SYLLABUS FOR THE BATCH FROM YEAR 2022 TO YEAR 2025

B.A. / B.Sc.

(12+3 SYSTEM OF EDUCATION)

Computer Science

Examinations: 2022–25

GURU NANAK DEV UNIVERSITY AMRITSAR

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B.A./B.Sc. (Semester System) (12+3 System of Education) *(Batch 2022-25)*
(Faculty of Engineering & Technology)

INDEX

Sr. No.	Computer Science	Page No.
1.	Semester I	1-2
2.	Semester II	3-4
3.	Semester III	5-6
4.	Semester IV	7-8
5.	Semester V	9-10
6.	Semester VI	11-12

B.A./B.Sc. (Semester System) (12+3 System of Education) *(Semester–I) (Batch 2022-25)*
(Faculty of Engineering & Technology)

SEMESTER–I
COMPUTER SCIENCE
COMPUTER FUNDAMENTAL & PC SOFTWARE
(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours/week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setter:- Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

1. **Computer Fundamentals**: Definition of Computer , Components of a Computer System , Generations of Computers.
2. **Input Devices**: Keyboard , Mouse , Source Data Automation (MICR, OCR, OMR) , Vision Input Systems , Scanners, Screen Assisted Data Entry.
3. **Output Devices**: Monitors , Printers , Plotters , Voice Response Units.
4. **Data Storage Devices**: Primary Memory , Secondary Memory , Removable Data Storage Devices.

SECTION–B

MS–Word : Introduction to Word, Introduction to Parts of Word Window (Title Bar, Menu Bar, Tool Bar, The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, Opening an Existing documents, Insert a second document into an open document, Editing and Formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table , Using the Table Menu and Table formatting, Borders and Shading, Templates and Wizards, Mail Merge.

SECTION-C

MS-Power Point : Introduction to MS Power point, Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view) Formatting and Enhancing text formatting, Creating Graphs (Displaying slide show and adding multi–media)

SECTION-D

MS-Excel : Introduction to Worksheet/Spreads, Features of Excel , Describe the Excel Window, Different Functions on different data in Excel, Creation of Graphs, Editing it and Formatting, Changing chart type to 2d chart or 3d chart, Creation of Worksheet, Adding, Deleting, Moving the text in Worksheet. Linking different sheets, Sorting the data, Querying the data, Filtering the data (auto and advance filters), What-if analysis, Printing a Worksheet.

References:

1. R.K. Taxali: Introduction to Software Packages, Galgotia Publications.
2. MS–Office Compiled by SYBIX
3. MS–Office BPB Publications.
4. Introduction to Computer by P.K. Sinha
5. Windows Based Computer Courses by Gurvinder Singh &Rachpal Singh, Kalyani Publishers.

SEMESTER–I

COMPUTER SCIENCE

(PRACTICAL)

Marks: 25

2 Hours/week

Practical based on Computer Fundamental & PC Software

Windows, MS Word, Power Point,

References:

1. R.K. Taxali: Introduction to Software Packages, GalgotiaPublicaions.
2. MS–Office Compiled by SYBIX
3. MS–Office BPB Publications.
4. Introduction to Computer by P.K. Sinha
5. Windows Based Computer Courses by Gurvinder Singh &Rachpal Singh, Kalyani Publishers.

B.A./B.Sc. (Semester System) (12+3 System of Education) *(Semester–II) (Batch 2022-25)*
(Faculty of Engineering & Technology)

SEMESTER–II

COMPUTER SCIENCE

PROGRAMMING USING C

(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours/week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for the Candidates:
The students can use only Non–programmable & Non–storage type calculator.
Practical marks will include the appropriate weightage for proper maintenance of Lab record

SECTION–A

Data Representation, Introduction to Number Systems and Character Codes, Flow Charts, Problem Analysis, decision tables, pseudo codes and, algorithms.

