

***Faculty of Computer Science & Application***  
***P.K.University***  
***Shivpuri (MP)***



**Evaluation Scheme & Syllabus**  
**Bachelor of Science (Computer Science)**  
**(I Year)**

Department of Computer Science

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**Course Structure , Scheme of Examination & Syllabus**

**Exam Scheme:**

**Theory 70**

**Internal 30**

**Practical (Internal + External)=25+25=50**

**FIRST SEM**

S.NO	Subject Code	Subject Name	Theory	Internal	practical	total
1	Computer Systems and Programming in C	BCS-101	70	30	50	150
2	Language & Communication	BCS-102	70	30	-	100
3	Computer Organization	BCS-103	70	30	-	100
4	Discrete Mathematics	BCS-104	70	30	-	100
5	Principle of Management	BCS-105	70	30	-	100
	<b>GRAND TOTAL</b>					550

**SECOND SEM**

S.NO	Subject Code	Subject Name	Theory	Internal	Practical	Total
1	Data Structure using 'C'	BCS-201	70	30	50	150
2	Organization Behavior	BCS-202	70	30	-	100
3	Computer Based Numerical & Statistical Techniques	BCS-203	70	30	50	150
4	Computer Networks	BCS-204	70	30	-	100
5	Digital Electronics	BCS-205	70	30	-	100
	<b>GRAND TOTAL</b>					600

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**I SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-101- Computer Systems & Programming in C**

**L    T    P**  
**3    1    2**

Unit	Contents
<b>I</b>	<p><b>Unit1:</b>            Introduction to digital computer, basic operations of computer, functional components of computer, Classification of computers.            Introduction to operating system: [DOS, Windows, Linux and Android] purpose, function, services and types.            Number system : Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic.            Basics of programming: Approaches to Problem Solving, Concept of algorithm and flow charts, Types of computer languages:- Machine Language, Assembly language and High Level Language, Concept of Assembler, Compiler, Loader and Linker.</p>
<b>II</b>	<p><b>Standard I/O in C Standard I/O in C</b>, Fundamental data types- Character type, integer, short, long, unsigned, single and double floating point, Storage classes- automatic, register, static and external,            Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity. Fundamentals of C programming: Structure of C program, writing and executing the first C program, components of C language.</p>
<b>III</b>	<p>Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, Sequential search, Sorting arrays, Strings, Structures: Purpose and usage of structures, declaring structures, assigning of structures, Pointers to Objects: Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, Union , Enumeration, The Standard C Preprocessor: Defining macros and calling macros, utilizing conditional compilation, passing values to the compiler, The Standard C Library: Input/output : fopen, fread, etc, string handling functions, Math functions :log, sine, like Other Standard C functions.</p>

<b>IV</b>	<b>Arrays:</b> Array notation and representation, manipulating array elements, using multidimensional arrays. Structure, union, enumerated data types
<b>V</b>	<b>Pointers:</b> Introduction, declaration, applications File handling standard C preprocessors, defining and calling macros, conditional compilation, passing values to the compiler.

### Reference Books:

1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.
3. Computer System and Programming in C By Dr. Anand K. Tripathi, Dr. Monika Tripathi, Laxmi Publication Delhi

Department of Computer Science

**Bachelor of Science (Computer Science)**  
**(Faculty of Computer Science & Application)**  
**P.K. University, Shivpuri (MP)**

**I SEMESTER (I YEAR)**

**Paper Code & Title: BCS-102-Language & Communication**

L    T    P  
3    1    0

Unit	Contents	Contact Hours
<b>I</b>	Fundamentals of Communication Technical Communication; features: Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communications; The flow of Communication: Downward, Upward, Lateral of Horizontal (Peer group): Importance of technical communication; Barriers to Communication.	<b>14</b>
<b>II</b>	Constituents of Technical Written Communication Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Correct Usage: all Parts of Speech; Modals; Concord; Articles; Infinitives; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods- Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation-various steps. Business Communication Principles, Sales & Credit letters; Claim and Adjustment Letters; Job application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance. Negotiation & Business Presentations skills.	<b>14</b>
<b>III</b>	Presentation Strategies and Listening Skills. Defining Purpose; Audience & Local; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Dimension of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Listening Skills: Active Listening, Passive Listening. Methods for improving Listening Skills.	<b>14</b>

**Reference Books:**

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt.Ltd, 2011, NewDelhi.
2. Business Correspondence and Report Writing by Prof. R.C.Sharma & Krishna Mohan, Tata McGraw Hill & Co.Ltd.,2001, NewDelhi.

