

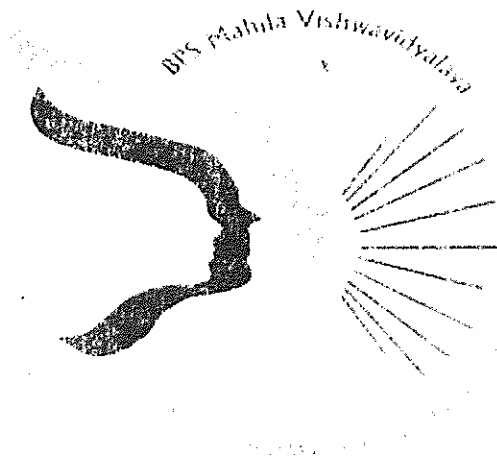
SCHEME & SYLLABUS OF EXAMINATIONS

FOR

FOUR YEAR BCA (Hons.)/ BCA PROGRAMME

(As Per New Education Policy-2020)

From the Academic Session 2024 - 25



**Bhagat Phool Singh Mahila Vishwavidyalaya
Khanpur Kalan, Sonipat**

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Bhagat Phool Singh Mahila Vishwavidyalaya Khanpur Kalan
Scheme of Examination for Four Year UG Programme
Bachelor of Computer Application (Hons.-Interdisciplinary Scheme)
With Effect from the Academic Session 2024-25

First Year: First Semester												
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks				
				L	T	P		Internal Marks		External Marks		Total Marks
								T	P	T	P	
1	BCA-DSC-101	DSC-A	Problem Solving through C	3	0	2	4	20	10	50	20	100
2	BCA-DSC-102	DSC-B	Foundations of Computer Science	3	0	2	4	20	10	50	20	100
3	BCA-DSC-103	DSC-C	Logical Organization of Computer	3	1	0	4	30		70		100
4	BCA-MIC-104	MIC	Mathematical Foundations for Computer Science-I	2	0	0	2	15		35		50
5	BCA-MDC-105	MDC	Cognitive Psychology	2	1	0	3	25		50		75
6		AEC	Choose any one course from the common pool offered by University				2					50
7		SEC	Choose any one course from the common pool offered by University				3					75
8		VAC	Choose any one course from the common pool offered by University				2					50
Total Credits							24	Total Marks				600

First Year: Second Semester												
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks				
				L	T	P		Internal Marks		External Marks		Total Marks
								T	P	T	P	
1	BCA-DSC-201	DSC-A	Object Oriented Programming using C++	3	0	2	4	20	10	50	20	100
2	BCA-DSC-202	DSC-B	Internet and Web Technologies	3	1	0	4	30		70		100
3	BCA-DSC-203	DSC-C	Data Structure and Algorithms	3	0	2	4	20	10	50	20	100
4	BCA-MIC-204	MIC	Mathematical Foundations for Computer Science-II	2	0	0	2	15		35		50
5	BCA-MDC-205	MDC	Emotional Intelligence	2	1	0	3	25		50		75
6		AEC	Choose any one course from the common pool offered by University				2					50
7		SEC	Choose any one course from the common pool offered by University				3					75
8		VAC	Choose any one course from the common pool offered by University				2					50
Total Credits							24	Total Marks				600


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Second Year: Third Semester													
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks					
				L	T	P		Internal Marks		External Marks		Total Marks	
								T	P	T	P		
1	BCA-DSC-301	DSC-A	Java Programming	3	0	2	4	20	10	50	20	100	
2	BCA-DSC-302	DSC-B	Operating System	3	1	0	4	30		70		100	
3	BCA-DSC-303	DSC -C	Data Base Management System	3	0	2	4	20	10	50	20	100	
4	BCA-MIC-304	MIC	Logical Reasoning	2	0	0	2	15		35		50	
5	BCA-MDC-305	MDC	Quantitative Aptitude	2	1	0	3	25		50		75	
6		AEC	Choose any one course from the common pool offered by University				2					50	
7		SEC	Choose any one course from the common pool offered by University				3					75	
Total Credits							24	Total Marks				600	

