

B.SC. (INFORMATION TECHNOLOGY)

BSc (IT)

Session 2014-2015

B.Sc. (Information Technology)

Semester – I:

Paper No.	Subjects	M. Marks
Paper – 1	Fundamentals of Computers	75
Paper – 2	C Programming Part – I	75
Paper – 3	Basic Mathematics & Statistics	75
Paper – 4	Communication Skills in English – I	50
Paper – 5	Punjabi / Basic Punjabi (Mudhli Punjabi) (Compulsory)	50
Paper – 6	Practical – PC Computing & C Language–I	75

B.Sc. (Information Technology) Semester – I

Paper – I: Fundamentals of Computers

Max. Marks: 75

TERM –I (Before September)

1. Introduction to computer:

Computer System Characteristics, Hardware - CPU, Memory, Input, Output & Storage devices, Organization of Secondary Storage Media, Software - System & Application, Types of processing Batch and On-line.

2. Operating System Concepts:

Role of an Operating System, Types of operating systems, Booting procedure and its types, Fundamentals and typical instructions of Windows & Non-Windows based Operating Systems.

TERM –II (From September)

3. MS Word (Word for Windows):

Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size. Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers, book marks, symbols and dates. Using tabs and tables, header, footer and printing. Headers and Footers, Mail merge, macros, tables.

4. MS – PowerPoint:

Introduction to MS Power Point, Power Point Elements, Exploring Power Point Menu, Working with Dialog Boxes, Saving Presentation, Printing Slides, Slide View, Slide Sorter view, notes view, outline view, Formatting and enhancing text formatting.

B.Sc. (Information Technology) Semester – I

Paper – II: C Programming Part – I

Max. Marks: 75

TERM – I (Before September)

Logic Development Tools: Data Representation, Flow Charts, Problem Analysis, Decision Tree, Decision Table, Pseudo Code and Algorithm

Fundamentals: Character Set, Identifiers and Key Words, Data Types, Constants, Variables, Expressions, Statements, Symbolic Constants.

Operators and Expressions: Arithmetic Operators, Unary Operators, Relational and logic Operators, Assignment and Conditional Operators, Library functions.

Data Input and Output: Preliminaries, single character Input, single character output, entering input data, more about scanf function, writing output data more about printf functions, gets and puts functions, interactive programming.

TERM – II (From September)

Control Statements: Preliminaries, While, Do–While and For statements, Nested loops, If–else, Switch, Break – Continue statements.

Functions: Brief overview, defining, accessing function, passing arguments to a function, specifying argument data types, function prototypes, recursion.

Arrays: Defining and processing as array, passing array to a function, multi – dimensional arrays.

B.Sc. (Information Technology) Semester – I

**Paper –VI: (Practical)
PC Computing and C Language-I**

Max. Marks: 75

TERM –I (Before September)

C Language Part I

TERM –II (From September)

PC Computing

B.Sc. (Information Technology)

Semester – II:

Paper No.	Subjects	M. Marks
Paper – 1	Communication Skills in English – II (Th.35+Pr.15)	50
Paper – 2	Punjabi / Basic Punjabi (Mudhli Punjabi) (Compulsory)	50
Paper – 3	Principles of Digital Electronics	75
Paper – 4	C Programming Part – II	75
Paper – 5	Numerical Methods & Statistical Techniques	75
Paper – 6	Practical – C Language – II	75

B.Sc. (Information Technology) Semester – II

Paper–III: Principles of Digital Electronics

M. Marks: 75

TERM –I (Before March)

Number System: Introduction, number conversion system , binary arithmetic, representation of signed binary numbers, 1's and 2's complement, Codes: straight binary code, BCD Code Excess3 Code, Grey Code ASCII, Integer and floating point representation

Logic Gates and Boolean Algebra: Logic gates, Universal Gates, Boolean algebra and Minimization techniques, canonical forms of Boolean expressions, K-Map

Combinational Circuits: Adder, Subtractor, Multiplexer, Demultiplexer, Decoder, Encoder

TERM –II (From March)

Sequential Circuits: Flip-flops, clocks and timers, registers, counter

Semiconductor memories: Introduction, Static and dynamic devices, read only & random access memory chips, PROMS and EPROMS Address selection logic. Read and write control timing diagrams for ICs

B.Sc. (Information Technology) Semester – II

Paper – IV: C Programming Part-II

Max. Marks: 75

TERM –I (Before March)

Strings: String declaration, string functions and string manipulation.

