Credits**

**UNIT I: Programming Concepts and Introduction to C language:**

System software, Application software. Program Translators – Assembler, Compiler, and Interpreter. Programming languages -Machine Level language, Assembly level language, High level language.

Program development life cycle: Problem definition, analysis, Design, Coding, Testing and debugging, Documentation and maintenance . Algorithm- Features, simple examples. Flowchart –Symbols used in a flowchart, suitable examples,

**Overview of C:** Importance of C, basic structure of C program, executing a C program, sample C program,. Constants, variables and data types. C character set, C tokens, identifiers, constants, variables, declaration of variables, assigning values to variables. Data type conversion.

**Operators in C:** arithmetic operators, relational operators. Logical operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, precedence of arithmetical expression, relational expression, logical expressions.

**UNIT II: Input and output operations:**

Input and output statements, reading a character: getchar(), writing a character: putchar(), formatted and unformatted i/o statements.

**Control structures:**

**Branching**: if, if-else, nested if, else-if ladder, switch.

**Looping** : while, do-while and for loop. Jump statements, nested loops.

**UNIT III: Arrays, Strings and Functions :**

**Arrays:** Introduction, single dimensional array, two-dimensional arrays, initializing 2-d arrays, multidimensional arrays. Operations on arrays: traversal, insertion and deletion. Searching: linear search & binary search. Sorting: bubble sort, selection sort and insertion Sort.

**Strings :** Declaring and initializing string variables, reading string from terminal, writing string to screen, putting strings together. Comparison of two strings, length of a string, copying a string, string operations using library functions & User defined functions.

**Functions**: Introduction, types of functions, need for user-defined functions, function call, types of arguments, nesting of functions, a multi function program, recursion, storage classes.

**UNIT IV: Structures ,Unions Pointers and Files**

**Structures :** Definition and declaration of a structure, assigning and accessing the members of a structure, structure initialization, structure elements in memory, comparison of structure variables, structure with in the structure, array within structures.

**unions:** Definition and declaration, accessing the members of a union. comparison of structure and union.

**Pointers :** Advantages of pointers, declaration of pointer variable, pointer expressions, pointers and functions: call by value and call by reference, pointers and arrays, array of pointers, pointer to pointer.

**Files:** Definition, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations, random files.

**Texts Books:**


1. E. Balaguruswamy : Programming in ANSI C" Tata Mc Graw-Hill
2. Problem Solving with C -PHI(EEE). By - M.T.Somashekara.
3. S. ByronGottfried. : "Programming with C", Tata McGraw-Hill(2000)
4. Yashawant Kanetkar : "Let us C"
5. Brain Verminghan & Dennis M. Ritchie "ANSI C Programming" (PHI)

**BSc**

**DSC-3 B : Data Structures and File Processing (4:0:2) 6 Credits**

**Unit-1**

Basic data structure : Primitive and non primitive, Abstract data structure, Operations, Data representation, Arrays - Memory representation of one and two dimensional arrays, Stack – Operations, Applications – Recursion, infix to postfix conversion, evaluation of postfix expression, Queues – Operations, Applications, circular queue-Operations, Dequeue, priority queue – uses of priority queues, Linked list - Dynamic memory allocation, Singly linked list – Operations, Circular linked list – Operations, Applications of linked list, doubly linked list – memory representation

**Unit-2**

Tree – Terminologies, tree properties, binary tree-properties, memory representation – Array and Linked list representation, Binary search tree – Creation through insertion, searching, deletion algorithms, Tree traversal, balanced trees, Applications of binary tree, sets: Dictionary implementation, sets with merge-find operations

**Unit-3**

Searching and sorting – sequential and binary search, internal and external sorting - bubble, selection, insertion, quick sort and merge sort, heap sort, comparison of different sorting techniques, Memory management : Garbage collection algorithm for equal sized blocks, storage allocation of objects with mixed size, buddy system,

**Unit-4**

Physical devices : Characteristics of storage devices such as disks, tapes, I/O buffering, basic file system operations – create, open, close, extend, delete, read block and write block, protection mechanism, file organization : sequential, indexed, direct, inverted, multi-list, directory system, indexing using B-tree, B+ tree and their variants, hashing – hash function, collision handling methods, extendible hashing.

