UNIVERSITY ⚜ OF MYSORE
Established: 1916

Vishwavidyanilaya Karyasoudha,
Crawford Hall, Mysore-570 005.

No.AC.2(S)/785/2019-20

Dated: 12.07.2019.

NOTIFICATION

Sub: Revision of syllabus of B.Sc. (IT) from the Academic Year 2019-20.

Ref: 1. Decision of Board of Studies in Computer Science (UG) meetings
    held on 15.12.2018 & 23.02.2019.
  2. Decision of the Faculty of Science & Technology Meeting held
    on 01.04.2019.
  3. Decision of the Academic Council meeting held on 07.06.2019.

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The Board of Studies in Computer Science (UG) which met on 15.12.2018 & 23.02.2019 has recommended to revise the existing syllabus of B.Sc.(IT) for Distance Education as per CBCS pattern from the Academic Year 2019-20.

The Faculty of Science and Technology and Academic Council meeting held on 01.04.2019 and 07.06.2019 respectively have approved the above said proposal and the same is hereby notified.

The modified syllabus of B.Sc.(IT) course is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Draft approved by the Registrar

Deputy Registrar (Academic),

To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DOS in Zoology, 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 Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
7. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
8. Office file.

Subject: Computer Science   **Degree: BSc (IT) Programme**

Eligibility Criteria: Candidates who have successfully passed Class XII (2nd PUC) examination conducted by Pre-University Board or equivalent with Mathematics / Statistics / Accountancy as one of the optional subjects. Also, candidates who have successfully passed 3 years Polytechnic / Diploma examination or equivalent.

CBSC 2019-20 onwards

Semester	Course Type	Course	L	T	P	Total Credits
I	DSC-1	Concepts of C Programming	4	0	2	6
	DSC-2	Computer Fundamentals and Digital Electronics	4	0	2	6
	DSC-3	Discrete Mathematical Structures	4	2	0	6
II	DSC-4	Advanced Concepts in C Programming	4	0	2	6
	DSC-5	Fundamentals of Data Structures	4	0	2	6
	DSC-6	Matrix Algebra	4	0	2	6
III	DSC-7	Object Oriented Programming with C++	4	0	2	6
	DSC-8	System Software	4	0	2	6
	DSC-9	Data Communication and Computer Networks	4	2	0	6
IV	DSC-10	Object Oriented Programming Using Java	3	1	2	6
	DSC-11	Operating Systems	4	0	2	6
	DSC-12	Database Management Systems	4	0	2	6
V	DSE-1	Elective				6
	DSE-2	Elective				6
	DSE-3	Elective				6
	SEC-1	Elective				2
	SEC-2	Elective				2
VI	DSE-4	Elective				6
	DSE-5	Elective				6
	DSE-6	Project Work	0	0	6	6
	SEC-3	Elective				2
	SEC-4	Elective				2

Course	L	T	P	Total Credits
List of Elective courses for DSE-1 / DSE-2 / DSE-3 / DSE-4 / DSE-5				
Graphics and animation	4	0	2	6
.NET Programming	3	1	2	6
Software Engineering	4	2	0	6
Numerical and Statistical Analysis	4	0	2	6
Web Technology	4	1	1	6
Operation research	4	2	0	6
Accounting	4	0	2	6
List of Elective courses for SEC-1 / SEC-2 / SEC-3 / SEC-4				
DTP (PageMaker and CorelDraw)	1	0	1	2
Cyber Security	1	0	1	2
Introduction to Latex	1	0	1	2
Android Programming	1	0	1	2

BSc IT First Semester
DSC-1: Concepts of C Programming (LTP::4:0:2)   **6 Credits**
UNIT I:

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.

UNIT II:

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

Control structures: Decision making and branching, Simple if, if-else, nested if, else-if ladder, switch, nested switch.
Looping: while, do-while and for loop. Jump statements, nested loops.

UNIT IV

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.

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.

Texts Books:

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

BSc (IT)
DSC-2:   Computer Fundamentals and Digital Electronics (LTP::4:0:2)   6 Credits
Unit-I
Computer, History of Computer, General Architecture of a Computer, Generations, I/O devices, Memory devices, Instructions, 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,

Unit-II

Number Systems – Introduction- Decimal, Binary, Octal and Hexadecimal. Inter-Conversions, Addition, Subtraction, Multiplication and Division in Binary Number System. 1's and 2's Complement method in Binary Number System. Subtraction using 1's and 2's Compliment, Weighted Number System, Binary Coded Decimal (BCD), Addition of BCD Numbers.