**Text Books:**

1. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
2. Technical Communication: A Practical Approach: Madhu Rani and Seema Verma- Acme Learning, NewDelhi-2011
3. Technical Communication- Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press,2007, NewDelhi.

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**I SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-103:- Computer Organization**

**L    T    P**  
**3    1    0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit, Design of Fast address, Arithmetic Algorithms (addition, subtraction, Booth Multiplication), IEEE standard for Floating point numbers. Hardwired & Micro Programmed (Control Unit): Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization.	<b>14</b>
<b>II</b>	Hardwired Control, Micro programmed control (Microinstruction, Micro-program sequencing, Wide-Branch addressing, Microinstruction with Next address field, Prefetching Microinstruction). Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer. I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.	<b>14</b>
<b>III</b>	Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), organization of 2D and 2 1/2D, Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.	<b>14</b>

**Reference Books:**

1. Computer Organization, Vravice, Zaky & Hamacher (TMH Publication).
2. Structured Computer Organization, Tannenbaum (PHI).
3. Computer Organization, Stallings (PHI).
4. Computer Organization, John P. Hayes (McGraw Hill).

**Text Book:**

1. Computer System Architecture, M. Mano (PHI).

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science& Application)***  
***P.K. University, Shivpuri (MP)***

**I SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-104:-Discrete Mathematics**

Unit	Contents	L 3	T 1	P 0	Contact Hours
<b>I</b>	Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets. Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation. Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.				<b>14</b>
<b>II</b>	Mathematical Induction: Piano's axioms, Mathematical Induction D Numeric Functions and Generating functions Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients. Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.				<b>14</b>
<b>III</b>	Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices.				<b>14</b>

**Reference Books:**

1. Chowdhary, K. R. "Fundamentals of discrete Mathematical Structures", 2<sup>Ed</sup>, PHILearning.
2. Liptschutz, Seymour, "Discrete Mathematics", TMH.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH.

**Text Books:**

1. Trembley, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", TMH.

**Bachelor of Science ( Computer Science )  
(Faculty of Computer Science & Application)  
P.K. University, Shivpuri (MP)**

**I SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-105:-Principle of Management**

**L    T    P  
3    1    0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Evolution of Management: - Contribution of Taylor, Mayo & Fayol, Different approaches of management, role of manager, tasks of a professional manager, Management & its functions. Level of Management, managerial skills at various levels. Planning & Decision making: - Definition, Nature for planning, importance, Process of planning, decision making, nature importance & process, types of plans.	<b>14</b>
<b>II</b>	Organization & staffing: - Definition, organizing process, importance of organizing, Departmentation manpower planning, Recruitment, Selection, Training & promotion. Directing & Leadership:- X Theory, & Y Theory, Hawthorne & Tinstone studies Leadership. Definition, Stogdill trait theory, Managerial grid, Fiedlers contingency approach.	<b>14</b>
<b>III</b>	Motivation – Meaning, Missions, Herzberg's theory, V Room's expectancy theory & Porter & Lawler model of Motivation. Communication & control Communication Definition, importance, process, types, factors affecting communication methods, barriers & remedies.	<b>14</b>

**Reference Books:**

1. Principles & Practice of Management – L. M.Prasad
2. Management – Theory & Practice – C. B.Gupta



**Bachelor of Science ( Computer Science )  
(Faculty of Computer Science & Application)  
P.K. University, Shivpuri (MP)**

**II SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-201-Data Structure using 'C'**

L    T    P  
3    1    0

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices, and Vectors. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion. Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.	<b>14</b>
<b>II</b>	Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Dequeue, and Priority Queue. Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.	<b>14</b>
<b>III</b>	Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm. Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.	<b>14</b>

**Reference Books:**

1. Y. Langsam, M. Augenstein and A. Tannenbaum, Data Structures using C and C++, Pearson Education Asia, 2nd Edition, 2002.
2. Ellis Horowitz, S. Sahni, D. Mehta Fundamentals of Data Structures in C++, Galgotia Book Source, New Delhi.
3. S. Lipschutz, Data Structures Mc-Graw Hill International Editions, 1986.
4. Jean-Paul Tremblay, Paul. G. Soresan, An introduction to data structures with Applications, Tata Mc-Graw Hill International Editions, 2<sup>nd</sup> Edition 1984.
5. A. Michael Berman, Data structures via C++, Oxford University Press, 2002.