Second Year: Fourth Semester													
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks					
				L	T	P		Internal Marks		External Marks (Theory)		Total Marks	
								T	P	T	P		
1	BCA-DSC-401	DSC-A	Computer Organization and Architecture	3	1	0	4	30		70		100	
2	BCA-DSC-402	DSC-B	Software Engineering	3	1	0	4	30		70		100	
3	BCA-DSC-403	DSC-C	Computer Graphics	3	0	2	4	20	10	50	20	100	
4	BCA-MIC(VOC)-404	MIC(VOC)	Python	3	0	2	4	20	10	50	20	100	
5		AEC	Choose any one course from the common pool offered by University				2					50	
6		VAC	Choose any one course from the common pool offered by University				2					50	
Total Credits							20	Total Marks				500	


Third Year: Fifth Semester												
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks				
				L	T	P		Internal Marks		External Marks		Total Marks
								T	P	T	P	
1	BCA-DSC-501	DSC-A	Advanced Database Systems	3	0	2	4	20	10	50	20	100
2	BCA-DSC-502	DSC-B	Mastering .NET	3	0	2	4	20	10	50	20	100
3	BCA-DSC-503	DSC-C	Data Communication and Networking	3	1	0	4	30		70		100
4	BCA-MIC(VOC)-504	MIC (VOC)	Web Designing	3	0	2	4	20	10	50	20	100
5		INTERNSHIP	Internship				4	30	-	-	70	100
Total Credits							20	Total Marks				500

Third Year: Sixth Semester												
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks				
				L	T	P		Internal Marks		External Marks		Total Marks
								T	P	T	P	
1	BCA-DSC-601	DSC-A	Programming using R	3	0	2	4	20	10	50	20	100
2	BCA-DSC-602	DSC-B	Theory of Computation	3	1	0	4	30		70		100
3	BCA-DSC-603	DSC-C	Artificial Intelligence	3	1	0	4	30		70		100
4	BCA-MIC-604	MIC	Multimedia Technologies	3	0	2	4	20	10	50	20	100
5	BCA MIC(VOC)-605	MIC (VOC)	Advanced Web Development	3	0	2	4	20	10	50	20	100
Total Credits							20	Total Marks				500



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Fourth Year: Seventh Semester													
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks					
				L	T	P		Internal Marks		External Marks (Theory)		Total Marks	
								T	P	T	P		
1	BCA-DSC-701	DSC-H1	Mobile Application Development	3	0	2	4	20	10	50	20	100	
2	BCA-DSC-702	DSC-H2	Software Testing	3	1	0	4	30		70		100	
3	BCA-DSC-703	DSC-H3	Soft Computing	3	0	2	4	20	10	50	20	100	
4	BCA-DSC-704	DSC-H4 (Choose any one)	Advanced Data Base Management System	3	0	2	4	20	10	50	20	100	
	BCA-DSC-705		Mastering Cyber Security										
5	BCA-DSC-706	DSC-H5	Linux and Shell Programming	3	0	2	4	20	10	50	20	100	
6	BCA-MIC-707	MIC	Cloud Computing	3	0	2	4	20	10	50	20	100	
Total Credits							24	Total Marks				600	

Fourth Year: Eighth Semester (Honours)													
Sr. No.	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks					
				L	T	P		Internal Marks		External Marks		Total Marks	
								T	P	T	P		
1	BCA-DSC-801	DSC-H6	Design & Analysis of Algorithms	3	0	2	4	20	10	50	20	100	
2	BCA-DSC-802	DSC-H7	Data Analytics	3	0	2	4	20	10	50	20	100	
3	BCA-DSC-803	DSC-H8	Information and Network Security	3	1	0	4	30		70		100	
4	BCA-DSC-804	DSC-H9 (Choose any one)	Big Data	3	0	2	4	20	10	50	20	100	
	BCA-DSC-805		Machine Learning										
5	BCA-DSC-806	DSC-H10	Block Chain Technology and Applications	3	0	2	4	20	10	50	20	100	
6	BCA-MIC-807	MIC	Internet of Things(IoT)	3	0	2	4	20	10	50	20	100	
Total Credits							24	Total Marks				600	


