

**Department of Computer Sc. & Information Technology (CSIT)**  
**Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.**  
**Examination Scheme and Syllabus of Integrated UG/PG- CS**

1 <sup>st</sup> Sem					
S.NO	Paper Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-101	Fundamentals of computer	50	30	20
2	P CSC-102	Introduction to Programming Methodology	50	30	20
3	P CSC-103	LAB 1	50	30	20
<b>TOTAL</b>			<b>150</b>	<b>90</b>	<b>60</b>
2 <sup>nd</sup> Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-201	Introduction to Logics of Computer	50	30	20
2	P CSC-202	System Analysis and Design	50	30	20
3	P CSC-203	LAB 2	50	30	20
<b>TOTAL</b>			<b>150</b>	<b>90</b>	<b>60</b>
3 <sup>rd</sup> Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-301	Introduction to Operating system	50	30	20
2	P CSC-302	Introduction to C Language	50	30	20
3	P CSC-303	LAB 3	50	30	20
<b>TOTAL</b>			<b>150</b>	<b>90</b>	<b>60</b>
4 <sup>th</sup> Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	P CSC-401	Database Management System.	50	30	20
2	P CSC-402	Computer Based Numerical Method.	50	30	20
3	P CSC-403	LAB 4	50	30	20
<b>TOTAL</b>			<b>150</b>	<b>90</b>	<b>60</b>
5 <sup>th</sup> Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	PCSC -501	Internet Application	50	30	20
2	PCSC-502	Object Oriented Concepts	50	30	20
3	PCSC-503	System Software	50	30	20
4	PCSC-504	Introduction to Artificial Neural Network	50	30	20
5	PCSC-505	Minor Project	100	100	-----
<b>TOTAL</b>			<b>300</b>	<b>220</b>	<b>80</b>

6 <sup>th</sup> Sem					
S.NO	Subject Code	Subject	Marks Allotted	End Semester Marks	Internal Marks
1	PCSC -601	Introduction to JAVA	50	30	20
2	PCSC-602	Software Testing	50	30	20
3	PCSC-603	Introduction to Data Structure	50	30	20
4	PCSC-604	Management Information System	50	30	20
5	PCSC-605	Major Project	100	100	-----
TOTAL			300	220	80

**Subject – Fundamentals of Computer**  
**Paper Code – PCSC-101**

**Basics of Computer** – Development of computer ,Computer system concepts, Characteristics, capabilities and limitations of computer, Types and generation of computers, Computer architecture.

**Input /Output and Storage device** – Basic input devices: keyboard, mouse , joystick ,MICR, OCR. light pen ,Bar Code Reader, Touch screen ,Basic output devices: Printer –Types of printer, Plotter, Monitor VGA, SVGA ,XGA etc.

Storage device : Different types of storage device ,Primary Vs Secondary data storage .

**Computer software** – Definition ,Software and its need ,types of software :Application software, System software, Firmware, Evolution of programming language ,Different types of programming language :High level ,Assembly level ,Low level and 4GL,their advantages and disadvantages , language translator: Compiler, Interpreter, Assembler, Booting process.

**Data Representation** – Number system :Binary, Octal, and Hexadecimal ,converting from one number system to another ,Computer code:BCD,EBCDIC and ASCII ,Binary arithmetic :Addition ,subtraction, multiplication and division ,

**Operating System and other Software** – Definition and objective of operating system , types of operating system, DOS and Windows ,Characteristics of DOS ,some basic commands of DOS ,Virus : types of virus , virus detection and prevention.

**Readings:**

1. Alexis Leon and Mathews Leon ,Fundamental of Information Technology ,Vikas Publication .
2. V.Rajaraman .Computer fundamental ,PHI publication .

**Subject - Introduction to Programming Methodology**  
**Paper Code – PCSC-102**

Programming Concepts, Characteristics of Programming, Stored Program Concepts, Procedure Oriented Programming, Object Oriented Programming- characteristics & its advantages, Types of Computer Languages (Low Level, High Level, 4GL and Object Oriented Languages).

Programming Tools: Algorithms, characteristics of Algorithm, Program Flow Charts, Pseudo code, Decision Tables, Structured Programming Techniques.

File Concepts, types, Data Terminology and File Operations, attributes and access permissions, Directory.

Basic concepts of any programming language: Character set, keywords, identifiers, assigning values of variables, types of operators in C Language, JAVA(Basic Principles, class, object), C++ etc.

Decision making and looping: recursion, switch ....break, repeat, labels and goto statements.