**Text Books:**


1. M.T. Goodrich, R. Tamassia and D. Mount, *Data Structures and Algorithms in C++*, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, *Introduction to Algorithms*, 2nd Ed. Prentice-Hall of India, 2006.
3. E.Horowiz and S.Sahani, *Fundamentals of Data structures*, Galgotia Book source Pvt. Ltd., 2003.

**BSc**

**DSC-3 C: Object Oriented Programming Using Java (LTP::3:1:2) 6 Credits**

**Unit - I**

Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Procedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if…..else Statement, Nesting of if..else Statements, The else if Ladder, The Switch Statement, The ? : Operator. Decision Making and Looping: Introduction. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.

**Unit -II**

Classes, Arrays, Strings, Vectors and Interfaces: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes. Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

**Unit - III**

Packages, and Multithreaded Programming:
Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. Managing Errors and Exceptions: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

**Unit - IV**

Applet Programming, Graphics Programming, Input/Output:: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input

from the User. Graphics Programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes.

**Text Books:**


1. A.Balaguruswamy, “Programming with JAVA”, A Primer, TMH, 1999.


**Reference Books:**


1. Thomas Boutel, “CGI programming in C and Perl”, Addison – Wesley, 1996.
2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.
3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.
4. Schildt, “JAVA The Complete Reference”, 7th Edition.

**BSc**

**DSC-3 D: Database Management Systems (LTP::4:0:2) 6 Credits**

**UNIT I**

**Introduction to Database System Concepts and Architecture**

Databases and Database Users, Characteristics of the Database Approach, Actors on the Scene, Advantages of Using a DBMS

Data Models, Schemas and Instances, DBMS Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment

**Data Modeling Using the Entity-Relationship Model**

Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types**,** ER Diagrams, Naming Conventions and Design Aspects

**UNIT II**

**Transaction-** Transaction Concepts, States, ACID properties, Concurrent executions, Serializability

**Relational Data Model, Relational Constraints, and Relational Algebra**

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Basic Relational Algebra Operations, Additional Relational Operations, Examples of Queries in Relational Algebra.

Normalization- Functional Dependencies, Transitive and Multivalued dependency, First Normal form, Second Normal Form, Third Normal Form and Boyce Codd Normal Form

**UNIT-III**

**Advantages of RDBMS**- Codd's Rules.

**SQL-The Relational Database Standard**

Data Definition, SQL Data Types and Schemas, Constraints, Basic Queries in SQL, Insert, Delete, and Update Statements in SQL, Set Operations, Aggregate functions, Views (Virtual Tables) in SQL, Joins – Inner, Outer and Self, Additional Features of SQL,DCL-commit, Rollback, Save-point, Grant privileges.

**Unit-IV**

Storage Strategies – Indices, B-Trees, Hashing.

Transaction Processing, Transaction and System Concepts, Properties of Transactions

Locking Techniques for Concurrency Control, Time-stamp based schedules, Database Recovery Techniques

Introduction – Object-Oriented and Object Relational Databases, Logical Database, Web Databases, Distributed Databases, Data Warehouse and Data Mining.

**TEXT BOOKS:**

1. Fundamentals of Database Systems by Navathe and Elmasri –Pearson Education, Fifth Edition.
2. Database Systems Concepts, 3rd edition by Abraham Silberschatz, Henry Korth and S. Sudarshan McGraw Hill International Editions.

**REFERENCE BOOKS:**

1. Introduction to Database systems by CJ Date, Published by Addison-Wesley.
2. Principles of database systems by Ullman, Computer Science press, 1984.
3. Introduction to database systems by Bipin C.Desai, Galgotia.

**BSc**

**Elective: Numerical and Statistical Analysis (LTP::4:0:2) 6 Credits**

**UNIT-1**

**Computer Arithmetic**: Floating point representation of numbers, arithmetic operations with Normalization, consequences of normalized floating point representation of numbers, Errors in numbers.

**Finding the roots of an equation**: Iterative method: Introduction, Beginning an iterative method, Bisection method, Newton Raphson method, Regula Falsi method, Secant Method. Comparison of Iterative methods, Order of Convergence of Newton Raphson Method and Secant Method.