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Fourth Year: Eighth Semester (Honours with Research)													
Sr. No	Course Code	Course Type	Course Title	Workload			Credits	Division of Marks					
				L	T	P		Internal Marks		External Marks		Total Marks	
								T	P	T	P		
1	BCA-DSC-801	DSC -H6	Design & Analysis of Algorithms	3	0	2	4	20	10	50	20	100	
2	BCA-DSC-802	DSC-H7	Data Analytics	3	0	2	4	20	10	50	20	100	
3	BCA-MIC-803	MIC	Internet of Things (IoT)	3	0	2	4	20	10	50	20	100	
4		DISSERTATION	Dissertation				12	100		200		300	
Total Credits							24	Total Marks				600	


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Problem Solving through C
BCA-DSC-101
BCA-I Semester

Total Credits: 4
L- T- P
3- 0- 2

External Marks: 50
Internal Marks: 20
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

CO₁: Learn the basics of C program, data types and input/output statements.

CO₂: Understand different types of operators, their hierarchies and also control statements of C.

CO₃: Implement programs using arrays and strings.

CO₄: Get familiar with advanced concepts like structures, union etc. in C language.

CO₅: To implement the programs based on various concepts of C.

Unit – I

Overview of C: Overview of C: History, Importance, Structure of C Program, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Symbolic Constant. Input/output: Formatted I/O Function-, Input Functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putchar(), puts().

Unit- II

Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment, Conditional Operators and Special Operators Operator Hierarchy; Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion. Decision making with if statement, ifelse statement, nested if statement, else-if ladder, switch and break statement, goto statement, Looping Statements: for, while, and do while loop, jumps in loops.

Unit – III

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions. Strings: Declaration and Initialization, String I/O, Array of Strings, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc., Search for a Substring.

Unit - IV

Pointers in C: Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays. User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, Array of Structures; Unions – Union definition; difference between Structure and Union.

Recommended Readings:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill.
2. Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill.
3. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
4. Yashwant Kanetker, Let us C, BPB.
5. Rajaraman, V., Computer Programming in C, PHI.
6. Yashwant Kanetker, Working with C, BPB

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 10 marks. The students will be required to attempt at least one question from each unit.

Practical

Time : 3 Hrs

External Marks: 20
Internal Marks: 10

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. To read radius of a circle and to find area and circumference
2. To read three numbers and find the biggest of three
3. To check whether the number is prime or not
4. To read a number, find the sum of the digits, reverse the number and check it for palindrome



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5. To read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
6. To read percentage of marks and to display appropriate message (Demonstration of else-if ladder)
7. To find the roots of quadratic equation
8. To read marks scored by n students and find the average of marks (Demonstration of single dimensional array)
9. To remove Duplicate Element in a single dimensional Array
10. To perform addition and subtraction of Matrices
11. To find factorial of a number
12. To generate Fibonacci series
13. To remove Duplicate Element in a single dimensional Array
14. To find the length of a string without using built in function
15. To demonstrate string functions
16. To read, display and add two m x n matrices using functions
17. To read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters
18. To Swap Two Numbers using Pointers
19. To demonstrate student structure to read & display records of n students
20. To demonstrate the difference between structure & union.

NOTE: At least ten experiments have to be performed in the semester. Out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above of designed and set by the concerned institution.

Instructions for External Practical Paper Setter/Examiner:

Any two practical exams can be performed as assigned by external examiner for evaluation.


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Foundations of Computer Science
BCA-DSC-102
BCA-I Semester

Total Credits: 4
L- T- P
3- 0 -2

External Marks: 50
Internal Marks: 20
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

- CO1. Understand the basics of computer
- CO2. Learn about I/O devices and operating systems
- CO3. Understand internet and its services
- CO4. Learn about the threats and security concepts on computer
- CO5. To understand the working of operating system, internet and security related concepts.