Unit-III

Boolean Algebra: Basic laws, De-Morgan's theorem, Duality theorem, Sum Of Product method and Products Of Sum method. Karnaugh map (Up to 4 Variables, Don't Care Condition). Fundamentals of Gates: Basic gates, Derived gates and Universal gates (Design).

Unit-IV

Combinational and Sequential logic circuits - Half adder, Full adder, Half -subtractor and Full-subtractor. Flip-Flops - SR, D, JK, JK Master Slave, T Flip-flops, Introduction to encoders, decoders and multiplexer, Introduction to counters and Registers.

Text Books:
1. Digital fundamentals-Thomas.D.Floyd. Malvino Leach, digital principles and application (4th edition)
2. Computer System Architecture (3rd edition) Morris Mano PHI.
3. Computer Organization – by V.Carl Hamacher, Z.G.Vranesic, and S.G.Zaky, 3rd Edition. McGraw Hill,
4. Computer Organization & Design, (3rd Edition) by – D.A.Patterson& J.L.Hennessy – Morgan Kaufmann Publishers (Elseviers)

BSc (IT)
DSC-3 Discrete Mathematical Structures (LTP:4:2:0)   **6 Credits**
UNIT – I
Set Theory: Sets and Subsets, Set Operations and the Laws of Set Theory, Counting and Venn Diagrams, Cartesian Products and Relations, Functions–One-to-One, Onto Functions, Function Composition and Inverse Functions; Properties of Relations,
UNIT – II
Fundamentals of Logic: Proposition, Logical Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference.
UNIT – III
Mathematical Induction and Recursion: Sequences and summations, Mathematical Induction, The Well Ordering Principle, Recursive Definitions, Structural Induction, Pigeonhole Principle, Permutation and Combinations.
UNIT – IV
 Graphs: Introduction, Representing Graphs, Connectivity, Euler and Hamilton Paths, Shortest path problems, Trees: Introduction, Applications of Trees, Spanning Trees, Minimum Spanning Trees.

Text Books:
1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", 5 th Edition, Pearson Education, 2004.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 6 th Edition, McGraw Hill, 2007.

3. Jayant Ganguly, "A Treatise on Discrete Mathematical Structures", SanguinePearson, 2010.
4. D.S. Malik and M.K. Sen, "Discrete Mathematical Structures: Theory and Applications", Thomson, 2004.
5. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier, 2005, Reprint 2008.

BSc (IT) Second Semester
DSC-4: Advanced Concepts in C Programming (LTP::4:0:2)   **6 Credits**

UNIT I:

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.
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.

UNIT II

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

UNIT III

File Handling: Definition, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations, random files. C processes and directives, Macros and Compilation directives.

UNIT IV
Bit level operators and their applications. Graphics in C, initializing graphic mode, displaying text, drawing different shapes and simple linear transformations.

Texts Books:

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

BSc (IT)

DSC-5: Fundamentals of Data Structures   **(LTP::4:0:2)**   **6 Credits**

Unit-1

Basic data structure : Primitive data structure: Integer, Real, Character, String, Pointer and their representations and Operations. Fixed point and floating point representation of real numbers. Introduction to Non primitive data structures. Arrays – one, two and multi-dimensionalarray representation.

Unit-2

Stack – Operations, Applications – Recursion, infix to postfix conversion, evaluation of postfix expression, algorithm designs.

Queues – Operations, Applications, circular queue-Operations, Dequeue, priority queue – uses of priority queues, algorithm designs.

Problems associated with stack and queues.

Unit 3

Linked list – Concept of Dynamic memory allocation, Singly linked list – Operations, Circular linked list – Operations, Applications of linked list, doubly linked list – memory representation.

Unit-4

Tree – Terminologies, tree properties, binary tree-properties, memory representation – Array and Linked list representation, Binary search tree. Tree traversal techniques, algorithm designs.

Books Recommended

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 IT

DSC-6: **Matrix Algebra** **(LTP::4:0:2)** **6 Credits**

Unit-1

Matrices and Gaussian Elimination: Introduction, Geometry of Linear Equations, Example of Gaussian Elimination, Matrix notation and Matrix Multiplication, Triangular Factors and Row Exchanges, Inverses and Transposes, Special matrices and applications.

