Department of Computer Science & Information technology
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.

SYLLABUS FOR UG/PG INTEGRATED (CS) COURSE UNDER *CHOICE BASED CREDIT SYSTEM* (CBCS)

Semester 1 **Session 2017-18 (On and after)**

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-101	Fundamentals of Computers and Programming Methodology	2		20	30	2
2	PCSC-102	Introduction to Logics of Computer	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-103	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-201	Introduction to Data Structures	2		20	30	2
2	PCSC-202	Computer Programming using C	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-203	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 3

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-301	Computer Based Numerical Methods	2		20	30	2
2	PCSC-302	Database Management Systems	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
8	PCSC-303	Lab based on Computer Science		2	20	30	2
9		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

Semester 4

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-401	System Analysis and Design	2		20	30	2
2	PCSC-402	Introduction to Computer Networks	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics – I	2		20	30	2
6		Physics/Electronics – II	2		20	30	2
7		Environment – I	3		40	60	3
9	PCSC-403	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

Semester 5

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -501	Introduction to OOPS (C++)	4		20	30	4
2	PCSC-502	Introduction to Operating Systems	4		20	30	4
3	PCSC-503	Internet Applications	4		20	30	4
4	PCSC-504	Introduction to Software Engineering	4		20	30	4
5	PCSC-505	Minor Project		4		100	4
		Total	16	4	80	220	20

Semester 6

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -601	Programming in Visual Basic	4		20	30	4
2	PCSC-602	Introduction to JAVA	4		20	30	4
3	PCSC-603	Linux Operating System and Shell Programming	4		20	30	4
4	PCSC-604	Introduction to Artificial Intelligence	4		20	30	4
5	PCSC-605	Major Project		4		100	4
		Total	16	4	80	220	20

Total Course Credits – 126

*** The syllabus is subjected to change as per the requirement.**

Subject – Fundamentals of Computers and Programming Methodology
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.

Programming tools: Algorithm, Characteristics of algorithm, Program flow Charts, Pseudo code, Decision tables, and Structured programming techniques.

Basic concepts of any programming language: Character set, keywords, identifiers, assigning values of variables, Decision making and looping: recursion, switch ....break, repeat, labels and goto statements, types of operators in C Language, JAVA (Basic Principles, class, object), C++ etc.

Readings:

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

Subject – Introduction to logics of computer
Paper Code – PCSC-102

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 Moriss Manno, 3rd edit ion, Print ice Hall o f 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 rd Edit ion.

Subject- Introduction to Data Structures
PCSC – 201

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

Array, Pointers and Records: Basic Terminology, Linear and multi dimensional Array. Pointers: Array of pointers. Records: Record Structures.

Linked list, Stacks, Queues: 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 and searching: 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 –Computer Programming using C
Paper code – PCSC-202

Origin & Introduction to C : About C, Evolution of C, 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 o f 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 & File Management: Declaring structure and union **File Management:** Defining & opening a file, closing a file, I/O operations on file.

Readings:

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

Subject – Computer Based Numerical Methods
Paper code – PCSC-301

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 – Database Management Systems
Paper code – PCSC-302

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 –System Analysis and Design
Paper code – PCSC-401

System Concepts: What is system, Characteristics of system, Elements of a system, Computer based system and it s Components, Types o f Systems: Open and Closed System, Transact ion Processing System, MIS, DSS etc.

System Analysis & Requirement Analysis: what is System Analysis, Ro le and Qualities o f System Analyst, System Development Life Cycle- Phases o f S DLC, 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 : System testing – Black Box Testing, White Box Testing, Unit Testing , Integration Testing, Modular Testing.

Implementation, Type of Implementation- Fresh, Replacement and Modified, Implementation Methods.

Readings:

1. Analys is and Design of Infor mat ion System: James A Senn
2. System Analysis and Design: Awad

Subject - Introduction to Computer Networks
Papercode-PCSC-402

Introduction: Goal and application, Network Hardware and Software, Connection oriented and connection less services, Types of computer Network: LAN, MAN, WAN, Topologies, Transmission mode.

Reference Models – The OSI Reference model, The TCP/IP Model, Function of the layers.

Physical Layer: Data and signal, Analog and digital Communication, Transmission Media Guided Media, Unguided Media, Transmission Impairment, Switching Techniques, Multiplexing – FDM, WDM, TDM.

Data Link Layer: Data Link Layer design issues Data link control: Framing, Flow control. Error detection and correction. Protocol: Stop and Wait Protocol, Sliding window protocol, introduction to MAC.

Network Layer : The Network Layer Design Issue, IP addressing, Address mapping, Multicasting, subneting.

Readings:

1. Data Communications and Networking By Forouzan, Tata McGraw Hill Company.
2. Computer Networks By A.S. Tanenbaum
3. Computer Network By S.S.Shinde , New Age International Publisher.