Department of Computer Science

**Bachelor of Science ( Computer Science )**  
**(Faculty of Computer Science & Application)**  
**P.K. University, Shivpuri (MP)**

**II SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-202:-Organization Behavior**

		<b>L</b>	<b>T</b>	<b>P</b>
		<b>3</b>	<b>1</b>	<b>0</b>
<b>Unit</b>	<b>Contents</b>			<b>Contact Hours</b>
<b>I</b>	Organizational Behavior – What is O.B., Nature and Structure and Structure of O.S. approaches to O.B. behaviorists frame work, social learning frame work. Basic understanding of Individual behaviors:-personality – meaning, development, Freudian stage, Neo Freudian stage.			<b>14</b>
<b>II</b>	Perception-nature, Importance, meaning, learning & perception. Attitudes & satisfaction:- nature, dimensions of attitudes, meaning of job satisfaction. Sources & consequences of job satisfaction. Job stress – meaning, causes & effects. Group dynamics: - Nature of Groups, types- committee organization, its nature & functions. Informal Organization structure, Informal communication system			<b>14</b>
<b>III</b>	Conflicts – Organizational conflicts, types of conflict, Strategies of interpersonal conflicts. Group decision making & control:- Nature and meaning of decision making, phases of decision making process, Meaning of Control, elements of control process.			<b>14</b>

**Reference Books:**

1. Business Organization and Management by BhushanY.K.
2. Business Organization by GuptaC.B
3. Organizational Behavior by L.M.Prasad

**Bachelor of Science ( Computer Science )  
(Faculty of Computer Science & Application)  
P.K. University, Shivpuri (MP)**

**II SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-203-Computer Based Numerical & Statistical Techniques**

Unit	Contents	L 3	T 1	P 0	Contact Hours
<b>I</b>	Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation. Errors in numerical computation. Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods. Finite differences and Interpolation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Sterling's, Bessel's, Everett's formula. Lagrange's Interpolation, Newton Divided difference formula, Hermit's Interpolation for unequal intervals.				<b>14</b>
<b>II</b>	Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's Rule, Weddle's Rule Euler-Maclaurin Formula. Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, Ill Conditioned system of equations, Refinement of solution. Gauss Jacobi and Gauss Seidel iterative methods, Rate of Convergence. Solution of differential equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector methods				<b>14</b>
<b>III</b>	Curve fitting, Approximations and Regression Analysis: Method of least squares, fitting of straight lines, polynomials, exponential curves etc. Approximation of functions by Chebyshev polynomials. Linear, Non-linear and Multiple regressions. Statistical methods: Sample distributions, Test of Significance: Chi-Square Test, t and F test.				<b>14</b>

**Reference Books:**

1. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons.
3. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand & Sons.

**Text Books:**

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI
2. Gerald & Wheatley, "Applied Numerical Analyses", AW

**Bachelor of Science ( Computer Science)**  
**(Faculty of Computer Science& Application)**  
**P.K. University, Shivpuri (MP)**  
**II SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-204-Computer Networks**

Unit	Contents	L 3	T 1	P 0	Contact Hours
<b>I</b>	Basic Concepts: Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media.				<b>14</b>
<b>II</b>	Telephony: Multiplexing, error detection and correction: Many to one, One to many, WDM, TDM, FDM, Circuit switching, packet switching and message switching. Data link control protocols: Linediscipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures. Point to point controls: Transmission states, PPP layers, LCP, Authentication, NCP. ISDN: Services, Historical outline, subscriber's access, ISDN Layers and broadcastISDN.				<b>14</b>
<b>III</b>	Devices: Repeaters, bridges, gateways, routers, The Network Layer; Designissues, Routing algorithms, Congestion control Algorithms, Quality of service, Internetworking, Network-Layer in the internet. Transport and upper layers in OSI Model; Transport layer functions, connection management, functions of session layers, presentation layer and applicationlayer.				<b>14</b>

**Reference Books:**

1. A.S.Tanenbaum, "Computer Networks"; Pearson Education Asia, 4<sup>th</sup> Ed.2003.
2. Behrouz A. Forouzan, "Data Communication and Networking", 3<sup>rd</sup> Ed, Tata McGraw Hill, 2004.
3. William stallings, "Data and computer communications", Pearson education Asia, 7<sup>th</sup> Ed.,2002.

