

**The University of Burdwan**  
**Syllabus for B.Sc. General**  
**(1+1+1 Pattern)**  
**in**  
**Computer Science**  
**with effect from 2014-2015**

PART – I

PAPER – I (Theory, Full Marks: 100)	No. of Lecture Hours
<b>1.1 COMPUTER FUNDAMENTALS</b>	50L
1.1.1 Number System and Arithmetic	
1.1.2 Boolean Algebra	
1.1.3 Digital logic	
<b>1.2 PROGRAMMING LANGUAGE</b>	50L

PART – II

PAPER – II (Theory, Full Marks: 100)	No. of Lecture Hours
<b>2.1 Data Structure</b>	50L
<b>2.2 Operating Systems</b>	50L

PAPER – III (Practical, Full Marks: 100)

**3.1 PROGRAMMING AND DATA STRUCTURE LAB**

PART – III

PAPER – I V ( A) (Theory, Full Marks :65)	No. of Lecture Hours
<b>4.1. DATABASE MANAGEMENT SYSTEM</b>	25L
<b>4.2. NETWORKS &amp; INTERNET</b>	25L
PAPER – I V ( B ) (Practical, Full Marks :35)	
<b>4.3.DBMS AND HTML LAB</b>	

DETAIL SYLLABUS FOR 3-YEAR B.Sc. (GENERAL) COURSE  
IN  
COMPUTER SCIENCE

PART – I

PAPER – I

1.1 COMPUTER FUNDAMENTALS [25L]

1.1.1 Number Systems & Arithmetic Number System: Positional, Non-positional, binary, octal, decimal, hexadecimal and their representation; Methods of conversion from one base to another; Unsigned, Signed, 1's Complement, 2's Complement, sign-magnitude and excess notation; range of values; Binary Arithmetic: Fixed & Floating point numbers, representation, biased exponent, range & precession, errors, overflow, underflow, BCD arithmetic. [10L]

1.1.1 Boolean Algebra: Concepts propositional logic; Two variable Boolean algebra definitions, postulates, properties, simplification of logical expressions using properties and maps (up to 4-variables), Minterm, Maxterm, expressions. [05L]

1.1.3 Logic gates: AND, OR, NOT, XOR; Combinational Circuits; Simple logic design using logic gates. Alphanumeric Codes: ASCII, EBCDIC; Combinational Circuits: Encoder, Decoder, Code Converter, Comparator, Adder/ Subtractor, Multiplexer, Demultiplexer, Parity Generator. Basic Sequential circuits; Flip-Flops: RS, Clocked RS, D, Edge-Triggered D, JK, T and Master-Slave; Schmitt-trigger; Multi-vibrators: Astable and monostable; Registers and shift registers; Counters; D/A & A/D Converters. [10L]

1.2 PROGRAMMING LANGUAGE (C-PROGRAMMING)

Introduction: Basic Structure, Character Sets, Keywords, Identifiers Constants, Variable type declaration; Execution of some simple sample programs. Operators: Arithmetic, Relational, Logical and Assignment, Increment, Decrement and Conditional; Operator Precedence and Associations; Expressions in C; Expression evaluation and type conversion; Formatted input & output; Statements in C: Assignment, Control and Loop statements; Arrays: Single and Multi dimensional, Initialization, String handling with arrays, String handling functions. Functions in C: Need, Simple examples, argument passing in C, Functions & their use, Return value and their types, Recursion. Structures: Definitions & initialization, Arrays of structures, Arrays within structures. Pointers: Declaration & Initialization, Accessing variables through pointers, Pointer arithmetic, Pointers & arrays; Strings; Pointer to Functions & Structures. File Access: Opening & Closing, I/O Operations. [25L]

Ref. Books:

1. Digital Logic & Computer Design – M.Mano TMH
2. Computer Systems Architecture ,M.Mano TMH
3. Programming in ANSI C – E. Balagurusamy, TMH
4. Programming with C – B.S.Gottfried ,McGrawHill
5. Modern Digital Electronics – R.P.Jain TMH
6. Structured Computer Organization – A.S.Tanenbaum