Subject – Introduction to OOPs(C++)
Paper code – PCSC- 501

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 – Introduction to Operating Systems
Paper code – PCSC-502

Introduction to O.S: Over view of OS , function and goal, characteristics of OS, Hardware Concept related t o OS , CPU States, I/O channels , Memory Hierarchy, Types of OS – Multiprogramming, Times haring, 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, Interpocess 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, Operat ing S ystem Concepts 6/ed, Addisio n Wesley.
2. William Stalling, Operat ing S ystems: Internals and Design Pr inciples 5/ed, PHI.
3. Tanenbaum, Modern Operat ing S ystems, PHI.
4. Peterson and S ilberschatz, Operating S ystem Concepts, Addison Wesley.

Subject – Internet Applications
Paper code – PCSC-503

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 softwares 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, Prenlicc- Hall, India.
3. Internet & Intranet Engineering : Daniel Minoli, TataMcGraw-Hill.
4. Introduction to Data Communication & Networking : Forouzan.

Subject – Introduction to Software Engineering
Paper code – PCSC-504

Software Engineering Fundamental: Introduction, evolution of software Engineering, Software Life Cycle Models, Comparisons of all models, Metrics for Project Size Estimation: line of Code, Function Point .Project Cost Estimation Model COCOMO and its types.

Requirement Analysis and Software Design: SRS and its characteristics, Software designing approaches, Modular designing, coupling, cohesion. Interface designing: Basic Concepts and types,

Coding and Testing: Coding standards and guidelines, code review techniques, types of system Failure, objective and types of testing, testing activities.

Software Reliability, Quality Management: Software reliability and software Quality Assurance, Software reliability Metrics, ISO 9000 certification, SEI Capability Maturity Model(CMM) its level, focus and key process .

Software Maintenance: Types of maintenance, maintenance tools, maintenance activities,

Readings:
1. Software Engineering: A practitioner Approach, Pressman Rogers, TMGH
2. Fundamentals of Software Engineering, Rajib Mall, PHI
3. An Integrated approach of software Engineering, Pankaj Jalote, Narosa, New Delhi.
4. Software Engineering Demystified by Deepti Bhanot, Galgotiya Publication.

Subject – Programming with Visual Basic
Paper code – PCSC-601

Introduction to visual Basic: Event Driven Programming, Features of VB, Introduction to IDE, Introduction to VB Controls and their properties, methods, events, forms, MDI forms, modules. Overview of variables, Constants, data types, Declaring Scope, Operators. Interacting with the user: Msgbox function, Inputbox function, If...Then statements, Select case, Looping statements: do..While, for.. next, for each, exiting a loop, goto statement Array, Working with control array

Procedure and Functions: types of function, library function, string handling functions, date and time function, creating user defined function & procedure, call by value and call by reference, concept of recursion.

Working with Controls: Types of control, ComboBox and ListBox, Option Button Status Bar, menu editor.

Error Handling and File Handling: Types of errors, error trapping tools: watch window, local window, immediate window, tracing program flow with call stack. type of file handling, Sequential file handling: reading, writing. Random access file: reading, writing.

Data Access Using the ADO Data Control: Basic concepts of relational database concepts, connection using the ADO Data control to RDBMS, visual data manager, introduction to SQL, Cursor locations and types of Recordset and different lock types.

Readings:

1. Introduction to VB Programming : By V. K Jain
2. Database Programming VB6 : By B.P.B. Publication
3. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill
4. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill

Subject- Introduction to JAVA
Paper code – PCSC - 602

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 Publication.

Subject – Linux Operating System and Shell Programming
Paper code – PCSC-603

Introduction to Linux: History, various distributions, File System and architecture of the Linux, features and advantages of Linux. Basic commands: PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar,gzip

Utilities: Vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text processing utilities and backup utilities, Security commands.

Introduction to Shell: Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, FILTERS: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

GREP: Operation, grep Family, Searching for File Content. **SED**: Scripts, Operation, Addresses, commands, Applications, grep and sed. **AWK:** Execution, Fields and Records, Scripts, Operations, Patterns, Actions.

Shell and Shell Programming: Types of Shell, Linux variables, Iteration, control and if statement, conditional executions, tests, Array, case statement, Strings and substrings, functions, local and global shell variable (export command).

Readings:

1. Unix and shell Programming, Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.
3. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.
6. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher

Subject - Introduction to Artificial Intelligence
Paper Code – PCSC – 604

Introduction: Meaning, importance to make machines intelligent, challenges before AI, Different areas of A.I. Applications, exactness in AI solutions, meaning of natural language processing (NLP)

Problems Solving in AI: Understanding a problem, state space, state space search, production systems, some AI problems like Tic Tac Toe,8 puzzle, cannibals and missionary, solution of a water jug problem using production system

Search Techniques: Meaning and importance, blind search and informative search techniques, depth first and breadth first search, algorithms and examples, best first search with examples

Knowledge Representation: Propositions and propositional logic, applications and examples, limitations, Predicate logic, converting from simple sentences to predicate, simple semantic net

LISP: Simple statements and programs using LISP

Readings:

1. E. Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill.
2. LISP Programming: Any online tutorial / Lecture Notes

MAJOR PROJECT

PCSC-605