**Bachelor of Science ( Computer Science)**  
**(Faculty of Computer Science& Application)**  
**P.K. University, Shivpuri (MP)**

**II SEMESTER ( I YEAR )**

**Paper Code & Title: BCS-205-Digital Electronics**

**L    T    P**  
  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Digital computers and Digital systems, Number systems : Binary number system, Octal & Hexadecimal number system, Conversion of Number System, Complements: r's and (r-1)'s complement, Signed Binary numbers, Binary codes, Arithmetic operations on Binary numbers. Logic Gates: AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates. Boolean Algebra: Law's, Postulates and theorems, Universal building blocks, logic diagrams, Converting circuits to universal logic, Minimization techniques: K -Map, Sum of Product & Product of Sum, Tabulationmethod.	<b>14</b>
<b>II</b>	Combinational circuits: Adders, Subtractors, Binary parallel adders, Adder/Subtractor, Decimal adder, Code conversion, Magnitude com parator, Multiplexers, Demultiplexers, Decoders & Encoders.	<b>14</b>
<b>III</b>	Flip-flops: Types of Flip Flop: R-S, D, J-K, T, Master Slave, Triggering of flip-flops, state reduction and assignment, Conversion of flip-flops and State Realization of one Flip Flop Using Other Flip Flop. Registers and Counters: Shift Registers, Types of registers, Universal Shift Register with parallel load, Bi-directional Shift register, Ripple counters, synchronous counters, Ring counters, Johnson counter, Modcounters.	<b>14</b>

**Reference Books:**

1. Moris Mano, Digital Logic and Computer Design, Prentice Hal of India.
2. Moris Mano, Digital Design, Prentice Hal of India.
3. R.K. Gaur, Digital Electronics and Microcomputer, Dhanpat Rai Publication
4. R.P. Jain, Modern Digital Electronics, Tata McGraw-Hil
5. Malvino & Leach, Digital Principles and Applications, Tata McGraw-Hil.
6. Rajaraman & Radhakrishanan, An introduction to Digital Computer Design, Prentice Hal of India.

*Department of Computer Science*

***Faculty of Computer Science & Application***  
***P.K.University***  
***Shivpuri (MP)***



**Evaluation Scheme & Syllabus**  
**Bachelor of Science (Computer Science)**  
**(II Year)**

Department of Computer Science



***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**Course Structure, Scheme of Examination & Syllabus**

**Exam Scheme:**

**Theory 70**

**Internal 30**

**Practical (Internal +External) =25+25=50**

**THIRD SEM**

S.NO	Subject Code	Subject Name	Theory	Internal	Practical	Total
1	Object Oriented Programming Using C++	BCS-301	70	30	50	150
2	Design and Analysis of Algorithms	BCS-302	70	30	50	150
3	System Analysis & Design	BCS-303	70	30	-	100
4	Operating Systems	BCS-304	70	30	-	100
5	Financial Accounting & Management	BCS-305	70	30	-	100
	<b>GRAND TOTAL</b>					<b>600</b>

**FOURTH SEM**

S.NO	Subject Code	Subject Name	Theory	Internal	Practical	Total
1	.Net Framework using C#	BCS-401	70	30	50	150
2	Software Engineering	BCS-402	70	30	-	100
3	Business Communication	BCS-403	70	30	-	100
4	Optimization Technique	BCS-404	70	30	-	100
5	Database Management System	BCS-405	70	30	50	150
	<b>GRAND TOTAL</b>					<b>600</b>

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science& Application)***  
***P.K. University, Shivpuri (MP)***

**III SEMESTER ( II YEAR )**

**Paper Code & Title: BS-301-Object Oriented Programming Using C++**

**L    T    P**  
**3    1    0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Introduction: Introducing Object – Oriented Approach, Relating to other paradigms (Functional, Data decomposition). Basic concepts: Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ cin, cout, new, delete, operators. Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types++ garbage collection, dynamic memory allocation, Meta class / abstractclasses.	<b>14</b>
<b>II</b>	Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism.	<b>14</b>
<b>III</b>	Generic function: Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance. Files and Exception Handling: Streams and files, Namespaces, Exception handling, Generic Classes.	<b>14</b>

**Reference Books:**

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH,1997.
2. S.B.Lippman & J.Lajoie, “ C++ Primer”, 3rd Edition, Addison Wesley, 2000.TheC programming Lang., Person Ecl – DennisRitchie
3. R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications,2004.
4. E. Balagurusamy, “Object Oriented Programming with C++”,TMH.
5. Herbert Sehlidt, “The Complete Reference c++”,TMH.
6. Schaum's Outline, Programming with C++,TMH.