**UNIT-2**

**Solving simultaneous linear equations:** Introduction, Gauss Elimination method, pivoting, illconditioned equations, Gauss Jordon method, LU Decomposition method and Gauss-Seidel iterative method. Comparison of direct and iterative methods.

**Interpolation:** Introduction, Lagrange interpolation, Difference Tables- Newton-Gregory Forward and Backward interpolation, Truncation error in interpolation.

**UNIT-3**

**Ordinary differential equations**: Euler‘s method, Taylor series method, Range Kutta II and IV order methods. **Numerical Integration:** Simpson‘s 1/3 and 3/8 rule, Trapezoidal rule.

**Statistical methods:** Introduction, definitions, classifications, frequency distribution, mean - arithmetic mean for grouped and ungrouped data, continuous frequency distribution (step deviation method), Geometric mean for grouped and ungrouped data.

**UNIT-4**

**Standard deviation** - meaning standard deviation for actual mean method, assumed mean method and step deviation method using discrete series and continuous series. Coefficient of variation – meaning and problems **Median** – meaning, calculations of median for ungrouped, discrete series, continuous series. **Mode** - meaning calculations of mode for discrete series and continuous series. **Correlation** – meaning, types, rank correlations and problems.

Note: Algorithmic approach for all statistical methods.

**Text Books:**


1. Computer Oriented Numerical Methods by Rajaraman. V.
2. Fundamentals of Mathematical Statistics by Gupta and Kapoor (Sultan Chand).
3. Probability and Statistics for engineers and scientists by Ronald E. Walpole and Raymond H Mayers.
4. Mathematical Statistics by John Freund (Prentice Hall India Pvt. Ltd.)
5. Numerical Methods by Jain M.K., S.R.K. Iyengar and R.K. Jain
6. Numerical methods by K Krishnamurthy and Sen

**BSc**

**Elective: Computer Graphics and animation (LTP::4:0:2) 6 Credits**

**UNIT-1**

Introduction – applications of computer graphics, operations of computer graphics, graphics software packages. Graphical input – output devices- graphical input devices, graphical output devices, raster scan video principles- raster scan monitors, color raster scan systems, plasma panel display, LCD panels, hard copy raster devices. Random scan devices- monitor tube displays, plotters. Scan conversion – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham‘s algorithm for drawing line and circle. Midpoint methods for drawing line and circle, problems of scan conversion.

**UNIT-2**

Scan conversion for solids- solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm. 2D geometrical transformations – basic transformations- translation, rotation, scaling, homogeneous co-ordinate system – transformations in homogeneous notation, inverse of basic transformations, scaling about a reference point, rotation about an arbitrary point. Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combined transformations. 3D geometrical transformations- basic 3D transformation- 3D translation, 3D scaling. 3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing.

**UNIT-3**

Projection – introduction, parallel projection- orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera. 2D viewing and clipping- windows and viewports, viewing transformation, clipping of lines in 2D- Cohen - Sutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – Hogman polygon clipping. Curve design – classical techniques for designing curves and object surfaces, modern curve representations.

**UNIT – 4**

Multimedia : Definition, CD-ROM and the multimedia highway, Uses of Multimedia, Introduction to making multimedia – The stages of Project, the hardware & software requirements to make good multimedia, Multimedia skills . Multimedia building blocks: SOUND: MIDI, Digital audio, audio file formats. Images: still images, color and file formats. ANIMATION: principles of animation, making animation. VIDEO: using video, how video works, and video standards.

**Text Books:**

1. Computer Graphics, Multimedia and Animation by Malay K Pakhira
2. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
3. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum‘s Outlines, McGraw Hill
4. . Tay Vaughan “Multimedia – making it work”, TMH publication.

**BSc**

**Elective: Data Communication and Computer Networks (LTP::4:2:0) 4 Credits**

**Unit I:**

Introduction to computer network- Topology; Base Band & Broad Band Topology; Guided & Unguided Media. Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM); Multiplexing (TDM, FDM, STDM).