**Readings:**

1. Computer fundamentals: By V.Rajaram; PHI Publication
2. Data Structure : By Schaum Series

**Subject – Introduction to logics of computer**  
**Paper Code – PCSC-201**

**Number Systems and codes:** Decimal numbers, binary numbers, binary arithmetic, 1's and 2's complements, Octal numbers, hexadecimal numbers, inter-conversion of number system, Digital codes: Binary coded decimal (BCD) , Gray code, Excess-3 code, Format of ASCII code.

**Logic Gates:** Positive and negative logics, NOT gate, OR gate, AND gate, NAND gate, NOR gate, EX-OR and EX-NOR gates , Symbol , truth table, Circuit diagram using basic gates , universal property of NAND and NOR gates.

**Boolean Algebra:** Boolean operation, logic expressing, rules and laws of Boolean algebra, Demorgan's theorems, simplification of Boolean expression using Boolean algebra techniques.

SOP and POS form of Boolean expressions, minterms, maxterms, and simplification of Boolean expression using Karnaugh map techniques (Up to 4 Variables), half adder, Full adder, Multiplexer.

Flip-Flops, Registers, Shift registers, Counters.

**Readings:**

1. Computer Fundamentals , Architecture & Organization By B.Ram, New Age International Publisher limited.
2. Computer Architecture & Organization by Morris Manno, 3<sup>rd</sup> edition, Prentice Hall of India Pvt Ltd.
3. Digital Computer electronics: An Introduction to micro computers by Albert Malvino and Jerald Brown, Tata Mcgraw Hill.
4. Modern Digital Electronics, by R.P Jain, Tata Mcgraw Hill Publication, 3<sup>rd</sup> Edition.

**Subject –System Analysis and Design**  
**Paper code – PCSC-202**

System Concepts : What is system, Characteristics of system, Elements of a System, Computer Based system and its Components, Types of Systems: Open and Closed System, Transaction Processing System, MIS, DSS etc.

System Analysis & Requirement Analysis: what is System Analysis, Role and Qualities of System Analyst, System Development Life Cycle- Phases of SDLC, Prototyping- Steps in Prototyping, Advantages and Disadvantages of prototyping.

Requirement Investigation, Feasibility Study, Fact Finding Techniques.

Analysis and Design Tools: Flowcharts, Decision Trees, Decision Tables, Database/File Design, Data Flow Diagrams, E-R Diagrams.

System testing and Implementation : System testing – Black Box Testing, White Box Testing, Unit Testing , Integration Testing, Modular Testing.

What is implementation, Type of Implementation- Fresh, Replacement and Modified, Implementation Methods.

**Readings:**

1. Analysis and Design of Information System: James A Senn
2. System Analysis and Design: Awad

**Subject – Introduction to Operating System**  
**Paper code – PCSC-301**

**Introduction to O.S:** Over view of OS , function and goal, characteristics of OS, Hardware Concept related to OS , CPU States, I/O channels , Memory Hierarchy, Types of OS – Multiprogramming, Time sharing, Batch Processing , Multitasking, Real-time.

**Concepts of Process:** Operation on Process, Process states, Concurrent Processes, Process Control Block(PCB) and signals, Process scheduling, Process Hierarchy.

**Process synchronization and Communication:** Problem of concurrent processes, Critical section, Mutual Exclusion, Deadlock, Process of Deadlock, Interprocess synchronization, need for interprocess synchronization.

**Memory Organization and management:** Address Binding, Logical and Physical address, Fragmentation, Concept of Virtual memory, Swapping and Relocation.

**Preliminary Study of WINDOWS/ Unix.**

**Readings:**

1. Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.
2. William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.
3. Tanenbaum, Modern Operating Systems, PHI.
4. Peterson and Silberschatz, Operating System Concepts, Addison Wesley.

**Subject -Introduction to C Language**  
**Paper code – PCSC-302**

**Origin & Introduction to C:** About C, Evolution of C, Programming languages, Structure of a C program, Compiling a C program, Simple C program, Character set in C, Keywords in C, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Input function, Output function and format specifiers, arithmetic operators, Unary operators, Relational and logical operators, address operator, conditional operator, Hierarchy of operators.

**Decision Making, looping & Branching:** Control statements, if statement, if else statement, for statement, while loop, do while loop, switch statement, break statement, continue statement, goto statement.

**Arrays & String Handling :** Introduction to arrays, advantages of arrays, single dimensional arrays, multidimensional arrays, array declaration, array initialization, accessing data from array, Character arrays, String Variables, Reading & writing strings, string handling functions.