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***  
**III SEMESTER (II YEAR)**

**Paper Code & Title: BS-302- Design and Analysis of Algorithms**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences and their solution methods. Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort, Medians and order statistics Advanced Data Structure: Red Black Trees, Augmenting Data Structure, Binomial Heap, B-Tree, Fibonacci Heap, and Data Structure for Disjoint Sets, All kinds of Algorithms on these data structures, Dictionaries and priority Queues, mergeable heaps, concatenable queues.	<b>14</b>
<b>II</b>	Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem.	<b>14</b>
<b>III</b>	Randomized Algorithms, String Matching, NP-Hard and NP-Completeness, Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and FFT, Number Theoretic Algorithms.	<b>14</b>

**Reference Books:**

1. Thomas H Cormen, Leiserson "Introduction to Algorithms", PHI Learning Private Limited, Delhi India.
2. Sara Baase and Allen Van Gelder, Computer Algorithms: "Introduction to Design and Analysis", Pearson Education
3. Jon Kleinberg and Eva Tardos "Algorithm Design", Pearson Education
4. Brassard Bratley "Fundamental of Algorithms", PHI Learning Private Limited, Delhi India.
5. M T Goodrich "Algorithms Design", John Wiley
6. Aho, "Design and Analysis of Computer Algorithms", Pearson Education.
7. Horowitz and Sahani, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd Delhi, India.

**Bachelor of Science ( Computer Science )  
(Faculty of Computer Science & Application)**

**P.K. University, Shivpuri (MP)**

**III SEMESTER ( II YEAR )**

**Paper Code & Title: BCS-303- System Analysis & Design**

**L      T      P  
3      1      0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Overview of System Analysis and design: System Development life Cycle. Concept and models: requirements determination, Logical design, physical Design, test, planning, implementation planning and performance evaluation, interviewing, presentation skills; group – based approaches JAD. (Information requirement Analysis ; process modeling with physical data flow diagrams, data modeling with logical entity relationship diagrams ; Developing a Proposal; Feasibility study and cost estimation . System Design, Design of input and control, design of output and control. File design / database design, process design, user interface design, prototyping, software construction, documentation.	<b>14</b>
<b>II</b>	Application Development Methodologies and CASE tools , information engineering , structured system analysis and design object oriented methodologies for application development data modeling , process modeling , user interface design and prototyping , use of computer aided software engineering (CASE) tools in the analysis , design implementation of information systems.	<b>14</b>
<b>III</b>	Design and Implementation of OO platform , Object Oriented Analysis and design through object modeling technique , object modeling , dynamic modeling and functional modeling , object oriented design and object oriented programming system for implementation , object oriented data bases. System Implementation, Hardware Software selection, System testing, System Training, Software design, System maintenance.	<b>14</b>

**Reference Books:**

1. Haryszkiewicz, I.T, "Introduction of System Analysis and Design" PHI1989.
2. Raja Raman, V , " Analysis and Design of Information System" PHI1991.

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science& Application)***  
***P.K. University, Shivpuri (MP)***

**III SEMESTER ( II YEAR )**

**Paper Code & Title: BCS-304- Operating Systems**

**L    T    P**  
  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Definition and types of operating systems, Batch Systems, multi programming, time-sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines. Process Management: Process concept, Process scheduling, Cooperating processes, Threads, Interprocess communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling and Algorithm evaluation.	<b>14</b>
<b>II</b>	Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling. Storage management: Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.	<b>14</b>
<b>III</b>	Security & Case Study: Protection and Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption. Windows NT-Design principles, System components, Environmental subsystems, File system, Networking and program interface, Linux system-design principles, Kernel Modules, Process Management, Scheduling, Memory management, File Systems, Input and Output, Interprocess communication, Network structure, security	<b>14</b>

**Reference Books:**

1. Abraham Siberschatz and Peter Baer Galvin, "Operating System Concepts", Fifth Edition, Addison-Wesley
2. Milan Milankovic, "Operating Systems, Concepts and Design", McGraw-Hill.
3. Harvey M Deital, "Operating Systems", AddisonWesley
4. Richard Peterson, "Linux: The Complete Reference", OsborneMcGraw-Hill

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***  
**III SEMESTER (II YEAR)**

**Paper Code & Title: BCS-305- Financial Accounting & Management**

**L    T    P**  
**3    1    0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Overview: Accounting concepts, conventions and principles; Accounting Equation, International Accounting principles and standards; Matching of Indian Accounting Standards with International Accounting Standards. Mechanics of Accounting: Double entry system of accounting, journalizing of transactions; preparation of final accounts, Trading Account, Manufacturing Accounts, Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill.	<b>14</b>
<b>II</b>	Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios ; Common Size Statement ; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.	<b>14</b>
<b>III</b>	Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of Changes in Working Capital, Preparation of Funds Flow Statement and its analysis. Cash Flow Statement: Various cash and non-cash transactions, flow of cash, preparation of Cash Flow Statement and its analysis.	<b>14</b>

