Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

Institute of Computer Applications

Name of Program : BCA + MCA

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA201	COMPULSORY	Communication Skill-II	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To develop, enhance and demonstrate the Technical Communication Skills.
- To enable students to different presentation strategies.
- To prepare students to become more confident towards vocabulary and professional writing.

Course Outcomes (COs):

- The students will be able to enhance confidence in their ability to read, comprehend, organize, and retain written information.
- The students will be able to write grammatically correct sentences for various forms of written communication to express oneself.
- The students will be able to improve upon their language skills, oral communication skills, group discussion, personal development and confidence level.
- The students will be able to express his /her ideas and thoughts in speech or writing,
- The students will be able to bridge the language gap vital to their success.
- The students will be able to communicate effectively.

Unit I

Basics of Communication

Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group); Importance of technical communication; Barriers to Communication**.**

Unit II

Presentation Strategies

Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.

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Unit III

Presentation Strategies

Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.

Unit IV

Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods - Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation-various steps.

Unit V

Professional Writing

Reports: Types; Significance; Structure, Style & Writing of Reports. TechnicalProposal; Parts; Types; Writing of Proposal; Significance. Technical Paper, Project. Dissertation and Thesis Writing: Features, Methods & Writing

Text and Reference Books:

1. Sharma.(). **Business Correspondence and Report Writing**.; TMH.
2. W.S. Allen, Living. **English Structure**. Longmans.
3. Ehrlich .**English Grammar**. Schaum Series; TMH.
4. R.K. Bansal and IB Harrison. **Spoken English** . Orient
5. Joans and Alexander. **New International Business English .**Longman.; OUP.
6. Ashraf Rizvi.(200**5).Effective Technical Communication**. New Delhi:Tata Mc Graw Hill
7. A.J. Thomson and A.V. Martinet.(1991) **A Practical English Grammar**(4th ed). Newyork: Oxford IBH Pub.

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			THEORY			PRACTICAL		L	T	P	CREDITS
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BCCA202	COMPULSORY	Mathematical Foundation of Computer Science - II	60	20	20	0	0	3	1	0	4

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Course Educational Objectives (CEOs):

- To introduce the students with the concepts of Probability and Distributions.

Course Outcomes (Cos:)

- After the successful completion of this course students will be able to understand and apply the fundamentals of probability.
- Students will be able to demonstrate the use of distributions.
- Students will be able to apply the hypothesis in test cases.

UNIT – I

Probability: Axioms, Conditional probability, Baye's theorem, Random Variables, Discrete random variables – Binomial, Geometric, Poisson RV.

UNIT – II

Continuous RV – Uniform, Exponential, Gamma & Normal,

UNIT – III

Expectation, Mean and Variance, Jointly distributed RVs, Co-variance, Sums of RVs, Central Limit theorem, Moment Generating functions.

UNIT – IV

Sample Distribution, Inference concerning mean, Statistical Inference – Parameter estimation, Maximum likely-hood estimation

UNIT – V

Testing of Hypothesis, Curve Fitting-Method of the Least Square, Curvilinear multiple regression

Text and Reference Books:

1. Ross, S: A First course in probability, sixth edition, Pearson Education.
2. Ross Sheldon: Introduction to Probability models, Eighth edition, Elsevier, 2003
3. Trivedi K. S.: Probability & Statistics with Reliability, Queuing and Computer Science Applications, Second edition, Wiley, 2002

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			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA203	COMPULSORY	Physics	60	20	20	0	0	4	1	0	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*__Teacher Assessment__ shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To develop the comprehensive understanding of laws of physics.
- To develop ability to apply laws of physics for various engineering applications.
- To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.

Course Outcomes (COs):

- Student will be able to comprehend laws of physics.
- Student will be able to apply laws of physics for various engineering applications.
- Student will be able to determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

Unit-I: Quantum Physics

Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof and applications to microscope and single slit, Compton Effect, Wave function and its physical significance. Development of time dependent and time independent Schrodinger wave equation, Applications of time independent Schrodinger wave equation

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Unit-II: Solid State Physics

Free electron model, Qualitative Analysis of Kronig Penney Model, Effective mass, Fermi level for Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar- cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

Unit-III: Nuclear Physics

Nuclear Structure & Properties Nuclear models: Liquid drop with semi-empirical mass formula & shell model. Particle accelerators: Cyclotron, Synchrotron, Betatron. Counters and Detectors: Giger-Muller counters, Bainbridge Mass Spectrograph and Auston Mass Spectrograph.

Unit-IV: Laser & Fibre Optics

Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, Nd:YAG, He-Ne lasers.

Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, V- Number, Ray theory of propagation through optical fibre, Pulse dispersion , applications of optical fibre.