**Pointers & User Defined Functions :** Introduction to pointers, pointer variables, pointers and arrays, pointers to pointers, array of pointers, 2 dimensional arrays and pointers, Introduction to functions, advantages of functions, declaring a function, calling a function, passing arguments to a function.

**Structure, Union & Enum: Structure:** Array of structure, array within structure, Nested structure, passing arguments and returning structure for functions. **Union:** declaring union and its usage. **Dynamic memory allocation functions** – malloc, calloc, realloc and free.

**File Management in C :** Defining & opening a file, closing a file, I/O operations on file, error handling during I/O operations.

**Readings:**

1. A. K. Saxena, Programming Language C : Anamaya Publishers, New Delhi.
2. Y. Kanetkar, Let Us C, BPB Publication.
3. B.S. Gottfried, Schaum's outline of Theory and Problems of Programming with C, McGraw-Hill.

**Subject – Database Management  
System**

Paper code – PCSC-401

**Introduction** : Purpose of Database System, Concept of database & its evaluation, Views of Data, Types of DBMS, DBMS architecture, Data Independency, Data Models, Data Dictionary.

**E-R Model** : Basic Concept, Design Issues, Entity Sets, Attributes & its Types, E-R Diagram, Design of an E-R Database Schema , Keys.

**Normalization** : Purpose of Normalization , Functional Dependencies, 1 NF, 2 NF and 3 NF.

**SQL** : Introduction to SQL, DDL, DML & DCL statements, Basic Operations, Aggregate function, Modification of Database, other SQL features.

**Relational Model** : Structure of Relational Model, The Relational algebra (Selection, Projection, Union, Intersection, Cartesian product, Join), Tuple relational calculus.

**Readings:**

1. Database system concepts By H.Korth and A. Silberschatz ,S.Sudarshan, TMH Publication , 2010.
2. An introduction to Database Systems by Bipin Desai, Galgotia Publications, 2003 edition.
3. An Introduction to Database Systems, C.J.Date, A.Kannan, S. Swamynathan, Pearson Publication, Eight edition, Database Management System C.J.Data

**Subject – Computer Based Numerical  
Method**

Paper code – PCSC-402

**Algebraic Equation :** Bisection Method, Newton – Raphson Method, Regula Falsi Method.

**Simultaneous Algebraic Equation:** Gauss Elimination Method, Gauss-Jordan Method, Factorization Method, Jacobi's Iteration Method, Gauss- seidal Iteration Method.

**Matrix Inversion & Eigen Value :** Gauss Jordan Method, Factorization Method , Eigen values and Eigen Vectors .

**Interpolation:** Newton's backward and forward Interpolation Formula, Lagrange's Interpolation Formula.

**Numerical Differentiation & Integration:** Trapezoidal Rule, Simpson's one- third rule Simpson's three- eight rule.

**Readings:**

1. Numerical Methods in Engineering & Science By Dr. B.S.Grewal, Khanna Publishers, Seventh edition, 2005.
2. Introductory methods of numerical Analysis By S.S.Sastry, Phi Learning publication, Edition Fourth , 2009

## Subject – Internet Application

Paper code – PCSC-501

Max  
Min Marks-12

Marks-30

**Basic of Internet:** Basic concept, History, Hardware & software requirement, Client server architecture model, IP Address and Domain Name System, Use of Web Browsers, Customizing the browser, Finding information on the Internet, Search Engines, and Basic Protocols: HTTP, FTP, Telnet etc.

**Working with Internet:** Uploading and Downloading Text and Images, Web Pages and Web sites, Downloading software with the Browser, Installing, Downloading software , Advanced Software Downloading.

**Services of Internet:** E-mail, Outlook express, Eudora and Netscape Messenger, Advanced E-mail Facilities, Newsgroups: Use and Advantages, Online and e-mail Gaming, Chatting, Videoconferencing, World Wide Web(WWW).

**HTML:** Benefit and drawbacks, Tables, Frames, Image and Form, Introduction to CGI scripting.

**Web Pages:** Developing Web page with HTML.

### Readings:

1. How to do Everything with the Internet: Dennis Jones.
2. The Internet: Douglas E. Coiner, Prentice-Hall, India.
3. Internet & Intranet Engineering : Daniel Minoli, TataMcGraw-Hill.
4. Introduction to Data Communication & Networking : Forouzan.

**Subject – Object Oriented Concepts**

Paper code – PCSC- 502

**Overview of Object Oriented:** Need of Object Oriented, Procedural Vs Object Oriented approach, Benefits, C++ and other languages.