SECTION–B

Programming Languages C:
Basics of C: Introduction to C, Applications and Advantages of C, Tokens, Types of Errors

Data Types: Basic & Derived Data Types, User Defined Data Types, Declaring and initializing variables.

Operators and Expressions: Types of operators (Unary, Binary, Ternary), Precedence and Associativity

Data I/O Functions: Types of I/O function, Formatted & Unformatted console I/O Functions

SECTION–C

Control Statements: Jumping, Branching and Looping–Entry controlled and exit controlled, Advantages/Disadvantages of loops, difference between for, while and do–while.

Arrays: Types of Arrays, One Dimensional and Two Dimensional Arrays.

Strings: Introduction to Strings and String functions, array of strings.

SECTION–D

Functions: User Defined & Library Function, Function (Prototype, Declaration, Definition), Methods of passing arguments, local and global functions, Recursion.

Storage Classes: Introduction to various storage classes, scope and lifetime of a variable, Storage class specifiers (auto, register, static, extern), advantages and disadvantages.

Structure and Union: Introduction to structure and union, pointers with structure.

SEMESTER–II

COMPUTER SCIENCE

(PRACTICAL)

Marks: 25

Practical based on Programming in C
2 Hours/week

Books Suggested:-

(i) Programming with C Languages C. Schaum Series.
(ii) YashwantKanitkar – Let Us C
(iii) C Programming by Stephen G Kochan

SEMESTER–III

COMPUTER SCIENCE

COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours/week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Introduction:
Numerical methods, Numerical methods versus numerical analysis, Errors and Measures of Errors. Non-linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bisection, False position Method, Newton Raphson-method.

SECTION–B

Simultaneous Solution of Equations, Gauss Elimination Method Gauss Jordan method. Gauss Siedel Method, Matrix Inversion Method.

SECTION–C

Interpolation and Curve Fitting, Lagrangian Polynomials, Newtons Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.
Numerical Integration and Different Tryaperzoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

SECTION–D

Numerical differentiation by Polynomial Fit Statistical Techniques
Measure of Central Tendency, Preparing frequency distribution table, Mean Arithmetic, Mean geometric, Mean harmonic, Mean median Mode.
Measure of dispersion, Skewness and Kurtosis Range, Mean deviation, Standard deviation, co-efficient of variation, Moments Skewness Kurtosis.
Correlation Bivariate Distribution Multivariate distribution.
Regression B.C., Linear Regression, Multiple Regression.
Trend Analysis least square fit linear trend, Non-linear trend
Y=axb
Y=abx
Y=acx
Polynomial fit: Y=a+alX+ea^2x2+a^nxn+n

Books Recommended:
1 B.S. Grewal: *Numerical Methods for Engineering,* Sultan Chand Publications.
2 V. Rajaraman: *Computer Oriented Numerical Methods,* Prentice Hall of India Private Ltd., New Delhi.

SEMESTER–III

COMPUTER SCIENCE

COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS LAB.

(PRACTICAL)

Marks: 25

2 Hours/week

Practical based on Computer Oriented Numerical and Statistical Methods

SEMESTER–IV

COMPUTER SCIENCE

DATA STRUCTURES & PROGRAMMING LANGUAGE USING C++

(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours/week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION– A

Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Trade off between Algorithm.
Arrays: Array Defined, Representing Arrays in memory, Various operations on Linear arrays, Multi Dimensional arrays.
Linked Lists: Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, Various operations of linked lists.

SECTION–B

Stacks: Description of STACK structure, Implementation of stack, using arryas and linked lists, application of stack-converting Arithmetic expression from infix notational to polish and their subsequent evaluation, quicksort technique to sort an array.