**Reference Books:**

1. Narayanswami - Financial Accounting: A Managerial Perspective (PHI, 2ndEdition).
2. Mukherjee - Financial Accounting for Management (TMH, 1stEdition).
3. Ramchandran & Kakani - Financial Accounting for Management (TMH, 2ndEdition).
4. Ghosh T P - Accounting and Finance for Managers (Taxman, 1stEdition).
5. Ashish K. Bhattacharya- Essentials of Financial Accounting (PHI, NewDelhi)
6. Ghosh T.P- Financial Accounting for Managers (Taxman, 3rdEdition)
7. Maheshwari S.N & Maheshwari S K – A text book of Accounting for Management (Vikas, 1st Edition)
8. Gupta Ambrish - Financial Accounting for Management (Pearson Education, 2ndEdition)
9. Chowdhary Anil - Fundamentals of Accounting and Financial Analysis (Pearson Education, 1st Edition).

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**IV SEMESTER (II YEAR)**

**Paper Code & Title: BS-401- .Net Framework using C#**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Introduction to .NET Technology, Introduction to VB.NET, Software development and Visual Basic .NET, Visual Basic .NET and .NET frame. Visual Basic fundamentals: The Visual Basic .NET Development Environment, The element of VB.NET, VB.NET operators, Software design, Conditional structure and control flow, Methods.	<b>14</b>
<b>II</b>	Classes and Objects: Types, Structure and Enumeration, Classes, Interfaces, Exception handling and Classes, Collections, Arrays and other Data Structure.	<b>14</b>
<b>III</b>	Advance design concepts, Patterns, Roles and Relationships, Advanced Interface Patterns: Adapters and Delegates and Events Data Processing and I/O. Writing Software with Visual Basic .NET, Interfacing with the End User, Introduction to ASP.NET and C#.NET and their features.	<b>14</b>

**Reference Books:**

1. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" TMH (2002 Edition).
2. Rox "Beginner and Professional Edition VB.NET" Tata McgrawHill.
3. Steven Holzner "Visual Basic .NET Black Book" Wiley Dreamtech Publication.
4. Alex Homer, Dave Sussman "Professional ASP.NET 1.1" Wiley Dreamtech.
5. Bill Evzen, Bill Hollis "Professional VB.NET 2003" Wiley Dreamtech.
6. Tony Gaddis "Starting Out VB.NET PROG. 2nd Edition" Wiley Dreamtech.
7. Chris Ullman, Kauffman "Beg. ASP.NET 1.1 with VB.NET 2003" Wiley Dreamtech.

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science& Application)***  
***P.K. University, Shivpuri (MP)***  
**IV SEMESTER (II YEAR )**  
**Paper Code & Title: BS-402- Software Engineering**

L      T      P  
3      1      0

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.	<b>14</b>
<b>II</b>	Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design.	<b>14</b>
<b>III</b>	Software Testing and Maintenance: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing. Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Project Management and Other Software Engineering methodologies: Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.	<b>14</b>

**Reference Books:**

1. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
2. Jibitesh Mishra and Ashok Mohanty, Software Engineering: Pearson

**Text Books:**

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGrawHill.
2. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.



***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**IV SEMESTER (II YEAR)**

**Paper Code & Title: BS-403-Business Communication**

**L    T    P**  
**3    1    0**

<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
<b>I</b>	Meaning, Nature, Scope, Definition of Communication, Types of Communication, Communication Barriers, Principles of Communication. Written Communication – Types of Letter, Letter lay-out, Essentials of an effective letter writing, Need and function of Businessletter.	<b>14</b>
<b>II</b>	Oral Communication – Types of oral communication, Barriers to oral communication, speedy – Introduction & Characteristic of good speech. Mass Communication – Nature & Scope of Mass Communication, function of mass communication – Media of mass communication, Role of Mass – Media in India.	<b>14</b>
<b>III</b>	Report Writing - What is report, Importance of Reports, Types of reports, Characteristic of good report selecting suitable types of reports.	<b>14</b>

**Reference Books:**

1. Business Communication – Monopoly & Monipally.
2. Commercial Correspondence – Ghosh & Bhushan.

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**IV SEMESTER (II YEAR)**

**Paper Code & Title: BS-404- Optimization Technique**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.	<b>14</b>
<b>II</b>	Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models (Model-I, Model-II). Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement.	<b>14</b>
<b>III</b>	Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite. Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2machines.	<b>14</b>

**Reference Books:**

1. L. R. Foulds, An Introduction Optimization Techniques Undergraduate Texts in Mathematics 1981
2. A.R., Balling, R., and J.D. Hedengren Optimization Methods for Engineering Design, Parkinson, Brigham Young University, 2013.
3. C. B. Gupta, Optimization Techniques in Operation Research Paperback
4. R. Panneerselvam, Operations Research Paperback, Publisher: Prentice-Hall of India Pvt. Ltd; 2nd edition.