**Features of Object Oriented:** Class, Objects, Polymorphism, Inheritance, Message Passing, Abstraction, Encapsulation.

**Class and Object:** Definition, Construction of class, Creation of objects, Pointer to Object, Array of Object, Comparison of Class with Union & Structure.

**Polymorphism :** Type of Polymorphism, Methods Overloading, Operator overloading.

**Inheritance :** Types of Inheritance, Single Level, Multi Level, Multiple & Hybrid Inheritance, Advantage of Inheritance, Base Class & Derived Class, C++ & VB: Introduction, Basic Data Type, Writing Simple Program.

**Readings:**

- 1 Object Oriented Programming: E. Balaguru Swamy, Tata Mc. Graw Hill
- 2 Object Oriented Programming & C++: By R. Raja Raman
- 3 Visual C++ Programming: Yeshwant P. Kanitkar

**Subject – System Software**

Paper code – PCSC-503

**Basic Concepts:** Software, System Software, Types of system software, SIC (Simplified Instructional Computer), SIC/XE, Simple programs for SIC and SIC/XE.

**Assemblers:** Assembler functions, M/C dependent assembler features, M/C independent assembler features, One-pass assembler, Multi-pass assembler, Implementation example- MASM assembler.

**Loaders and Linkers:** Introduction, Basic loader function, Machine dependent loader features, machine independent loader features, Loader design option.

**Macro processors:** Macro definition and expansion, Macro processor algorithm and data structure, Independent macro processor features, Macroprocessor design option.

**System software tools:** Software tools for program development, Editors, Debugging, Programming environment, User Interface.

**Readings:**

- 1 Leland L. Beck, System software-An Introduction to System Programming, 3<sup>rd</sup> Edition, Pearson Education, Asia, 2006.
- 2 D. M. Dhamdhere, System Programming & Operating Systems, Tata Mc Graw Hill, Second Revised Edition, 1999.
- 3 J. Donovan, Systems Programming: An Introduction to System Programming, Tata Mc Graw Hill Publication, Edition, 1999.
- 4 A. C. Shalini, System Software, Scitech Publications (INDIA) PVT, LTD, Fifth Reprint, 2010.

**Subject - Introduction to Artificial Neural Networks**

**Paper Code – PCSC – 504**

**Introduction:** Definition and meaning, Different areas of A.I. Applications

**Preliminaries of Neural Networks:** Essence and benefits of neural networks

**Introduction to Artificial Neuron:** Model of biological neuron, meaning of learning and training, Model of an artificial Neuron, different units of an artificial neuron.

**Introduction to Artificial Neural Network:** Connectionist Networks, types of neural networks, single layer and multilayer perceptrons, Weights, bias, transfer functions

**Training of a simple perceptron:** Training of a single layer neural network with simple example like AND, OR logic gates.

**Readings:**

1. Neural Networks: A comprehensive Foundation (2e preferred): Simon Haykins, Prentice Hall of India.
2. Neural Networks for Pattern Recognition: Christopher M Bishop: Oxford Press
3. Introduction to Artificial Neural Systems: J.M. Zurada, West Publishing Company, St. Paul, Minnesota, 1992 / Jaico Publishing House, Bombay, 1994
4. Artificial Intelligence, E. Rich and K. Knight, Tata McGraw Hill.
5. Artificial Intelligence: A New Synthesis, Nilsson, Morgan Kaufmann.

## Subject- Introduction to Java

### PCSC – 601

**Introduction: Genesis** of java, importance to the Internet, overview and features.

**Language Basics:** Constants, Variables and Primitive Data types, Operators and Expression, Decision Making and Branching statement, Decision Making and Looping, Classes, Objects and Methods, Arrays, Strings and Vectors.

**Inheritance:** Definition, Types, Method overloading and Method Overriding, super and this keywords,

**Interfaces:** Defining Interface, Extending Interfaces Implementing Interface.

**Packages:** Defining Packages, Java API Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding class to Package, CLASS PATH.

**Exception handling:** Exception Types, Try, Catch & finally Blocks, Throw and Throws keywords. Creating user defined Exception.