Unit-V: Wave Optics

Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit, resolving power, Rayleigh criterion, Resolving power of grating, Concept of polarized light, Double refraction, quarter and half wave plate, circularly & elliptically polarized light.

Text and Reference Books:

1. Engineering Physics by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. Engineering Physics by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. Engineering Physics by H. J. Sawant, Technical Publications, Pune, Maharastra.
4. Engg Physics by M.N. Avdhanulu & P.G. Kshirsagar, S.Chand & Co.Edition (2010).
5. Fundamentals of Physics by Halliday, Wiley, India.
6. Concepts of Modern Physics by Beiser, TMH, New Delhi.
7. Solid State Physics by Kittel,Wiley India.
8. Atomic and Nuclear physics by Brijlal and Subraminiyan.
9. LASERSs and Electro Optics by Christopher C. Davis, Cambridge Univ. Press (1996).
10. Optroelectronics an Introduction by J. Wilson & J.F.B.Hawkes, "" Prentice-Hall II Edition.
11. LASER theory and applications by A. K. Ghatak & Tyagarajan, TMH (1984).
12. Optics by Ghatak, TMH.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA204	COMPULSORY	Data Structure using C	60	20	20	0	0	4	1	0	5

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***Teacher Assessment** shall be based on following components: Quiz/Assignment/project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To understand the students with the applications of Standard data structure in real world problems.
- To provide knowledge of creation of new data structures.
- To familiarize the students with the analysis and design a particular problem.

Course Outcomes (Cos):students will be able to

- Demonstrate familiarity with major algorithms and data structures.
- Analyze performance of algorithms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- Demonstrate understanding of various searching algorithms.
- Program multiple file programs in a manner that allows for reusability of code.
- Compare different implementations of data structures and to recognize the advantages and disadvantages of the different implementations.
- Write complex applications using structured programming methods.

UNIT - I

The Concept of Data Structure, Abstract Data Type, Concept of List and Array, Introduction to Stack,

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Stack as an Abstract Data Type, Primitive Operations on Stack, Stack's Applications - polish notations Infix, Postfix, Prefix and Recursion, evaluation of post and prefix expressions.. Introduction to Queues, Primitive operations on Queues, Queue as an Abstract Data Type, Circular Queue, Dequeue, Priority Queue, Applications of Queue.

UNIT - II

Linked List - Introduction to Linked List, Memory Representations of Linked List, comparison; Operations on Linked List, Linked Representation of Stack and Queue, Header Nodes. Types of Linked List : Doubly Linked List, Circular Linked List, Application of Linked List, Self Referential Structures.

UNIT –III

Trees: Definition, Basic Terminology of Trees, Tree Representations as Array and Linked. Binary Trees, Binary Tree Operations. Traversal of Binary Trees – In order, Preorder & Post order, Complete Binary Tree, almost complete binary tree; Application of Binary Tree, Threaded Binary tree, Height Balanced tree, B-tree. forests, conversion of forest into tree. Heap: definition.

UNIT-IV

Complexity: concept and notations. Searching: Sequential, Binary and their comparison. Sorting - External and Internal Sorting, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Methods. Hashing;

UNIT-V

Graphs - Introduction to Graphs, Basic Terminology, Directed, Undirected and Weighted graph, Representation of Graphs, Graph Traversals - Depth First and Breadth First Search. Applications of Graphs: Spanning Trees, Minimum Cost Spanning Tree, Shortest Path Problem: Kruskal's and Dijkstra algorithms.

Text and Reference Books:

1. Kruse R.L. Data Structures and Program Design in C; PHI
2. Aho, "Data Structure & Algorithms".
3. Trembly and *SORRENSON*, "Introduction to Data Structure with Applications".
4. TennenBaum A.M. & others, "Data Structures using C & C++"; PHI
5. Horowitz & Sawhaney, "Fundamentals of Data Structures", Galgotia Publishers.
6. Yashwant Kanetkar, "Understanding Pointers in C", BPB.
7. Lpschuists, "Data Structure", (Schaum 's Outline Series, McGraw Hill publication)
8. Ellis Horowitz and Sartaj Sawhney, "Fundamentals of Computer Algorithm"

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			THEORY			PRACTICAL		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA205	COMPULSORY	Object Oriented Methodology & C++	60	20	20	0	0	4	1	0	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To familiarize the students with programming and to encourage them to develop their logic.
- To make students well versed with C++ language to solve problems efficiently.
- Using simple and well drawn illustrations develop their programming skills using modular programming.