Unit – I

Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software, Shareware, Freeware, Firmware, Free Software. Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory.

Unit- II

I/O Devices: I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter Introduction to Operating System: Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.

Unit – III

The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Modes of Connecting to Internet. Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.

Unit - IV

Threats: Physical & non-physical threats, Virus, Worm, Trojan, Spyware, Keyloggers, Rootkits, Adware, Cookies, Phishing, Hacking, Cracking. Computer Security Fundamentals: Confidentiality, Integrity, Authentication, Non-Repudiation, Security Mechanisms, Security Awareness, Security Policy, anti-virus software & Firewalls, backup & recovery.

Recommended Readings:

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB.
2. Dromey, R.G., How to Solve it By Computer, PHI.
3. Norton, Peter, Introduction to Computer, McGraw-Hill.
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World.
5. Rajaraman, V., Fundamentals of Computers, PHI.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 10 marks. The students will be required to attempt at least one question from each unit.


Practical

Time : 3 Hrs

External Marks: 20
Internal Marks: 10

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

Operating System:


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1. Starting with basics of Operating Systems and its functionalities Computer Basics:
2. Identify the various computer hardware
3. Understanding the working of computer
4. Understanding various types of software

Internet and E-mail:

1. Using Internet for various tasks
2. Creating and using e-mail.


Security:

1. Understanding various threats
2. How to be safe from virus threats
3. Various software to get safe from virus attacks.

NOTE: At least ten experiments have to be performed in the semester. Out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above of designed and set by the concerned institution.

Instructions for External Practical Paper Setter/Examiner:

Any two practical exams can be performed as assigned by external examiner for evaluation.


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Logical Organization of Computer
BCA-DSC-103
BCA-I Semester

Total Credits: 4
L- T- P
3- 1- 0

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

- CO1.** Understand number systems, error detecting correcting code and representations of numbers in a computer system.
- CO2.** Understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.
- CO3.** Understand working of logic gates and design various combinational circuits using these logic gates.
- CO4.** Understand working of different types of flip-flops and design different types of registers.
- CO5.** To understand the practical aspects of logical organization of computer.

Unit – I

Number Systems: Binary, Octal, Hexadecimal etc. Conversions from one number system to another, BCD Number System. BCD Codes: Natural Binary Code, Weighted Code, Self- Complimenting Code, Cyclic Code. Error Detecting and Correcting Codes.

Character representations: ASCII, EBCDIC and Unicode. Number Representations: Integer numbers - sign-magnitude, 1's & 2's complement representation. Real Numbers normalized floating point representations.

Unit- II

Binary Arithmetic: Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division using 1's and 2's Complement representations, Addition and subtraction with BCD representations.

Boolean Algebra: Boolean Algebra Postulates, basic Boolean Theorems, Boolean Expressions, Boolean Functions, Truth Tables, Canonical Representation of Boolean Expressions: SOP and POS, Simplification of Boolean Expressions using Boolean Postulates & Theorems, Karnaugh-Maps (upto four variables), Handling Don't Care conditions.

Unit – III

Logic Gates: Basic Logic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. Their symbols, truth tables and Boolean expressions.

Combinational Circuits: Design Procedures, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers, Demultiplexers, Decoder, Encoder, Comparators, Code Converters.

Unit – IV

Sequential Circuits: Basic Flip- Flops and their working. Synchronous and Asynchronous Flip –Flops, Triggering of Flip- Flops, Clocked RS, D Type, JK, T type and Master-Slave Flip-Flops. State Table, State Diagram and State Equations. Flip-flops characteristics & Excitation Tables.

Sequential Circuits: Designing registers –Serial-In Serial-Out (SISO), Serial-In Parallel-Out (SIPO), Parallel-In Serial-Out (PISO) Parallel-In Parallel-Out (PIPO) and shift registers.


Recommended Readings:

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall.
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry seven small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 14 marks.

The students will be required to attempt at least one question from each unit.