**Unit II:**

Digital To Analog – ASK, PSK, FSK, QPSK. Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control, Error Detection methods.

Goals of Layered protocols- Introduction to OSI, TCP/IP

**Unit III:**

HDLC- frame format, station, states, configuration, access control. LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5)

Switching Technologies – Circuit, Message, and Packet. X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities.

**Unit IV:**

ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices. Bridging and Routing. Congestion Control – Leaky Bucket & Token Bucket Algorithms. Introduction to data security (private key, public key)

**Text Books:**


1. Fourauzan B., “Data Communications and Networking”, 3rd edition, TataMcGraw-HillPublications, 2004, ISBN 0 – 07 – 058408 – 7
2. Tanenbaum A., “Computer Networks”, 4th Edition, PHI, ISBN 81 – 203 –2175 – 8


**Reference Books:**


1. Keshav S., “An Engineering Approach to Computer Networking”, PearsonEducation, ISBN 981 – 235 – 986 – 9
2. Comer D., “Computer Networks and Internet”, 2ND Edition, PearsonEducation, ISBN 81– 7808 – 086 – 9
3. S.K.Basandra & S. Jaiswal, “Local Area Networks”, Galgotia Publications
4. William Stallings, “Data and Computer Communication”

**BSc**

**Elective: Web Programming (L:T:P::3:1:2) 6 Credits**

**Unit - I**

Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML.

**Unit - II**

Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.

**Unit - III**

Java Script and HTML Documents, Dynamic Documents with JavaScript, The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements.

**Unit - IV**

CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The  and  tags, Conflict resolution. XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

**Text Books :**


1. Robert W Sebesta, “Programming the World Wide Web”, 4th Edition, Pearson Education, 2008.


**Reference Books :**


1. M.Deitel, P.J.Deitel, A.B.Goldberg, “Internet & World Wide Web How to program”, 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, “Web Programming Building Internet Applications”, 3rd Edition, Wiley India, 2006.
3. Xue Bai et al, “The Web Warrior Guide to Web Programming”, Thomson, 2003.
4. Sklar, “The Web Warrior Guide to Web Design Technologies”, 1st Edition, Cengage Learning India.

**BSc**

**SEC-1: DTP (Page Maker and CorelDraw) (LTP::1:0:1) 2 Credits**

**PageMaker:**

Page layout basics, understanding tools & workspace
Creating: labels, pamphlets, bill books, viz. cards, greetings cards, kankotri, advertisements, etc.
Books & booklets, column style documents.

**CorelDRAW:**

Understanding Tools & Workspace, Drawing Shapes & Graphics, Logos & Artistic Text
Multicolor Designs: Viz. Cards & Greetings Cards, Book Covers, Brochures, Advertisements, Banner, Web Graphics.

**Text Books:**


1. Learning PageMaker 7:Ramesh Bangia,Khanna Publishing
2. Training Guide Pagemaker 7:Satish Jain ,Bpb Publications
3. CorelDraw 9 for Windows:Phyllis Davis ,Peachpit Press
4. Mastering CorelDraw 9:Vishwaprakash Dikshit Batuk,Bpb Publications

**BSc**

**SEC-2: Cyber Security (LTP::1:0:1) 2 Credits**

Basics of internet, www, http, html, DNS, IP Address, electronic mail, web browsers, search engines, Social Media: Twitter, Facebook, YouTube, WhatsApp, LinkedIn, advantages, disadvantages, privacy issues. E-commerce, advantages of e-commerce, survey on popular e-commerce sites. Introduction to e-governance, stages of e-governance, advantages, challenges, International Status, Indian status. IT Act, 2000 salient features, digital signature, electronic signature, Cyber Appellate Tribunal, Adjudicator, offences, and penalties.