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

SECTION–C

Sorting and Searching : Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

SECTION–D

Object Oriented Programming: Objects & Classes, Constructor & Destructor, Operator Overloading, Overloading uniary operators, Overloading binary operators, Data conversion, Pitfalls of operator overloading and conversion, Inheritance, Derived class and pase, Derived class constructor. Overloading member functions, Inheritance in the English distance class, class hierarchies, Public & Private inheritance, Level of inheritance, Polymorphism, problems with single inheritance, multiple inheritance

References:
1. Seymour Lischutz, *Theory and Problems of Data Structures.*
2. *Schaum's Outline Serie*s, McGraw Hill Company.
3. Tanenbaum, *Data Structure Using C++*

SEMESTER–IV

COMPUTER SCIENCE

DATA STRUCTURES & PROGRAMMING LANGUAGE USING C++ LAB

(PRACTICAL)

2 Hours/week **Marks: 25**

Practical based on Data Structures & Programming Language Using C++

SEMESTER–V

COMPUTER SCIENCE

DATA BASE MANAGEMENT SYSTEM & ORACLE

(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours per week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Introduction to Data, Field, Record, File, Database, Database management system., DBMS Environment, DBA, responsibilities of DBA, Structure of database system, Advantage and disadvantage, levels of database system, Data Independence, Structure and Components of DBMS, E–R diagram, different keys used in a relational system

SECTION–B

Relational model, hierarchical model, network model, comparison of these models, Relational form like INF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG

SECTION–C

SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Built in Functions

SECTION–D

Concurrency control and its management, protection, security, recovery of database.
Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL

References:
1 Desai B.C.: An Introduction to Database Systems, Galgotia Publishers.
2 Date C.J. An Introduction to Database Systems, Vol. I, Narosa Publishers.

SEMESTER–V

COMPUTER SCIENCE

DATA BASE MANAGEMENT SYSTEM & ORACLE

(PRACTICAL)

Marks: 25

Practical: Based on Database Management System and Oracle

Note: Practical marks will include the appropriate weightage for proper maintainance of Lab.

B.A./B.Sc. (Semester System) (12+3 System of Education) *(Semester–VI) (Batch 2022-25)*
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SEMESTER–VI

COMPUTER SCIENCE

BASIC OF INTERNET TECHNOLOGIES

(THEORY)

Time: 3 Hours **Max. Marks: 100**
4 Hours/week **Theory Marks: 75**
Practical Marks: 25

Instructions for the Paper Setter: Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A

Internet: Introduction to Internet and its application, services offered by internet, Evolution of internet Intranet and Extranets, Internet Architectures, Internet Applications, , internet service provider (ISP), windows environment for dial up networking (connecting to internet), internet addressing (DNS) and IP addresses).
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.

SECTION-B

Introduction to HTML: Introduction to websites, Static vs dynamic websites, server side and client side scripting HTML 5 : Introduction , Structure of a web page , HTML Elements, HTML attributes, Basic Text Formatting tags, Comments, Links, Lists, Image, Style, Forms

SECTION-C

Media, Classes, iframes, working with Tables : Page Design & Layout with Links
CSS: Introduction to CSS and understanding CSS syntax, Adding Rules to a Style Sheet, managing style sheets (creating, Importing and embedding)

SECTION-D

Controlling page layout, Understanding grouping and nesting Styling text, Modifying background and foreground elements , Understanding tables, columns and lists ,Using global styles Understanding CSS box model, Working with images, Creating navigation bars using CSS Html Website using CSS.

References:

1. Chris Bates, “Web Programming- Building Internet Applications”, Wiley India, 2006.
2. David William Baron, The World of Scripting Languages.
3. “Understanding The Internet”, Kieth Sutherland, Butterworth-Heinemann; 1st Edition (October 31, 2000).
4. “Beginning Web Programming with HTML, XHTML, and CSS”, Jon Duckett, John Wiley & Sons, 06 Aug. 2004.

SEMESTER–VI

COMPUTER SCIENCE

INFORMATION TECHNOLOGY

(PRACTICAL)

Marks: 25

Periods/Week: 2

Note: Practical Marks will include the appropriate weightage for proper maintainance of lab record.