Unit-2

Vector Spaces: Vector spaces and Subspaces, Solving problems, linear independence, basis and dimension, the four fundamental subspaces, Graphs and Networks, Linear Transformations.

Unit 3

Orthogonality: Orthogonal Vectors and Subspaces, Cosines and Projections onto Lines, projections and least squares, orthogonal bases and Gram-Schmidt, The Fast Fourier Transform.

Unit-4

Determinants: Introduction, Properties of the determinant, formulas for the determinant and applications.

Eigenvalues and Eigenvectors: Introduction, Diagonalization of a matrix, difference equations and powers, Differential equations, complex matrices, similarity transformations.

Books Recommended

1. Linear algebra and its applications, fourth edition, Gilbert Strang.
2. Linear algebra and its applications, Third edition, David C. Lay.

BSc (IT) Third Sem
DSC - 7: Object Oriented Programming with C++   (LTP::4:0:2)   6 Credits

UNIT-1

Object Oriented Programming (OOP): An Overview, C++ Language: An Overview, C++ Language: Preliminaries, Keywords and Identifiers, Constants, variables and Data Types, Operators and Expressions.
Control Structures: Simple-if, if-else, nested if-else, else-if, switch, nested switch, goto statements. Looping Structures: while, do-while, for, jumps in loop.

UNIT-2

Functions: Introduction, Advantages, classification, Types of functions, Recursion, Inline Functions, Function overloading, Scope resolution Operator, Reference Variables. Arrays and Strings. Structures and Unions, Pointers.

Classes and Objects: Introduction, Definitions, Access Specifiers, passing objects as arguments, Returning an object from a function, Arrays of objects, Static data and function members, Friend functions, Friend class, const member functions, static and const objects, this pointer, local classes, local object versus global object.

UNIT-3

Constructor and Destructors, Types of constructors. Operator Overloading and Type Conversions, Inheritance: Types, virtual functions, abstract class, Accessibility of Base Class Members in Derived Classes, Containership and Delegation, Exception Handling.

UNIT-4

File Handling, I/O Streams, Templates: class and function temples, overloading temple functions, class templates and Inheritance. Standard Template Library: Components of Standard Template Library.

Text Books:

1. Object-Oriented Programming with C++, M T Somashekara, D S Guru, K S Manjunath.

2. C++: *The Complete Reference*, Herbert Schildt.
3. Object Oriented Programming with C++, E *Balagurusamy.*

BSc (IT)
DSC-8 SYSTEM SOFTWARE   **(L:T:P::4:0:2) 6 Credits**
Unit 1: Overview
Introduction, System software and machine architecture, Simplified Instructional Computers (SIC) and its architecture, Instruction Formats of IBM-360. Language processing system, illustrative examples.

Unit 2: **Assembler**
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).

Unit 3: Macro Language and macro processor and Loaders
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.

Unit 4:
 Loader schemes-compile and go loader scheme, general loader, Absolute loader, Relocating loader, Direct linking loader, overlays, Dynamic loading. Introduction to compiler, different phases in compilation, Lexical Phase, Syntax Phase, Intermediate code generation, code optimization and target code generation.

Text Books:
 1. System programming – John. J. Donovan.
 2. System Software – Leland L. Beck, Third edition, Addison Wesley 1997.

BSc (IT)
DSC-9: Data Communication and Computer Networks (LTP::4:2:0)   **6 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 (IT)

DSC-10: Object Oriented Programming Using Java (LTP::3:1:2)   6 Credits

Unit - I : Fundamentals of object-oriented programming, JAVA Evolution, Overview of JAVA Language. Constants, Variables, Data Types. Operators and Expressions, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching, Decision Making and Looping, Jumps in Loops, Labelled Loops.

Unit -II : Classes, Objects and Methods, 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, Wrapper Classes.
Interfaces, Multiple Inheritance, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

Unit – III: Packages: Putting Classes together, 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, 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 Exception, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

Unit – IV: Applet Programming, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, Graphics Programming, 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, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, 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.

Text Books:
1. E. 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 (IT)
DSC-11: OPERATING SYSTEMS (L:T:P::4:0:2)   6 Credits
Unit 1:   Introduction
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, context switch. Operations on Processes: creation and termination.

Unit 2:Processor Management
Processor -CPU I/O burst cycle, CPU Scheduler, Pre-emptive 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.