Pointers: Fundamentals, pointer declaration, passing pointers to a functions, pointer and one dimension arrays, operation on pointers, pointers & multi-dimensional arrays, passing functions to other functions, more about declarations.

Storage classes: Automatic, external and static variables.

TERM –II (From March)

Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self referential structure, unions.

Data Files: Opening, closing, creating and processing of data files.

B.Sc. (Information Technology) Semester – II

Paper – V: Numerical Methods and Statistical Techniques

Max. Marks: 75

TERM –I (Before March)

1. Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.
2. Non–linear Equations, iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bi–section, False position method, Newton Raphson – method.
3. Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan Method,
4. Numerical Integration and different Trapezoidal Rule, Simpson’s 3/8 Rule.
5. Interpolation and Curve Fitting, Lagrangian Polynomials, Newton’s Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.

TERM –II (From March)

- 6 Least square fit linear trend, Non–linear trend. $Y = a + bx$
 $Y = ab^x$
 $Y = ae^{bx}$
Polynomial fit: $Y = a + bx + cx^2$

Statistical Techniques:

1. Measure of Central Tendency, Mean Arithmetic, Mean Geometric, Mean Harmonic, Mean, Median, Mode.
2. Measure of Dispersion, Mean Deviation, Standard Deviation, Co–efficient of Variation,

B.Sc. (Information Technology) Semester – II

Paper–VI: C Language–II (Practical)

Max Marks: 75

TERM –I (Before March)

Implementation of Numerical Methods

TERM –II (From March)

Statistical Techniques Using C Language

B.Sc. (Information Technology)

Semester – III:

Paper No.	Subjects	M. Marks
Paper – I	Object Oriented Programming Using C++	75
Paper – II	Data Structure	75
Paper – III	System Analysis & Design	75
Paper – IV	* Environmental Studies – I (Compulsory)	50
Paper – V	Programming Lab – I (C++, Programming Language)	50
Paper – VI	Programming Lab – II (Data Structure)	25

B.Sc. (Information Technology) Semester – III

Paper – I: Object Oriented Programming Using C++

M. Marks: 75

TERM –I (Before September)

C++ Programming Basics Basic Program Construction, Output using cout, Preprocessor Directive, Comments, Integer Variables, Declaration and Definitions, Character Variables, Input using cin, Type float, Manipulators, Unsigned data types, Type conversions, Arithmetic Operators, Library functions.

Loops and Decisions Relational Operators, Loops: The for loop, for loop variations, The while loop, do loop, Decision: The if statement, The else... If construction, The switch statement, The conditional operators, Logical Operators: Logical AND operator, The logical OR operator, The logical NOT operator, Other Control Statements: The break statements, The continue statement, The goto statement.

Structures Defining and processing a structure, user defined data types structure, Enumerated Data Types

Functions Brief overview defining, Accessing function, Passing Arguments to functions, Returning values from functions, Overloaded functions, Inline functions, Default Arguments, Variables and Storage Classes: Automatic Variables, External Variables, Static Variables, Storage.

TERM –II (From September)

Object & Classes A simple Class: Classes and objects, Specifying the class Using the class, C++ Objects as physical Objects, C++ Objects as Data types, Constructions, Objects as Functions Arguments: Overloaded Constructors, Member Functions Defined Outside the Class, Objects as Arguments, Returning Objects from Functions, Static Class Data.

Arrays: Defining and processing an array, passing array to a function, multi – dimensional arrays, Strings: String declaration, string functions and string manipulation.