Course Outcomes (COs): Student will be able to:

- Develop algorithms for problems.
- To understand the object Oriented paradigm
- Apply the programming concepts to solve the given problems.
- Write the programs using modular programming.
- Understand and write programs using various data structures very efficiently.
- Write the programs using pointers and to manage memory.
- To apply the knowledge of Object Oriented Methodology to write reusable code.
- Implement programs of file handling.

UNIT-I

Object Oriented Paradigm: need, features, comparison with other programming paradigm, various programming styles; C++ basics: C++ character set, C++ Tokens (Identifiers, Keywords, Constants), Operators, precedence and associativity, Expressions; Type conversion and type casting, Structure of a C++ Program (include files, main function); cout, cin; loops and decisions.

Use of I/O operators (<< and >>), Use of manipulators: endl and setw() etc., Cascading of I/O

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operators,; Use of editor, basic commands of editor, compilation, linking and execution; Error Messages, debugging

Functions: Library and User Defined Functions: Defining a function; function prototype, Invoking/calling a function, Reference variables and use of alias; passing arguments to function, returning values from a function, local and global variables;

Unit II:

Concept of a class, Data Members and Member Functions, visibility modes, inline functions, scope resolution operator (::); Objects: accessing members from object(s), object and classes, object arrays, constructor and destructor functions. Default Constructor, Overloaded Constructors, Copy Constructor, Constructor with default arguments; Operator and Function Overloading.

UNIT-III

Structured Data Type: Arrays, one dimensional and multi dimensional, array manipulation, string manipulations using library functions, array of objects.

Pointers: Declaration and Initialization of Pointers; Dynamic memory allocation, new, delete operators; Pointers and Arrays: Array of Pointers, Pointer to an array, Function returning a pointer, Pointer to structures: Deference operator: *, ->; self referential structures;

Unit-IV

Inheritance (Extending Classes): Concept, Base Class, Derived Class, Private, Public and Protected derivation of classes, accessibility of members from objects and within derived class(es); pointers to base and derived classes inheritance, Polymorphism, Virtual Functions, Abstract Base Classes and Pure Virtual Function, Friend Function, Early and Late Binding.

UNIT-V

C++ I/O system, formatted I/O, creating inserters and extractors, file I/O basics, Data File Handling: creating disk files and file manipulations using seekg(), seekp(), tellg() and tellp() functions, exception handling: try, catch and throw. Use defined manipulators.

Header file: fstream.h; ifstream, ofstream, fstream classes;

Text and Reference Books:

- Lafore R. “Object Oriented Programming in C++”, Galgotia Pub.
- Lee “UML & C++ a practical guide to Object Oriented Development 2 ed, Pearson.
- Scheildt “C++ the complete reference 4ed, 2003.
- Hans Erit Eriksson, “UML 2 toolkit” Wiley.
- Balagurusawmy , “Object Orienter Programming with C++”.
- B.G., Boach “Object Oriented Analysis & Design with Applications”, Addision Wesly.
- S. Parate “C++ Programming”, BPB. 8. Boggs “Mastering UML” BPB Publications.
- Mastering C++ by Venugopal TMH

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			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BCCA206	COMPULSORY	Lab- 1 (Programming Lab in C++)	0	0	0	30	20	0	0	6	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Learning Objectives (CEOs):

- To familiarize the students with programming and to encourage them to develop their logic.
- To make students well versed with C++ language to solve problems efficiently.
- Using simple and well-drawn illustrations develop their programming skills using modular programming.

Course Outcomes (COs): Student will be able to:

- Develop algorithms for problems.
- Apply the programming concepts to solve the given problems.
- Write the programs using modular programming.
- Understand and write programs using various data structures very efficiently.
- Write the programs using pointers and to manage memory.
- Implement programs of file handling.
- Compile and debug the programs
- Understand different error messages and to rectify them

List of Programs:

1. Write down the features of Object Oriented Programming?
2. Write down the advantages and disadvantages of OOP's?
3. Define copy constructor. Explain its significance. Under which condition is it invoked? Support your answer with an example.
4. Explain the purpose of function overloading. Write a C++ program that uses a function to check whether a given number is divisible by another number or not. Give proper comments whether the denominator number is a prime number or not.
5. Define a friend function. Explain the relation of friend function with respect to Public, Private and Protected data members of the class.

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6. Write a program in C++

a. To generate the following number pyramid

1. 0

ii. 1 0 1

b. 2 1 0 1 2

2. 3 2 1 0 1 2 3

ii. 4 3 2 1 0 1 2 3 4

b. Using recursion generate the Fibonacci series.

c. Create two function max and min to find the largest and smallest numbers respectively. Function select having arguments as a pointer to function and numbers. User will input the choice to find out the max or min.

d. Convert a 2 digit octet number into binary number and prints binary equivalent.