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**IV SEMESTER (II YEAR)**

**Paper Code & Title: BS-405- Database Management System (DBMS)**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Characteristics of database approach, data models, database users, database schema, DBMS architecture and data independence, DBMS structure. E-R Modeling: Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization. EER and ER to relational mapping: Data base design using EER to relational language.	<b>14</b>
<b>II</b>	File Organization: Indexed sequential access files; implementation using B & B++ trees, hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach implementation and performance. Relational Data Model: Relational model concepts, relational constraints, relational algebra SQL: SQL queries, programming using SQL.	<b>14</b>
<b>III</b>	Database Normalization: Functional Dependencies, Normal form up to 3rd normal form. Concurrency Control, Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security.	<b>14</b>

**Reference Books:**

1. Abraham Silberschatz, Henry Korth, S.Sudarshan, "Database Systems Concepts", 4th Edition, McGraw Hill, 1997.
2. Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.
3. A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
4. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991

*Department of Computer Science*

***Faculty of Computer Science & Application***  
***P.K.University***  
***Shivpuri (MP)***



**Evaluation Scheme & Syllabus for**  
**Bachelor of Science (Computer Science)**  
**(III Year)**

Department of Computer Science

***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***

**Course Structure, Scheme of Examination & Syllabus**

**Exam Scheme:**

**Theory 70**

**Internal 30**

**Practical (Internal +External) =25+25=50**

**FIFTH SEM**

S.NO	Subject Code	Subject Name	Theory	Internal	Practical	Total
1	Java Programming	BCS-501	70	30	50	150
2	Artificial Intelligence	BCS-502	70	30	-	100
3	Computer Graphics & Multimedia	BCS-503	70	30	-	100
4	Linux Environment	BCS-504	70	30	50	150
	<b>GRAND TOTAL</b>					<b>500</b>

**SIX SEM**

S.NO	Subject Code	Subject Name	INTERNAL	EXTERNAL	TOTAL
1	PROJECT 6		300	300	600

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***  
**V SEMESTER ( III YEAR )**  
**Paper Code & Title: BCS-501-Java Programming**

Unit	Contents	L 3	T 1	P 0	Contact Hours
<b>I</b>	Internet: Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing. Core Java: Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.				<b>14</b>
<b>II</b>	Java Swing: Creating a Swing Applet and Application, Programming Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame. JDBS: The connectivity Model, JDBS/ODBS Bridge, (5) java.sql package, connectivity to remote database, Navigating through multiple rows retrieved from a database.				<b>14</b>
<b>III</b>	Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB), Introduction to RMI (Remote Method Invocation): A simple client-server application using RMI. Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).				<b>14</b>

**Reference Books:**

1. Margaret Levine Young, "The Complete Reference Internet", TMH Education Pvt.Ltd.
2. Thampi, "Object Oriented Programming in JAVA" Wiley DreamtechPublication.
3. Balagurusamy E, "Programming in JAVA", Tata Mcgraw-hill Education Pvt.Ltd.
4. Dustin R. Callway, "Inside Servlets", Addison Wesley.
5. Mark Wutica, "Java Enterprise Edition", QUE.
6. Steven Holzner, "Java2 Black book", Wiley DreamtechPublication.
7. Liang, "Introduction to Java Programming, Comprehensive Version", PearsonEducation.
8. Deitel and Deitel, "Java: How to Program" PHI Learning Private Limited, Delhi India

***Bachelor of Science ( Computer Science)***  
***(Faculty of Computer Science& Application)***  
***P.K. University, Shivpuri (MP)***  
**V SEMESTER ( III Year )**

**Paper Code & Title: BCS-502-Artificial Intelligence**

**L**  
**3**      **T**  
**1**      **P**  
**0**

Unit	Contents	Contact Hours
<b>I</b>	Introduction: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing. Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.	<b>14</b>
<b>II</b>	Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks. Machine Learning : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data –EM algorithm, Reinforcement learning.	<b>14</b>
<b>III</b>	Pattern Recognition : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.	<b>14</b>

**Reference Books:**

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, TMH Education Pvt.Ltd.
3. E. Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
4. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India



***Bachelor of Science (Computer Science)***  
***(Faculty of Computer Science & Application)***  
***P.K. University, Shivpuri (MP)***  
**V SEMESTER (III Year)**