Operator Overloading Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Pitfalls of Operators Overloading and Conversion.

Inheritance Derived Class and Base Class, Derived Class Constructors, Overriding Member Functions, Inheritance in the English Distance Class, Class Hierarchies, Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance.

B.Sc. (Information Technology) Semester – III

Paper – II: Data Structure

M. Marks: 75

TERM –I (Before September)

Basic Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space trade off between Algorithms.

Arrays: Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.

Linked Lists Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation, Quicksort Technique to sort an array.

TERM –II (From September)

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix.

Sorting and Searching: Sorting Algorithms, Bubble Sort, Searching Algorithms, Linear Search and Binary Search.

B.Sc. (Information Technology) Semester – III

Paper – III: System Analysis & Design

M. Marks: 75

TERM –I (Before September)

System Planning and Analysis: Introduction to systems development life cycle and role of different stages.

Requirement analysis, Problem definition, Feasibility Study and its importance.
Information Gathering Tools, Cost Benefit Analysis, Role and Responsibilities of System Analyst.

System Design: Input/Output Design, Modular and Structured Design, Tools for structured design and system design considerations.

TERM –II (From September)

System Implementation: System testing, Quality assurance, Documentation tools, Managing system implementation.

System Testing: Introduction to testing and its types

System Maintenance: Concept of maintenance and its importance, types of maintenance

B.Sc. (Information Technology) Semester – III

Paper – V
(Programming Lab-I)

50 Marks

Lab – I: Based on C++, Programming Language division as per theory

Paper – VI
(Programming Lab-II)

Lab – II: Data Structure division as per theory

25 Marks

B.Sc. (Information Technology)

Semester – IV: Subjects

Paper No.	Subjects	M. Marks
Paper – I	Database Management System & Oracle	75
Paper – II	Internet Applications	75
Paper – III	JAVA & Web Designing	75
Paper – IV	* Environmental Studies – II (Compulsory)	50
Paper – V	Compiler Design	75
Paper – VI	Programming Lab – I (Oracle)	50
Paper – VII	Programming Lab – II HTML & (JAVA)	50

B.Sc. (Information Technology) Semester – IV

Paper – I: Database Management System and Oracle

M. Marks: 75

TERM –I (Before March)

Introduction to Data, fields, record, file, database, database management system, structure of database system, advantage & disadvantage, levels of database system, Relational model, Hierarchical model, Network model, comparison of these model, E–R diagram, different keys used in a relations system, SQL.

DBA, responsibilities of DBA, Relational form like 1NF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG, Concurrency control and its management, protection, security, recovery of database.

TERM –II (From March)

Oracle

SQL * PLUS: Introduction to Oracle 8, SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Tree Walking, Built in Functions, Views, Security amongst users, Sequences, Indexing Object Oriented Features of Oracle 8.0.

PL/SQL: Introduction to PL/SQL, Cursors–Implicit & explicit, Procedures, Functions & Packages Database Triggers.

B.Sc. (Information Technology) Semester – IV

Paper – II: Internet Applications

M. Marks: 75

TERM –I (Before March)

Introduction : About internet and its working, business use of internet, services effect by internet, evaluation of Internet, Internet Service Provider (ISP) windows environment for dial up networking (connecting to internet), audio on internet, internet addressing (DNS) and IP addresses.

E-Mail Basic Introduction, advantage and disadvantage, structure of an email message, working of e-mail (sending and receiving messages), managing email (creating new folder, deleting messages, forwarding messages, filtering messages, implementation of outlook express.

Internet protocol Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

TERM –II (From March)

WWW introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.

Search engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

Internet and extranet: Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

B.Sc. (Information Technology) Semester – IV

Paper – III: Java & Web Designing

Max. Marks: 75

TERM –I (Before March)

Introduction to Concepts of Programming: Object Orientation Concepts, Platform, Independence & Cross Platform Computing.