## PART – II

PAPER – II (Theory, Full Marks:100)

### 2.1 DATA STRUCTURE

[50L]

Definitions: Concepts of data types, Elementary Structure, Words and their interpretation; Arrays: Types, Memory representation, Address translation, Functions of single and multi dimensional arrays with examples; Linked Structures: Singly linked list; List Manipulation with Pointers: Examples involving insertion and deletion of elements; Stack and Queues: Definition, Representation, Uses and applications-Recursion, Postfix Conversion and Evaluation, Applications of queues; Binary Trees: Definition, Quantitative properties, Path Length: Internal and external properties, Minimum and maximum path length of a binary tree, Importance; Searching: Linear and binary search; Sorting: Terminology, Performance evaluation, Different sorting techniques (Bubble, Insertion, Selection, Heap) with iterative and/or Recursive description, Advantages and disadvantages. File Structure: I/O operations on files.

### 2.2 OPERATING SYSTEMS

[50L]

What is OS; Concepts of Process, Files, Shell, System Calls. Structures: Monolithic, Layered, Virtual, Client-Server Model. Concept of Synchronization: Semaphores, Critical Regions, Monitor etc., Inter Process Communication Mechanisms. Processor; Message Passing, Scheduling; I/O: Devices and Device Controllers; Interrupt handlers and Device drivers. Memory: Multiprogramming, Swapping, Paging, Page Replacement Techniques; File System: Files and Directories, File Servers, Security and Protection. Deadlock: How it can happen; Ideas on Detection and Prevention. Case Study: DOS, UNIX, and Windows.

Ref. Books:

1. Data Structure using C/C++ - A.S.Tanenbaum
2. Modern Operating System – Tanenbaum
3. Operating System Concept – Galvin
4. Fundamentals of Data Structure through C – Sahani et. Al.

PAPER – III (Practical, Full Marks:100)

### 3.1 PROGRAMMING AND DATA STRUCTURE LAB

## PART – III

PAPER – I V

GROUP – A (Theory, Full Marks :65)

### 4.1. DATABASE MANAGEMENT SYSTEM

**Basic concepts:** Advantages of DBMS, ANSI/SPARC architecture, physical, conceptual and external models; Entity-Relationship diagrams; **Data models:** Relational, Hierarchical and Network. **File organization:** Sequential, indexed sequential, random, inverted; **Query Languages:** Relational Algebra; Functional dependencies and normal forms: 1NF, 2NF, 3NF and BCNF; SQL; Security; Integrity; **Case Study:** ORACLE/ MY-SQL/ACCESS. [45L]

### 4.2. NETWORKS & INTERNET

Networks: Concepts of centralized and distributed computing; Advantages of networking; Layered architecture; OSI architecture: Basic features, LAN, MAN and WAN; Simple PC based network examples: block diagram, mode of operation and characteristic features.

Internet: What is Internet; Basics of Web Site, WWW; Browser, HTML-Tags and Features; Servers; Clients; Port; Domain Name Server (DNS); Accounts; ISP; Connection: Dial Up, ISDN, ADSN, Cable modem; Email: Account, sending, receiving, mailing list, IRC; Voice & Video conferencing. [20L]

Ref. Books:

1. Database Concepts and Systems – Ivan Bayross, SPD
2. Mastering Web Design-John McCoy, BPB
3. Internet and Introduction-CIStems, TMH
4. Computer Networks – A.S.Tanenbaum
5. Computer Network – U.Black
6. Data & Computer Communication – Stallings
7. Internet Handbook – TMH Cistern Series
8. Special Edition Using HTML 4, 6<sup>th</sup> Edn. Holzschlag, PHI
9. Using HTML-4 4<sup>th</sup> Edn., Phillips, PHI
10. Special Edition Using Oracle Applications, Boss Corporation, PHI

PAPER – I V

GROUP – B (Practical,Full Marks:35)

DBMS & HTML Lab.