Unit 3: Deadlock and I/O scheduling
Deadlocks: Definition with example, System model, Dead lock characterization – Necessary Conditions Resource Allocation Graph, methods for handling deadlocks, Dead lock prevention, Avoidance and detection, Recovery from deadlock.

Unit 4: Memory Management
Main Memory: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table, Example.
Virtual Memory: Demand Paging, copy-on-write, page replacement, allocation of frames, thrashing, memory mapped files, allocating kernel memory.

Text Books:
1. Operating System Concepts, Abraham Silberschatz and Peter Baer Galvin, Fifth edition, Addison - Wesley 1989.
2. Operating Systems, Stallings, Pearson Edition.

BSc IT
DSC-12:   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 Modelling 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: 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.

Unit III: Normalization- Functional Dependencies, Transitive and Multivalued dependency, Axiomatization of functional dependencies, First Normal form, Second Normal Form, Third Normal Form and Boyce Codd Normal Form.

Storage structures, trees, balanced trees.

UNIT-IV: 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.

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 (IT)
Graphics and animation   (LTP::4:0:2)   6 Credits

UNIT-1
Introduction – applications of computer graphics, operations, graphics software packages. Graphical input – 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 (IT)

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

UNIT-I
Introduction: Overview of OOP, The .NET strategy, the origins of the .NET technology, the .NET framework. C# and .NET, Introduction to C #, 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 and String handling.

UNIT-II
Inheritance: Types of Inheritance, classical inheritance, containment inheritance, visibility control, constructors, overriding methods, hiding methods, abstract classes, abstract methods, sealed classes, Preventing inheritance, sealed methods **and polymorphism**
Interfaces, Multiple Inheritance, abstract class
Operator overloading: over loadable operators, defining Operator overloading, overloading unary operators, overloading binary operators.

UNIT-III
Delegates: delegate declaration, delegate methods, delegates instantiation, delegate invocation, using delegates, multicast delegates and **Events**.
Managing Console I/O operations, **Managing Errors and Exceptions** : Types of errors, exceptions, syntax, multiple catch statement, the exception hierarchy, using final statement, nested try blocks, throwing our own exceptions, checked and unchecked operators.

UNIT-IV
Introducing windows forms: A tale of three GUI namespaces, overview windows forms, Anatomy of a Form, Programming with windows forms controls: Working with button types, check boxes, Radio buttons, Group boxes, list boxes.

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 (IT)
Software Engineering   (LTP::4:2:0)   6 Credits
UNIT I: SOFTWARE PROCESS: 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: SOFTWARE REQUIREMENTS: 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: DESIGN CONCEPTS AND CODING: System Design, Problem Partitioning, Abstraction, Top-down and bottom-up design, 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: TESTING AND PROJECT MANAGEMENT: 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.
4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996

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, ill conditioned equations, Gauss Jordon method, LU Decomposition method and Gauss-Seidel iterative method. Comparison of direct and iterative methods.

UNIT-3

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

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.

UNIT-4

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.

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.

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 (IT)
      Web Technology   (LTP::4:1:1)   **6 Credits**
UNIT I: INTRODUCTION
Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from
Internet – HTM and Scripting Languages – Standard Generalized Mark –up languages – Next
Generation – Internet –Protocols and Applications.
UNIT II: COMMON GATEWAY INTERFACE PROGRAMMING

HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client-Side applets – CGI server applets – authorization and security.

UNIT III : SCRIPTING LANGUAGES

Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client-side script - VB Script programming – Forms – Scripting object.

UNIT IV: SERVER-SIDE PROGRAMMING

XML – Server side includes – communication – DTD – Vocabularies – DOM methods – Firewalls-Proxy Servers.

SERVLETS AND JSP

JSP Technology Introduction-JSP and Servelets- Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files- Support for the Model-View- Controller Paradigm- Case Study- Related Technologies.

TEXT BOOKS

1. Deitel H.M. and Deitel P.J., "*Internet and World Wide Web How to program*", Pearson International, 2012, 4th Edition. (Ch-1,4,5,6,12,14,26,27)
   Gopalan N.P. and Akilandeswari J., "*Web Technology*", Prentice Hall of India, 2011.(Ch- 1 to 11)
2. Paul Dietel and Harvey Deitel," Java *How to Program*", Prentice Hall of India, 8th Edition. (Ch-29)

REFERENCES

1. Mahesh P. Matha, "*Core Java A Comprehensive study*", Prentice Hall of India, 2011.
2. Uttam K.Roy, "*Web Technologies*", Oxford University Press, 2011.