Introduction to Java: Control Statements, Operators Data Types.

TERM –II (From March)

Introduction to OOPS: Classes & Methods, constructors, Inheritance & Polymorphism. Packages & Interfaces, Multithreading in Java, Exception Handling, String handling in Java & Input/Output in Java

Introduction to Web Designing through HTML

B.Sc. (Information Technology) Semester – IV

Paper – V: Compiler Design

M. Marks: 75

TERM –I (Before March)

Basics of Compilers and different phases of compiler design
Detailed study of Lexical Analysis and Syntax Analysis

Symbol Table Handling

Symbol table contents, operations on Symbol Tables, Organizations of Symbol Tables.

Storage Management

Static Storage Management, Dynamic Storage Management.

TERM –II (From March)

Code Generation

Code Generator, Code generation of simple programming constructs.

Code Optimization

Local optimization, global optimization, loop optimization

Types of Compiler-Incremental compilers and Cross Compilers.

B.Sc. (Information Technology) Semester – IV

**Paper – VI
(Programming Lab-I)**

Lab – I: Oracle division as per theory 50 Marks

**Paper – VII
(Programming Lab-II)**

Lab – II: HTML & Java division as per theory 50 Marks

B.Sc. (Information Technology)

Semester – V:

Paper No.	Subjects	M. Marks
Paper – I	Computer Networks	100
Paper – II	Operating System	100
Paper – III	E-Business	100
Paper – IV	Lab – I (Computer Networks)	50
Paper – V	Lab – II (Operating System)	50

B.Sc. (Information Technology) Semester – V

Paper – I: Computer Networks

M. Marks: 100

TERM –I (Before September)

Basic concepts of Computer Networks, Client Server Network topologies.

OSI Reference Model, TCP/IP Model Comparison and Critiques, Concepts of Routers, bridges, Repeaters, Gateways.

Data Transmission: – Analog & Digital Transmission, Modem, Codec, Pulse Code Modulation Multiplexing, Circuit Switching, Packet Switching, message Switching, Hybrid Switching.

TERM –II (From September)

Transmission Media: – Twisted Pair, Co–axial Cable, Baseband, Broadband, Fibre optics, Satellite, Wireless Transmission, Telephone System

The Data link Layer: Design Issues, Error Detection and Correction, Data Link Sliding Window Protocols.

IEEE Standard 802 for LAN's and MAN's Routing Algorithm.

Internetworking, Network Security.

B.Sc. (Information Technology) Semester – V

Paper – II: Operating System

Max. Marks: 100

TERM – I (Before September)

Introduction:

Definition, evolution, need, early system, function, buffering spooling, single user, multiuser, multiprogramming, multiprocessing, multitasking, multithreading, batch processing, real time, time systems, time sharing systems, security, protection.

Processor Management / CPU Scheduling:

CPU – I/O Basic Cycle, process state, process control block, Scheduling, Queue, Schedulers, Scheduling Algorithms, Performance criteria, FCFS, SJF, Priority, SRTF, Round Robin, Multi – Levels users Algorithm.

Memory Management:

Concept of Relocation, Swapping, backing storage, swap time, MFT, MFT job scheduling, region size selection, memory fragmentation, MVT, MVT job scheduling compaction, paging, segmentation.

TERM – II (From September)

Virtual Memory:

Overlays, demand paging, page fault, performance of demand paging, page replacement, page replacement algorithm, FIFO, Optimal page replacement, Thrashing.

Device Management:

I/O and device management physical characteristics, FCFS, SSTF, SCAN, CSCAN.

File Management:

Disk and File Management.

Deadlocks:

Definition, Necessary condition for deadlock, Deadlock Prevention Mutual exclusion, Hold and wait, No pre-emption, circular wait Banker's algorithms, Recovery from deadlock, semaphores.

B.Sc. (Information Technology) Semester – V
Paper – III: E-Business
Max. Marks: 100

TERM –I (Before September)

E – Commerce:

Its definition, aims, process tools and results, EDI, VAN's and internet as Promoters, Types of E – Commerce, Commerce – net.