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Mathematical Foundation for Computer Science-I
BCA-MIC-104
BCA-I Semester

Total Credits: 2
L- T- P
2 -0- 0

External Marks: 35
Internal Marks: 15
Time Allowed: 1.5 Hrs

Courses Outcomes

- CO1:** Students will be able to understand the Matrices and types of the matrices and how they relate with computer science.
- CO2:** Students will be able to understand the determinant of the matrices and solving a system of linear equations using matrix method.
- CO3:** Students will come to know about the concept of Measure of central tendency.
- CO4:** Students will be able to know about the Measure of dispersion.

UNIT-I

Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Determinants, Definition, Minors, Cofactors, Properties of Determinants, Applications of determinants in finding area of triangle, Adjoint of matrix, Inverse of matrix, solving a system of linear equations using matrix method.

Matrices and its Applications: Gauss Jordan Method, Rank of Matrix, Characteristic Equation, Eigen Values, Eigen Vectors, Cayley Hamilton Theorem, Reduction of a Matrix to Diagonal Form, Quadratic form, Canonical form.

UNIT-II

Measures of central tendency: Arithmetic mean, Median, Mode, Geometric mean, and Harmonic mean for ungrouped and grouped data.


Measures of dispersion: Concept of dispersion, Mean deviation and its coefficient, Range, Variance and its coefficient, Standard deviation.

Recommended Reading:

- S.C. Gupta and V.K. Kapoor (2014). Fundamentals of Mathematical Statistics, S. Chand & Sons, Delhi.
- R.V. Hogg, J. W. McKean and A. T. Craig (2013). Introduction to Mathematical Statistics (7th edition), Pearson Education.
- J. V. Dyke, J. Rogers and H. Adams (2011). Fundamentals of Mathematics, Cengage Learning.
- A.S. Tussy, R. D. Gustafson and D. Koenig (2010). Basic Mathematics for College Students. Brooks Cole.

Instruction for Theory paper setter/ Examiner:

The examiner shall set five questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of three marks each. The rest of the four questions will be set from all two units and questions shall carry 10 marks each. The students will be required to attempt two questions (at least one question from each unit).


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Cognitive Psychology
BCA-MDC-105

Total Credits: 3
L- T-P
2- 1 -0

External Marks: 50
Internal Marks: 25
Time Allowed: 3 Hrs

Course Learning Outcomes (CLO): After completing this course, the learner will be able to:
CO1: Acquaint themselves about history of cognitive psychology, and understand different methods to study cognition.
CO2: Have in-depth understanding of nature and types of attention and different models of selective attention.
CO3: Have familiarity with process of pattern recognition along with reasoning.
CO4: Have acquaintance with nature, structure of language development and problem solving.
CO5: Conduct tests related to their theory paper.

UNIT-I

Cognitive Psychology: Nature, Scope, Historical background and Current Status of Cognitive Psychology. Methods to Study Cognition - Behavioral and Physiological.
Attention: Nature; Selective Attention and Divided Attention: Nature, Models of Selective Attention – Broadbent and Treisman. Vigilance.

UNIT-II

Pattern Recognition: Nature and Theories- Prototype Matching and Template Matching. Reasoning: Nature and Types – Inductive and Deductive.

UNIT-III


Language: Nature, Properties, and Structure. Stages of Language Development. Problem Solving: Nature and Classification of Problems, Factors Affecting Problem Solving.

Recommended Books/e-resources/LMS:

1. Eysenck, M.W., & Keane, M.P (2000). Cognitive Psychology: A students guide, Psychology Press.
2. Galotti, K.M.(2000). Cognitive Psychology in and out of the Laboratory. Delhi: Thomson.
3. Kellogg, R.T. (2012). Fundamentals of Cognitive Psychology. Lab Angles: Sage.
4. Matlin, M.W. (2008), Cognition. New York: Wiley. Solso, R.L. (2001). Cognitive Psychology. Delhi: Pearson Education. Sternberg, R.J. (2007). Cognitive Psychology. Delhi: Thomson.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 10 marks. The students will be required to attempt at least one question from each unit.


