B.SC. (INFORMATION TECHNOLOGY)

BSc (IT)

Session 2014-2015
B.Sc. (Information Technology)

Semester – I:

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

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.


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:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Subjects</th>
<th>M. Marks</th>
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<tbody>
<tr>
<td>Paper – 1</td>
<td>Communication Skills in English – II (Th.35+Pr.15)</td>
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<tr>
<td>Paper – 2</td>
<td>Punjabi / Basic Punjabi (Mudhli Punjabi) (Compulsory)</td>
<td>50</td>
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<tr>
<td>Paper – 3</td>
<td>Principles of Digital Electronics</td>
<td>75</td>
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<tr>
<td>Paper – 4</td>
<td>C Programming Part – II</td>
<td>75</td>
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<tr>
<td>Paper – 5</td>
<td>Numerical Methods &amp; Statistical Techniques</td>
<td>75</td>
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<tr>
<td>Paper – 6</td>
<td>Practical – C Language – II</td>
<td>75</td>
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</tbody>
</table>
B.Sc. (Information Technology) Semester – II


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.
3. Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan Method,

TERM – II (From March)

6 Least square fit linear trend, Non–linear trend. Y
   \[ Y = a \frac{x^b}{x} \]
   \[ Y = ab^x \]
   \[ Y = ae^x \]
Polynomial fit: \( Y = a+bx+cn^2 \)

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:

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Subjects</th>
<th>M. Marks</th>
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<tbody>
<tr>
<td>Paper – I</td>
<td>Object Oriented Programming Using C++</td>
<td>75</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Data Structure</td>
<td>75</td>
</tr>
<tr>
<td>Paper – III</td>
<td>System Analysis &amp; Design</td>
<td>75</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>* Environmental Studies – I (Compulsory)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Programming Lab – I (C++, Programming Language)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>Programming Lab – II (Data Structure)</td>
<td>25</td>
</tr>
</tbody>
</table>
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.


**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.


**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.
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.

TERM –I  (Before September)


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)

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<tr>
<th>Paper No.</th>
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<tr>
<td>Paper – I</td>
<td>Database Management System &amp; Oracle</td>
<td>75</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Internet Applications</td>
<td>75</td>
</tr>
<tr>
<td>Paper – III</td>
<td>JAVA &amp; Web Designing</td>
<td>75</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>* Environmental Studies – II (Compulsory)</td>
<td>50</td>
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<tr>
<td>Paper – V</td>
<td>Compiler Design</td>
<td>75</td>
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<tr>
<td>Paper – VI</td>
<td>Programming Lab – I (Oracle)</td>
<td>50</td>
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<tr>
<td>Paper – VII</td>
<td>Programming Lab – II HTML &amp; (JAVA)</td>
<td>50</td>
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</tbody>
</table>
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.

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, tile 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 FFTML, DTTML 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.
TERM – I (Before March)


**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
<table>
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<tr>
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<tbody>
<tr>
<td>Paper – I</td>
<td>Computer Networks</td>
<td>100</td>
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<td>Paper – II</td>
<td>Operating System</td>
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<td>Paper – III</td>
<td>E-Business</td>
<td>100</td>
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<td>Paper – IV</td>
<td>Lab – I (Computer Networks)</td>
<td>50</td>
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<tr>
<td>Paper – V</td>
<td>Lab – II (Operating System)</td>
<td>50</td>
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</table>
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.
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:

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.
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 Start 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.


TERM –II (From September)


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
## Semester – VI:

<table>
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<tr>
<th>Paper No.</th>
<th>Subjects</th>
<th>M. Marks</th>
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<tr>
<td><strong>Paper – I &amp; II:</strong></td>
<td>Option(I): Computer Graphics</td>
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<tr>
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<td>Paper –I: Computer Graphics</td>
<td>75</td>
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<tr>
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<td>Option(II): Network Management</td>
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<tr>
<td></td>
<td>Paper –I: Network Operating System/Client Server Application</td>
<td>75</td>
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<td>Paper –II: Practical Lab based on NOS</td>
<td>25</td>
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<tr>
<td><strong>Paper – III:</strong></td>
<td>Project</td>
<td>300</td>
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B.Sc. (Information Technology) Semester – VI


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


Networking Operating System/Client–Server Application

Max. Marks: 75

TERM –I (Before March)


TERM –II (From March)

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