BSc (IT)
 Operation Research   **(LTP::4:2:0)**   **6 Credits**

UNIT-I:

Definition of the term Operation Research – Nature, Management Application, Modeling, Principles of modeling, features, Different Phases, scope, Advantages and Limitations of O.R. General method for solving O.R models and Role of O.R in decision making. Solutions to LPP, Basic feasible solution, Optimum basic feasible solution, unbounded solution. Assumptions in LPP, Limitations of LPP, Applications of LPP and advantages of LPP.

UNIT-II

Standard Linear Programming – Formulation, Solving L.P.P. by Graphical Method. And Simplex Method. Artificial Variable Technique – two phase method and Big M method, Duality – Meaning, definitions of primal problem, General rules for converting any primal problem into its dual. Characteristics of Dual problem, Advantages of Duality, Dual formulation procedure and Problems to obtain the dual of LPP. Fundamental Duality theorems, Primal and Dual correspondence.

Unit - III

Transportation Problems – Method of finding initial basic feasible solution to Transportation problem-North West Corner, Least Cost Method and Vogel's Method. Method of finding initial basic feasible solution to Assignment Problem using Hungarian Method. Sequencing Problems – Definitions, terminology and notations, Principle assumptions, processing n-jobs through two machines. Travelling Salesman (Routing) Problems - Formulations of TSP as an assignment problem

UNIT - IV

Game Theory: Basic definitions, minmax - maxmin principle and optimal strategy solution of games with saddle point, dominance rule for solving a two-person Game, graphical method for solving two person game. Network analysis: Network and basic components, Rules for network construction, basic steps in PERT/CPM techniques and applications. Time estimates and critical path in network analysis.

Text Books:
1. S. D. Sharma – Operations research
2. Hamdy A. Taha, Operation Research – An introduction, 5th edition, PHI.,
3. Kanti Swarup, P. K. Gupta & Manmohan – Operation Research, 1996.
4. S. Kalavathy: Operations Research, Second Edition – Vikas Publications
5. J K Sharma - Operations Research

BSc (IT)
Accounting   **(LTP::4:0:2)**   **6 Credits**
UNIT-I

Principles, concepts and conventions, double entry system of accounting, ledger keeping. Subsidiary books with special reference to simple cash book and three column cash book. Trial balance and final accounts of sole trader: Preparation trial balance, adjusting entries, including revenue for bad debts, revenue for discount on debtors and creditors, preparation of final accounts. Final accounts of joint stock companies.

UNIT-II

Meaning and scope of financial management, functions of the financial manager. Ratio analysis: Meaning of ratio, advantages, limitations, types of ratios and their usefulness, liquidity and ratios, profitability rations, efficiency ratios, solvency ratios, problems including preparation of balance sheet.

UNIT-III

Funds flow statement: Meaning and concepts of funds, preparation of fund flow statement. Unit costing: Preparation of cost sheet and tender price statement. Marginal costing: Concepts, Marginal cost equations, P/V ratio, B.E.P., Margin of safety, Sales to earn a desired profit, Problems on the above.

UNIT-IV

Budgetary Control: Meaning and definition, preparation of flexible budget and cash budget. Standard costing: Meaning of standard cost and standard costing, analysis of variances – material and labour variances only.

Text Books:
1. Accountancy Vol. 1 by B.S. Raman.
2. Accountancy Vol. 2 by B.S. Raman.
3. Management Accounting by R.K. Sharma and Gupta.

4. Financial Management by I.M. Pandey.

B.Sc. IT
DTP (Pagemaker 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: PhyllisDavis ,Peachpit Press
4. Mastering CorelDraw 9:Vishwaprakash Dikshit Batuk,Bpb Publications

B.Sc. IT
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 IT
Introduction to LATEX   (LTP:: 1:0:1)   2 Credits
Installation of the software LaTeX, Understanding Latex compilation, Basic Syntax, Writing equations, Matrix, Tables, Page Layout – Titles, Abstract Chapters, Sections, References, Equation references, citation, List making environments, Table of contents, Generating new commands, Figure handling numbering, List of figures, List of tables, Generating index, Packages: Geometry, Hyperref, mathematical equations, symbols, algorithms, algorithmic graphic, color, tilez listing, Classes: article, book, report, beamer, slides, IEEtran. Applications to: Writing Resume, Writing question paper, Writing articles/ research papers.

BSc IT
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.