**Reference:**

1. Information Technology Amended Act, 2008

**BSc**

**SEC-3: Accounting Software (Tally) (LTP::1:0:1) 2 Credits**

Introduction, Types of Accounts, Accounting Principles or concepts, Mode of Accounting, Rules of Accounting , Double entry system of book keeping. Introduction of Tally.ERP 9, History of tally, Versions of tally, Company Features, Configuration, Getting functions with Tally.ERP9, Creation / setting up of Company in Tally.ERP9. Stock Groups, Multiple Stock Groups, Stock Categories, Multiple Stock Categories, Units of Measure, Godowns, Stock Items

**BSc**

**SEC-4: Android Programming (LTP::1:0:1) 2 Credits**

Mobile technology: Overview of Android - An Open Platform for Mobile development, Open Handset Alliance, Use Android for mobile app development, Android Marketplaces, Android Development Environment setup, Android development Framework - Android-SDK, Eclipse Emulators / Android AVD, Creating & setting up custom Android emulator, Android Project Framework and its applications, Linux Kernel, Libraries, Android Runtime, Application Framework, Applications, Android Startup and Zygote, Android Debug bridge, Android Permission model, Android Manifest File, Android application components Intent**,** Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest, Create Application and new Activities, Expressions and Flow control, Android Manifest, Simple UI -Layouts and Layout properties, XML Introduction to GUI objects, Event driven Programming in Android (Text Edit, Button clicked etc.), Creating a splash screen, Android Activity Lifecycle, Introduction to threads in Android, Menu: Custom Vs. System Menus, Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Android Manifest.xml File, SQLite: Open Helper and create database, Open and close a database.

**Text Book:**


1. Android - A Programmer's Guide, Jerome (J.F.) DiMarzio, McGraw Hill Education.
2. Professional Android 2 Application Development, Reto Meier, Wiley India Pvt Ltd.


**Reference Books:**


1. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd
2. Professional Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd
3. Android Studio Development Essentials by Neil Smyth

**BSc**
**Elective: .NET Programming (LTP::3:1:2) 6 Credits**

**UNIT-I**
**Introduction**: Overview of OOP, Introduction to C # - Characteristics, application, Difference between c and c#, The .NET strategy, the origins of the .NET technology, the .NET framework, benefits of the .NET approach, C# and .NET, c# program structure, command line argument, math function, Literals, variables and data , constant variables, scope of variables, boxing and unboxing, Operators in C#, expression, Decision making and looping statements in c# Methods in C# : declaring methods, nesting of methods, methods parameters, the output parameters, variable arguments list, method overloading, Arrays - variable size arrays, the system, array class, array list class, String handling

**UNIT-II**
**Inheritance and polymorphism**: classical inheritance, containment inheritance, defining a subclass, visibility control, defining subclass constructors, multilevel inheritance, hierarchical inheritance, overriding methods, hiding methods, abstract classes, abstract methods, sealed classes, Preventing inheritance, sealed methods, polymorphism. **Interfaces**: Multiple Inheritance: defining an interface, extending an interface, implementing interface, interface & inheritance, explicit interface implementation, abstract class and interface. **Operator overloading**: over loadable operators, need for operator overloading, defining Operator overloading, overloading unary operators, overloading binary operators, overloading Comparison operators.

**UNIT-III**
**Delegates and Events**: Delegate, delegate declaration, delegate methods, delegates instantiation, delegate invocation, using delegates, multicast delegates, events. Managing Console I/O operations: console class, console input, console output, formatted output, numeric formatting, standard numeric format, custom numeric format. **Managing Errors and Exceptions** : Types of errors, exceptions, syntax of exception handling code, multiple catch statement, the exception hierarchy, general catch handler, using final statement, nested try blocks, throwing our own exceptions, checked and unchecked operators, using exceptions for debugging.

**UNIT-IV**
**Introducing windows forms**: A tale of three GUI namespaces, overview of the system. windows. Forms Namespaces, Anatomy of a Form, Component class, control class, control. Programming with windows forms controls: Working with button types, check boxes, Radio buttons, Group boxes, list boxes, calendar control, assigning tooltips for controls. **Data access with ADO.NET**: The need for ADO.NET, two faces of ADO.NET, role of ADO.NET data providers, Building a simple test database, selecting a data provider, working with connected layer of ADO.NET & OleDb Data reader, inserting, updating and deleting records using OleDb command.