**Multithreaded Programming:** Thread Model, Creating Threads, Thread Priority , Thread Exception, Synchronization.

**Input/output:** Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files.

**Java Collection:** Introduction, Overview of Interfaces, Overview of Classes.

**Introduction to AWT:** Window fundamentals, creating windowed programs working with graphics, Using AWT controls, Delegation event model, handling mouse and keyboard event

### Readings:

1. Naughton P and schildt H. Java: The complete reference, Osborne Mcgra-Hill, Berkeley, USA, 1997.
2. Rodgers Cadenhead, Laura Lemay, Sams Teach Yourself Java 2 in 21 Days, Sams Publishing.
3. E. Balagurusamy, Programming with Java, Tata McGraw Hill.
4. Bruce Eckel, Thinking in Java, Pearson Education.
5. Peter Van Der Linden, Just Java 2, Sun Microsystems/Prentice Hall.
6. Simply JAVA :An Introduction to JAVA programming By James R. Levenick ,Firewall Media New,Delhi
7. Java Programming - Khalid Mughal.
8. Core JAVA An Integrated Approach By Dr. R. Nageswara Rao dremtech Publicatio.

**Subject- Software Testing**

**PCSC – 602**

**Fundamentals of Testing**

Human and errors, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics.

**Role of Testing in SDLC**

Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

**Approaches to Testing - I**

Static Testing ,Structured Group Examinations ,Static Analysis ,Control flow & Data flow, Determining Metrics

**Approaches to Testing - II**

Dynamic Testing ,Black Box Testing ,Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing.

White Box Testing ,Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage.

**Test Management**

Test Organization ,Test teams, tasks and Qualifications ,Test Planning ,Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria ,Cost and economy Aspects ,Test Strategies, Test Activity Management, Incident Management.

**Readings:**

1. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors
2. Software Testing: Ron Patton , Techmedia
3. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000
4. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996
5. Software Engineering – A practitioner’s approach by Roger S. Pressman, 5th Edition, McGraw Hill

## **Subject- Introduction to Data Structure**

### **PCSC – 603**

**Introduction:** Basic terminology, Elementary data organization, Data structure, Data structure Operation and Types, Order of an algorithm, Complexity of Algorithms.

**Array:** Basic Terminology, Linear and multi dimensional Array.

**Pointers:** Array of pointers.

**Records:** Record Structures.

**Linked list:** traversing a linked list, searching a linked list, Insertion into a linked List, Deletion from a Linked List. **Stacks:** operation on stack, Array Representation of Stack.

**Queues:** Linear Queue, Circular Queue, operation on Queue,.

**Trees :** Definition of Trees: Types of Trees, Linear Tree, Binary Tree and Their Representation, Implementation and Searching (inorder, Preorder, Postorder)

**Operations on binary search tree:** Traversing, Searching, Insertion, Deletion.

**Sorting:** Sorting, bubble sort, quick sort, Insertion Sort, Selection Sort, Merge sort, heap sort. **Searching:** Binary Search, hashing.

#### **Readings:**

1. Data Structure - Seymour Lipschutz (Schaum's Series).
2. Data Structure & Program Design - Robert L. Kruse, 3rd Ed., Prentice Hall.
3. Standish, Data Structure, Addison-Wesley.
4. A. M. Tennenbaum, Y. Langsam and M. J. Augenstein, Data Structures using C, PHI, 1996.
5. N. Wirth, Algorithms+Data Structures= Program, Prentice Hall.
6. Robert Lafore, Data Structures and Algorithms in Java, Sams.
7. Sahni S, data Structures, Algorithms and Applications in C++ , Mc Graw- Hill, 2002.
8. R. B. Patel and M.M.S. Rauthan, Expert Data Structures With C++, Khanna Publications, Delhi, India.
9. G. S. Baluja Data Structures Using C

**Subject- Management Information System**  
**PCSC -604**

**Management Information System:** Definition, MIS as an evolving concept, MIS and other Academic Disciplines, Subsystems of an MIS.

**Structure of MIS:** Elements of an Information System, MIS support for Decision making, MIS Structure.

**Hardware, Software, and communications** Technology for Information Systems.

**System & Design: Systems** Development Initiative, Different Methodologies - Life Cycle & Prototype approach, detailed study on Life Cycle Design & Implementation. Case Study.

**Managerial Decision Making:** Decision Making Process, Group Decision Support Systems, Architecture of GDSS, Categories of GDSS.

**Decision Support System:** Definition, Components of DSS (Data Base Management System, Model Base Management System, Support Tools), Applications of DSS, Functions of DSS.

**Study of Computerization:** Computerization in different functional areas of a typical manufacturing/business organization i.e. Marketing, production, material, financial, personal.

**Readings:**

- 1 Management Information Systems, Gordon B. Davis & Margerethe H. Olson  
Mc-Graw-Hill
- 2 Management Information Systems, Kenneth, Prentice Hall Publication
- 3 Management Information Systems, T. Lucey , Thomson Learning

***MAJOR PROJECT***

**PCSC – 605**