**Paper Code & Title: BCS-503- Computer Graphics & Multimedia**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Computer Graphics : definition, classification & Applications, Development of Hardware & Software for Computer Graphics. Display devices, Hard copy devices. Interactive Input devices, display processor, Line drawing; various algorithms and their comparison, circle generation- Bresenham's mid-point circle drawing algorithm, mid-point ellipse drawing algorithm. Attributes of output primitives, line style, color and intensity, Area filling algorithms, Scan line algorithm, boundary fill flood fill algorithm, Antialiasing techniques. Two dimensional transformations; translation, scaling, rotation, reflection sheering, composite transformation, transformation commands, character generation.	<b>14</b>
<b>II</b>	Viewing coordinates, Window, view port, clipping, Window to view port transformation, line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm, 3D clipping, normalized view volumes, view port clipping, clipping in homogeneous coordinates. Illumination model: Light sources, diffuse reflection specular reflection, reflected light, intensity levels, surface shading; phong shading ground shading, color models like RGB, YIQ, CMY, HSV etc.	<b>14</b>
<b>III</b>	3-D Viewing: Three-dimensional concepts, 3D display techniques, 3D representation polygon & curved surfaces. Design of curves & surfaces- Bezier's Method, B-Spline methods, 3D transformation translation, scaling, composite transformation rotation about arbitrary axis, projections: Parallel & Perspective, Hidden surface and line removal; back face removal, depth buffer and scan line methods. Introduction to multimedia, multimedia components, multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations.	<b>14</b>

**Reference Books:**

1. D.Hearn and M.P. Baker "Computer Graphics" (2nd ed), PHI.
2. S. Harrington – "Computer Graphics - a Programming approach" (2nd ed) McGrawhill.
3. New Mann & Sprovl- "Principles of interactive computer graphics" (2nd ed) McGrawhill.
4. Roger S. David "Procedural Elements for Computer Graphics", McGrawHill.
5. Roger S David "Mathematical Elements for Computer Graphics", McGrawHill.
6. Foley & Vandan "Computer Graphics Principles & Practice in "C" "AddisionWesly.
7. Tay Vaugham " Multimedia Making it Work" 5th Ed. 2001, Tata McGrawHill.
8. Prabhat K. Andleigh & Kiran Thakur "Multimedia System Design", PHI
9. Drew, "Fundamentals of Multimedia", Pearsons.
10. Nigel Chapman, J. Chapman "Digital Multimedia" WileyIndia.

**Bachelor of Science ( Computer Science)**  
**(Faculty of Computer Science& Application)**

**P.K. University, Shivpuri (MP)**

**V SEMESTER ( III Year )**

**Paper Code & Title: BCS-504- Linux Environment**

**L    T    P**  
**3    1    0**

Unit	Contents	Contact Hours
<b>I</b>	Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux Internals: Introduction, Process Management, System Calls. Linux File system: Logging in, getting familiar with Linux desktop, shell interface, understanding Linux Shell, Types of Text Editors, using vi editor, prompt character, correcting typing errors, simple shell commands-date, cal, who, tty, uname, password, BS, script, echo, logging out, Environment variables, wild card characters, *, ?, absolute and relative path, listing files and directories commands, navigating file system- pwd, cd, mkdir, rmdir, ls, pr, Handling ordinary files- cat, cp, mv, wc, rm, comm., amp, diff, Basic files attributes – file permissions, changing gpermissions.	<b>14</b>
<b>II</b>	Processes and filters : Simple filters- head, tail, cut, paste, sort, uniq, tr, Regular expression Grep utility, Shell command line, redirection, pipeline, spiltoutput, tee, and process- System Processes, internal and external commands, background process, premature termination of process, process priorities, processsch eduling – (at, batch), nohup command. Shell Programming: Interactive scripts, Shell variables, assigning values to variables, positional parameters, command line arguments, arithmetic inshell script, exit status of a command, sleep and wait, script termination.	<b>14</b>
<b>III</b>	Decision taking- if else, nested if, file tests, string tests, case control structure. Loop control structure- while, for, IFS, break, continue, \$* and \$@, logical operators & and executing script, Debugging a script, Debugging a script, executing multiple scripts System Administration : Configuration of Linux, Installation of Linux, Connecting to remote machines- ftp, telnet, Adding and removing users.	<b>14</b>

**Reference Books:**

1. Kathleen Donovan, Linx (Red Hat) Introduction Spiral-bound – 2000, Element K Press; Instructor's Edition edition(2000).
2. James K. L. Linux : Learning The Essentials, Phi Learning Pvt. Ltd.2012.
3. David Brickner - O'Reilly Media Test Driving Linux: ,2005