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**Object Oriented Programming using C++
BCA-DSC-201
BCA-II Semester**

Total Credits: 4
L- T- P
3 -0 -2

External Marks: 50
Internal Marks: 20
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

- CO1.Learn the input/output statements and functions in C++.
- CO2. Get familiar with OOPS concepts along with constructors and destructors in C++ language.
- CO3.Learn the various concepts of operator overloading and inheritance.
- CO4.Get familiar with concepts of virtual functions and exception handling in C++ language.

Unit – I

Input Output in C++: Unformatted and Formatted I/O Operations. I/O using insertion and extraction operators and streams in C++.

Functions: Declaration and Definition, return values, arguments, passing parameters by value, call by reference, call by pointer, Recursion, Inline Functions, Function overloading. Pointers, structures, and union in C++.

Unit- II

Object-oriented features of C++: Class and Objects, Data hiding & encapsulation, abstraction, Data Members and Member Functions, accessing class members, empty class, local class, global class, Scope Resolution Operator and its Uses, Static Data Members, Static Member Functions, Structure vs Class, Friend function and friend class.

Constructors and Destructors: Constructors, Instantiation of objects, Default constructor, Parameterized constructor, Copy constructor and its use, Destructors, Dynamic initialization of objects

Unit – III

Operator Overloading: Overloading unary and binary operators: arithmetic operators, manipulation of strings using operators.

Inheritance: Derived class, base class, Accessing the base class member, Inheritance: multilevel, multiple, hierarchical, hybrid; Virtual base class, Abstract class.

Unit – IV

Virtual Functions, pure virtual functions; Polymorphism & its types.

Exception Handling in C++: exception handling model, exception handling constructs - try, throw, catch, Order of catch blocks, Catching all exceptions, Nested try blocks, handling uncaught exceptions.

Recommended Readings:

1. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
3. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
4. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill. Richard Johnson,
5. An Introduction to Object-Oriented Application Development, Thomson Learning.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 10 marks. The students will be required to attempt at least one question from each unit.


Practical

Time : 3 Hrs

External Marks: 20
Internal Marks: 10

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. Write a C++ program to print the following lines:
 1. Your introduction
 2. Your institute introduction
2. Write a program that accepts principle, rate, and time from the user and prints the simple interest.
3. Write a program to swap the values of two variables.



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4. Write a program to check whether the given number is even or odd (using ?: ternary operator).
5. Write a program to check whether the given number is positive or negative (using ?: ternary operator).
6. Write a program that inputs three numbers and displays the largest number using the ternary operator.
7. WAP to initialize data members of the class using the constructor.
8. Pass values to the constructor and initialize the members of that class to those values.
9. Create a class called cube with the data members
Length, Breadth, Height
 - Members functions:
 - To accept the details.
 - To calculate the volume of the cube.
 - To display the details.
10. WAP to calculate the sum using constructor overloading.
11. WAP to demonstrate the use of destructor.
12. Create a C++ Program to show the order of constructor and destructor.
13. C++ Program to Find the Number of Vowels, Consonants, Digits, and White Spaces in a String
14. C++ Program to Multiply Two Matrices by Passing Matrix to Function
15. Increment ++ and Decrement -- Operator Overloading in C++ Programming
16. C++ Program to Add Two Complex Numbers
17. C++ Program to Show Function Overriding
18. C++ Program to Show Polymorphism in Class
19. C++ Program to Show Function Overloading
20. C++ Program to Show Inheritance

NOTE: At least ten experiments have to be performed in the semester. Out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above of designed and set by the concerned institution.

Instructions for External Practical Paper Setter/Examiner:

Any two practical exams can be performed as assigned by external examiner for evaluation.


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Internet and Web Technologies
BCA-DSC-202
BCA-II Semester

Total Credits: 4
L- T-P
3 -1 -0

External Marks: 70
Internal Marks: 30
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

- CO1. Learn the basics of web development.
- CO2. Understand different types of web pages and web sites.
- CO3. Implement HTML and CSS for web page designing.
- CO4. Understand the design of web crawlers and search engines.