Steps to Star E – Commerce:

H/W & S/W Requirements, steps involved in opening your own online business.

EDI:

EDI Vs Traditional Systems, EDI enabled procurement process, components of EDI system, EDI implementation issues.

Concerns for E – Commerce:

Basic challenges to E – Commerce, Technological, legal and regulators heads, Internet Bandwidth & Technological Issues.

NII: Technical issues, standards & Services GII, Issues that confront us in relation to securing electronic transactions. Implementation of digital signatures.

TERM –II (From September)

Authentication Mechanisms. Electronic cash, its elements, legal issues, risks, paper document versus Electronic document Laws for E – Commerce legal issues for Internet Commerce.

Re – Engineering for Change:

Business process re – engineering BPR, Methodology Planning Methods for change to EC / EDI.

Case Studies: To demonstrate usefulness of E – Commerce in various business areas.

Banks, Reservations, E – Governance, supply – chain, Management, manufacturing, retailing and online – publishing.

E – Commerce in India:

EDI service providers in India, EDI Projects in the Government regulatory agencies. The Internet in India, laws for E – Commerce in India.

B.Sc. (Information Technology) Semester – V

Paper – IV
M.M.: 50

Practical Lab: Computer Networks *division as per theory.*

Paper – V
M.M.: 50

Practical Lab: Operating Systems *division as per theory*

B.Sc. (Information Technology)

Semester – VI:

Paper No.	Subjects	M. Marks
Paper – I & II: (Will be based on any of the two specialization options)	Option(I): Computer Graphics	
	Paper –I: Computer Graphics	75
	Paper –II: Applications of Computer Graphics in C++/C	25
	Option(II): Network Management	
	Paper –I: Network Operating System/Client Server Application	75
	Paper –II: Practical Lab based on NOS	25
Paper – III:	Project	300

B.Sc. (Information Technology) Semester – VI

Paper – I: Option (I): Computer Graphics

M.M. 75

TERM –I (Before March)

Preliminaries

Basics of Computer Graphics, Computer graphics Hardware and Software. 2D Primitives

Line drawing, circle drawing and simple line clipping algorithms.

2D-Transformations

Simple 2D-Transformations and their different representations, composite 2D-Transformations.

TERM –II (From March)

3D-Transformations

Simple 3D-Transformations, composite 3D-Transformations.

Hidden Surfaces

Depth comparisons, Z-buffer algorithm, Scan line algorithms.

Projections

Parallel Projections, Perspective Projections, Oblique Projections.

B.Sc. (Information Technology) Semester – VI

Option I: (Paper – II)

M.M.: 25

Practical Lab: Applications of Computer Graphics in C++/C *division as per theory.*

B.Sc. (Information Technology) Semester – VI

Option (II): Paper–I: Network Management

Networking Operating System/Client–Server Application

Max. Marks: 75

TERM –I (Before March)

Basic Concept: History & Evaluation of Operating System, Various View of Operating System, Basic Concepts of Networking

Fundamentals of Networking O.S.: Introduction components of various networking O.S., Case Studies of various Network Operating System Windows 95 Windows NT/Novel Netware.

TERM –II (From March)

Fundamental of Client Server: Basics of Client Server model and its applications, Designing a Client Server model by Creating Proxy Server, Database server and Networking O.S. Server.

B.Sc. (Information Technology) Semester – VI

Option(II): Paper – II: Practical Lab: Based on NOS

Max. Marks: 25

TERM –I (Before March)

Networking O.S./Client–Server Lab.

Designing of homogenous and heterogenous lab.

Creating Windows 95/NT/Novell Netware Server.

TERM –II (From March)

Creating of Proxy Server.

Creating of Database Server.

B.Sc. (Information Technology) Semester – VI

Paper – III: PROJECT

Max. Marks: 300

A software module based on the work done in the entire course is to be developed.