**Text Books :**
1. Profession c# - By Karli Watson, Simon Robinson, Christian Nagel, Wiley India Pvt Ltd.
2. C# Unleashed – By Joseph Mayo, Techmedia, First Edition
3. Programming C# - By Jesse Liberty, Shroff Publishers, 4TH Edition
4. Programming In C# - By Barbara Doyle, Cengage \ Delmar Learning India Pvt.

**BSc**

**Elective: Software Engineering (LTP::4:2:0) 6 Credits**

**UNIT I :**

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

**UNIT II :**

Role of Management in Software Development, Role of Metrics and Measurement, Problem Analysis, Requirement Specification,Validation, Metrics, Monitoring and Control.software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modelling – data, functional and behavioural models – structured analysis and data dictionary.

**UNIT III:**

System Design, Problem Partitioning, Abstraction, Top-down and bottom-updesign, Structured Approach, Functional v/s Object-Oriented Approach, Design specification & verification, metrics.

Coding: Top-down & Bottom-up, Structured Programming, Information Hiding,Programming Style, Internal Documentation, Verification, Metrics, monitoring &control

**UNIT IV:**

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions- Functional Testing, – structural Testing, Levels of Testing-Structural Testing, Test Plan, TestCases Specification, Reliability assessment . Testing – integration testing – validation testing – system testing and debugging.

Software Project Management, Cost Estimation, Project Scheduling, Staffing. Software Configuration Management, Quality Assurance.

Measures and measurements – S/W complexity measure – size measure – data and logic structure measure – information flow measure. Software cost estimation COCOMO model-Delphi method.- software maintenance

**Text Books:**


1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

**BSc**
**Elective: SYSTEM SOFTWARES & OPERATING SYSTEMS (L:T:P::4:0:2) 6 Credits**

**Unit 1:**

Introduction, System software and machine architecture, Simplified Instructional Computers (SIC) and its architecture, Instruction Formats of IBM-360, Assembler ,Introduction, General design procedure, design of Assembler, statement of problem, data Structure, Format of Databases, Algorithm for pass 1 and pass 2, look for modularity. Explanation along with flowcharts for both pass 1 and pass 2 (detail flowchart).Table Processing:Searching & Sorting - Linear and binary search , comparison, examples. Interchange sort, shell sort, bucket sort, radix exchange sort, address calculation sort, Random entry searching.

**Unit 2:**

Introduction, Macro instructions, Features of macro facility-macro instruction arguments, Conditional macro Expansion, Macro calls within macro, Macro instruction defining macro implementation: statement of problem, Specification of databases and specification of database format, Algorithm and flowchart for processing macro definitions and macro expansion Introduction, Loader schemes-compile and go loader scheme, general loader, Absolute loader, Relocating loader, Direct linking loader, overlays, Dynamic loading.

**Unit 3:**

Definition of Operating System, Need, Early systems, Simple monitors, Batch Systems, Multiprogramming, Time Sharing, Real time, Parallel and Distributed systems. Special Purpose Systems: Real Time Embedded Systems, Multimedia Systems, Handheld Systems. Computing Environments – Traditional, Client Server, Peer-to-Peer and Web based. Open Source Operating Systems. Process Management: Process concept – meaning of process, sequential and concurrent processes, process state,process control block, threads, Process scheduling – scheduling queues, schedulers, contextswitch. Operations on Processes: creation and termination.

**Unit 4:**

Processor -CPU I/O burst cycle, CPU Scheduler, Preemptive scheduling, dispatcher. Scheduling criteria, Scheduling algorithms: First-Come-First-Served (FCFS), Shortest Job First (SJF), Priority Scheduling, Round Robin. Multi-level queue scheduling (Concepts only), multi-level feedback queue scheduling (Concepts only). Multiple processor scheduling, Real time scheduling. Deadlocks: Definition with example, System model, Dead lock characterization – Necessary Conditions Resource Allocation Graph, Dead lock prevention, Avoidance and detection, Recovery from dead lock.

**Text Books:**


1. System programming – John. J. Donovan.
2. System Software – Leland L. Beck, Third edition, Addison Wesley 1997.
3. Operating System Concepts, Abraham Silberschatz and Peter Baer Galvin, Fifth edition, Addison - wesley 1989.
4. Operating Systems, Stallings, Pearson Edition.