Unit – I

Introduction to Internet and World Wide Web (WWW); Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers; Hypertext Transfer Protocol, URLs; Searching, Search Engines and Search Tools.

Networking: Concept, Basic Elements of a Communication System, Data Transmission Media, LAN, MAN, WAN.

Unit- II

Web Publishing: Hosting your Site; Internet Service Provider; Web terminologies, Phases of Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names, Front page views, Adding pictures, Links, Backgrounds, Relating Front Page to DHTML. Creating a Website and the Markup Languages (HTML, DHTML).

Unit – III

Web Development: Introduction to HTML, Hypertext and HTML, HTML Document Features, HTML command Tags, Creating Links, Headers, Text styles, Text Structuring, Text colors and Background, Formatting text, Page layouts. DHTML: Dynamic HTML, Features of DHTML, CSSP (cascading style sheet positioning) and JSSS(JavaScript assisted style sheet), Layers of Netscape, The ID attributes, DHTML events.

Unit – IV


Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels(media), Introduction to internet and its uses, Applications of internet, Hardware and Software requirements for internet, Intranet, Applications of intranet.

Recommended Readings:

1. Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
2. Ramesh Bangia, Multimedia and Web Technology, Firewall Media.
3. Thomas A. Powell, Web Design: The Complete Reference, Tata McGraw-Hill
4. Wendy Willard, HTML Beginners Guide, Tata McGraw-Hill.
5. Deitel and Goldberg, Internet and World Wide Web, How to Program, PHI
6. David Flanagan, JavaScript: The Definitive Guide: The Definitive Guide. Kogent Learning, Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book, Wiley India Pvt. Ltd.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry seven small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 14 marks.


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Data Structure and Algorithms
BCA-DSC-203
BCA-II Semester

Total Credits: 4
L- T- P
3 -0- 2

External Marks: 50
Internal Marks: 20
Time Allowed: 3 Hrs

Course outcomes: A Successful completion of this course, the students will be able to:

- CO1: Understand the basic concepts of Data Structure and Application of Data Structure.
- CO2: Understand the concept of Strings and Array in details.
- CO3: Learn about Array and Linked List and different operation of linked list.
- CO4: Learn to work with Stack and Queue by implementing with the help of arrays.
- CO5: To implement the programs based Stack and Queue data structure.

Unit – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation. Strings: Introduction, Storing strings, String operations, Pattern matching algorithms.

Unit- II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, sparse arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

Unit – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

Unit – IV

Tree: Header nodes, Threads, Binary search trees, Searching, Insertion and deletion in a Binary search tree, AVL search trees, Insertion and deletion in AVL search tree, m-way search tree, Searching, Insertion and deletion in an m-way search tree, B-trees, Searching, Insertion and deletion in a B-tree

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort,

Searching: Linear search, binary search, merging, Comparison of various sorting and searching algorithms on the basis of their complexity.

Recommended Readings:

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", Orient Longman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw-Hill International Student Edition, New York.
4. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City. Prentice- Hall Of India Pvt. Ltd., New Delhi.
5. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set nine questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of two marks each. The rest of the eight questions will be set from all four units. The examiner will set two questions from each unit. All questions shall carry 10 marks. The students will be required to attempt at least one question from each unit.


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Practical

Time : 3 Hrs

External Marks: 20

Internal Marks: 10


Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort
5. Write a program to implement various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
7. Write a program to implement binary search tree and also Insertion and Deletion in Binary search Tree
8. Write a program to create a linked list & perform operations such as insert, delete, update, and reverse in the linked list.
9. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
10. Create a linked list and perform the following operations on it
A) Add a node b) Delete a node
11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
12. Write a program to simulate various graph traversal algorithms.
13. Write a program that simulates various tree traversal algorithms.

NOTE: At least ten experiments have to be performed in the semester. Out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above of designed and set by the concerned institution.

Instructions for External Practical Paper Setter/Examiner:

Any two practical exams can be performed as assigned by external examiner for evaluation.