7. Write a function in C++ that take one string argument and return a reversed string.

8. Write a C++ program using structure to store information of 10 employee (id_no, empname, empadd, sal) and display information of an employee depending upon the employee no given.

9. Create a class contains name & telephone number as two of it's fields. Write a C++ Program

10. Using an object to do the following

11. (a) to add a record (b) to search of telephone number for a given name

12. (c) to determine the name of telephone number is known

13. (d) Updating the data file, whenever there is a change in telephone number.

14. Imagine a ticket selling booth at a fair. People passing by are requested to purchase a ticket. A ticket is priced as Rs 2.50/-. The booth keeps the track of the number of people that have visited the booth and of the total amount of money collected. Model this ticket selling booth with a class called **ticbooth** including following members: number of people visited, total number of money collected.

15. Member function:

(1)to assign initial values (2) to increment only people total in case ticket is not sold out. (3) to increment people total as well as amount total in case ticket is not sold out (4) to display the two totals (5) to display the number of tickets sold out.

16. Create a class Bank account of 20 customers with the following data members depositor no, depositor name, account type(S for saving & C for current), balance amount. The class also contains the member functions to do the following :

17. (a) initialize the data member **(b)** deposit money **(c)** Display the customer information

18. (**d)** withdraw money after checking the balance (min bal for saving account is 500 and for current 1000) **(e)** search the depositor details according to name or number or both.

19. Write a program that invoke a function newdate() to return an object Date type. The function newdate( ) take two parameters:

20. An object oldadate of Date type **(b)** Number of days in integer

a. calculate the newdate as olddate + numbers of days and return newdate.

21. Write a program to interchange the private values of two classes by using a friend function swap().

22. Create a **Message** class with a constructor that takes a single **string** with a default value. Create a private member **string**, and in the constructor simply assign the argument **string** to your internal **string**. Create two overloaded member functions called **print( )**: one that takes no arguments and simply prints the message stored in the object, and one that takes a **string**

argument, which it prints in addition to the internal message. Does it make sense to use this approach instead of the one used for the constructor?

23. Write C++ code to create a class date. Using this class, calculate the age of a person as on the current date.

24. Create a class contain Bookno, Book Title, Book price. The class also store and display the complete information of book. **Total_cost()** function calculate the cost of for **N** number of copies, where **N** is passed to the function as argument and **purchase()** function to ask the user it input the number of copies to be purchased. It invoke **Total_cost()** and print the total cost to be paid by the user.

25. Define a class string use overloaded = = operator to compare two string.

26. Find the largest value of two objects using > operator.

27. Write a C++ program to print the number between 1 to 100 and 100 to 1 using operator overloading.

28. Define a class String that could work as a user defined string type. Include a constructors that will enable us to create an uninitialized string String s1; and also to initialize an object with a string constant at the time of creation like String s2("Welcome"); Include a function that adds two strings to make a third string. Note that the statement s2=s1 ;will be perfectly reasonable expression to copy one string to another .

29. Write a complete program to test your class to see that it does the following tasks:

(a) Create uninitialized string objects. (b) Creates objects with string constants

(c) Concatenates two string (d) Display a desired string objects

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BCCA207	COMPULSORY	Lab- II (Data Structure Lab in C/C++)	0	0	0	30	20	0	0	4	2

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Course Learning Objectives (CEOs):

- To familiarize the students with programming and to encourage them to develop their logic.
- To make students well versed with C++ language to solve problems efficiently.
- Using simple and well drawn illustrations develop their programming skills using modular programming.

Course Outcomes (Cos): Student will be able to:

- Develop algorithms for problems.
- Apply the programming concepts to solve the given problems.
- Write the programs using modular programming.
- Understand and write programs using various data structures very efficiently.
- To choose a suitable data structure for a given problem.
- Write the programs using pointers and to manage memory.
- Implement programs of file handling.

List of Programs:

1. Write a program to create a two dimensional array and perform add, subtract and multiplication operations.
2. Write a program to create a two dimentional array using dynamic memory allocation.
3. Write a program to implement stack.
4. Write a program to convert infix expression into postfix expression.

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5. Write a program to check balanced parentheses for a given infix expression.
6. Write a program to evaluate postfix expression.
7. Write a program to implement queue.
8. Write a program to implement circular queue.
9. Write a program to implement link list with insert, delete, search, view, and
10. delete function.
11. Write a program to implement ordered link list.
12. Write a program to add two polynomials.
13. Write a program to create doubly link list.
14. Write a program to implement tree with insert, delete and search function.
15. Write a program for in order, post order and preorder traversal of tree.
16. Write a program for binary search and sequential search using recursion.
17. Write a program for bubble sort and sequential search.
18. Write a program for insertion sort and quick sort.