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Mathematical Foundation for Computer Science-II
BCA-MIC-204
BCA-II Semester

Total Credits: 2
L- T- P
2 -0- 0

External Marks: 35
Internal Marks: 15
Time Allowed: 1.5 Hrs

Courses Outcomes

CO1: Students will be able to understand the Types of Sets.

CO2: Students will be able to understand the Venn diagram and what is use of Venn diagram is Computer Science.

CO3: Students will come to know about the concept of Presentation of data.

CO4: Students will be able to know about the Correlation and Scatter diagram.

UNIT-I

Sets and their representations: Empty set, Finite and infinite sets, Subsets, Equal sets, Power sets, Universal set, Union and intersection of sets, Difference of two sets, Complement of a set, Venn diagram, De-Morgan's laws and their applications.

Linear and Quadratic Equations: Degree of an equations, roots of an equations, Simultaneous Linear equations, Method of solving the quadratic equation, Equations reducible to quadratic, Relations between roots and coefficient of the Quadratic equation.

UNIT-II

Presentation of data: Frequency distribution and cumulative frequency distribution. Diagrammatic and graphical presentation of data, Construction of bar, Pie diagrams, Histograms, Frequency polygon, Frequency curve, and Ogives.

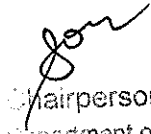
Correlation: Concept and types of correlation, Methods of finding correlation: Scatter diagram, Karl Pearson's coefficients of correlation, Rank correlation.

Recommended Reading:

- S.C. Gupta and V.K. Kapoor (2014). Fundamentals of Mathematical Statistics, S. Chand & Sons, Delhi.
- R.V. Hogg, J. W. McKean and A. T. Craig (2013). Introduction to Mathematical Statistics (7th edition), Pearson Education.
- J. V. Dyke, J. Rogers and H. Adams (2011). Fundamentals of Mathematics, Cengage Learning.
- A.S. Tussy, R. D. Gustafson and D. Koenig (2010). Basic Mathematics for College Students. Brooks Cole.

Instruction for Theory paper setter/ Examiner:

The examiner shall set five questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry five small questions of three marks each. The rest of the four questions will be set from all two units and questions shall carry 10 marks each. The students will be required to attempt two questions (at least one question from each unit).


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Emotional Intelligence
BCA-MDC-205

Total Credits: 3
L- T- P
2- 1- 0

External Marks: 50
Internal Marks: 25
Time Allowed: 2 Hrs

Course Learning Outcomes (CLO): After completing this course, the learner will be able to:
CO1. Get insight about emotional intelligence's nature, models and building blocks.
CO2. Discover personal competence and techniques of building emotional intelligence.
CO3. Gain knowledge about social Awareness & Relationship Management.
CO4. Gain insights into measurement and strategies to develop and enhance emotional intelligence.

UNIT-I

Emotional Intelligence: Nature and Significance. Models: Ability, Trait and Mixed.

UNIT-II

Personal Competence: Self Awareness: Observing and Recognizing One's own Feelings, Knowing One's Strengths and Areas of Development.

UNIT-III

Relationship Management: Effective communication, Collaboration, Teamwork, and Conflict management.
Emotional Intelligence: Strategies to develop and enhance emotional intelligence.

Recommended Books/e-resources/LMS:

1. Bar-On, R., & Parker, J.D.A.(Eds.) (2000). The handbook of emotional intelligence. San Francisco, California: Jossey Bros.
2. Goleman, D. (2005). Emotional Intelligence. New York: Bantam Book.
3. Singh, Dalip (2001). Emotional Intelligence at Work: A Professional Guide. Sage Publications Pvt. Ltd..
4. Sternberg, R. J. (Ed.). (2000). Handbook of intelligence. Cambridge University Press.

Instructions for External Theory Paper Setter/Examiner:

The examiner shall set seven questions in all covering the whole syllabus. Question no.1 will be compulsory covering all the units and shall carry seven small questions of two marks each. The rest of the six questions will be set from all three units and questions shall carry 12 marks each. The students will be required to attempt three questions (at least one question from each unit)


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