VIKRAM UNIVERSITY, UJJAIN MP

(Session -2021-2022 onwards)

BCA (Hon's) FOUR YEARS (EIGHT SEMESTERS), CBCS SCHEME (NEP)

S.No.	Paper code	Course Component and Name of Course	Credits			Marks		Total
			T	P	Total	Max Marks CCE Internals	Max Marks Theory Externals	
1.	BCAH 201 Major-1	Object Oriented programming using C++	2	0	2	30	45	100
	BCAH P	Object Oriented programming using C++	0	1	1	10	15	
2.	BCAH 202 Major-2	Digital Electronics	3	0	3	40	60	100
3.	BCAH 203 Minor-1	Data Base Management System	3	0	3	40	60	100
4.	BCAH-104 Generic Elective	Basic Statistics and Numerical analysis	3	0	3	40	60	100
5.	Ability Enhancement Course	Yoga and Meditation	2	0	2	20	30	100
		Environmental Education	2	0	2	20	30	
6.	Vocational/Skill Enhancement-Course from any faculty/Mooc Course	Web Designing	4	0	4	40	60	100
Total Credits and marks					20			600

PART A: Introduction				
Program: Certificate	Class: II SEM	Year: I Year	Session: 2021-22	
Subject: Computer Application				
1.	Course Code	**BCAH-201**		
2.	Course Title	**Object Oriented Programming using C++**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major I**		
4.	Pre-Requisite (if any)	Basic knowledge of computer and C language		
5.	Course Learning Outcomes(CLO)	• Creating simple programs using classes and objects in C++. • Implement Object Oriented Programming Concepts in C++. • Develop applications using stream I/O and file I/O. • Implement simple graphical user interfaces. • Implement Object Oriented Programs using templates and exceptional handling concepts		
6.	Credit Value	3 Credit		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hours per day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	**Object Oriented Systems Development :** Introduction to traditional programming with C. Objectives of OOP, Object Oriented Analysis, Object Oriented Programming in C++: Concepts of Objects, Classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding and Message passing. Tokens, Expressions and Control Structures.	12
II	**Classes & Objects:** Classes, Structure & classes, Union & Classes, Friend function, Friend classes, Inline function, Scope resolution operator, Static class members: Static data member, Static member function, passing objects to function, Returning objects, Array of objects.	12
III	**Constructor & Destructor:** Introduction, Constructor, Parameterized constructor, Multiple constructor in a class, Constructor with default argument, Copy constructor, Default Argument, Destructor. **Function & operator overloading:** Overloading and information hiding, Function overloading, Operator overloading	12
	Inheritance: Inheritance, Derived and base classes, Single, Multilevel, Hierarchical, Hybrid Inheritance, Protected member, overriding member	12

IV	function, class hierarchies, multiple inheritance, Containership, Virtual base class	
V	**Polymorphism :** virtual functions, late binding, pure virtual functions, abstract classes, this pointer, templates, function templates, Class templates. **The C++ I/O system basics:** C++ streams, The basic stream classes: C++ predefined streams.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Reading: 1. Object-Oriented Programming with C++: E. Balagurusamy, TMH, 2005 2. Object Oriented Programming in C++, Robert Lafore, Galgotia Publication. 3. Object Oriented Programming, Tomothy Budd, Pearson education.
Suggestive digital platform web links: https://www.youtube.com/watch?v=BClS40yzssA https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en https://www.youtube.com/watch?v=Umm1ZQ5ltZw https://nptel.ac.in/courses/106/105/106105151/ https://www.udemy.com/course/beginning-c-plus-plus-programming/

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	04 × 05 = 20 08 × 05 = 40 **Total Marks: 60**

PART A: Introduction				
Program: Certificate		Class: **B.C.A.(H)**	Year: **I Year**	Session: **2021-22**
Subject: **Computer Applications**				
1.	Course Code	BCAHP		
2.	Course Title	**Object Oriented Programming Using C++ Lab**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Core Course**		
4.	Pre-Requisite (if any)	To study this course, a student must have basic logical and analytical skills.		
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following**: 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Possess ability to choose a data structure to suitably model any data used in computer applications. 6. Implement and know the applications of algorithms for searching and sorting etc.		
6.	Credit Value	**Practical – 2 Credits**		
7.	Total Marks	Max. Marks : **10+15**	Min. Passing Marks:	

PART B: Content of the Course		
No. of Lab Practicals (in hours per week): **2 hours per week**		
Total No. of Lab.: **60 Hrs.**		
	Suggestive list of Practicals	**No. of Labs.**
	Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code in C++, execute and test it. Students should be given assignments on following : 1. Write a program to swap the contents of two variables. 2. Write a program for finding the roots of a Quadratic Equation. 3. Write a program to find area of a circle, rectangle, square using switch case. 4. Write a program to print table of any number. 5. Write a program to print Fibonacci series. 6. Write a program to find factorial of a given number using recursion. 7. Write a program to convert decimal (integer) number into equivalent binary number. 8. Write a program to check given string is palindrome or not. 9. Write a program to print digits of entered number in reverse order.	60

	10. Write a program to print sum of two matrices. 11. Write a program to print multiplication of two matrices. 12. Write a program to generate even/odd series from 1 to 100. 13. Write a program whether a given number is prime or not. 14. Write a program for call by value and call by reference. 15. Write a program to create a pyramid structure 1 12 123 1234 16. Write a program to check entered number is Armstrong or not. 17. Write a program to input N numbers and find their average. 18. Write a program to find the area and volume of a rectangular box using constructor. 19. Write a program to design a class time with hours, minutes and seconds as data members. Use a data function to perform the addition of two time objects in hours, minutes and seconds. 20. Write a program to implement single inheritance. 21. Write a program to find largest element from an array. 22. Write a program to implement push and pop operations on a stack using array. 23. Write a program to perform insert and delete operations on a queue using array. 24. Write a program for Linear search. 25. Write a program for Binary search. 26. Write a program for Bubble sort. 27. Write a program for Selection sort. 28. Write a program for Quick sort. 29. Write a program for Insertion sort. 30. Write a program to implement linked list.	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- J. R. Hanly and E. B. Koffman, “Problem Solving and Program Design in C”, Pearson, 2015
- E. Balguruswamy, "C++ ", TMH Publication ISBN O-07-462038-X
- Herbert Shildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7

Reference Books:

- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, “Programming and problem solving with C++: brief edition”, Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- SartajSahani, “Data Structures, Algorithms and Applications with C++”, McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, “Data Structure using C++”, Second edition, Cengage Learning.
- M. A. Weiss, “Data structures and Algorithm Analysis in C”, 2nd edition, Pearson.
- Lipschutz,“Schaum’s outline series Data structures”, Tata McGraw-Hill

Suggestive digital platform web links

https://www.youtube.com/watch?v=BClS40yzssA

https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en
https://www.youtube.com/watch?v=Umm1ZQ5ltZw

Suggested equivalent online courses

S.No.	Online Course	Duration	Platform
1	Programming in C++ https://nptel.ac.in/courses/106/105/106105151/	8 weeks	NPTEL
2	Beginning C++ Programming - From Beginner to Beyond https://www.udemy.com/course/beginning-c-plus-plus-programming/	Self paced	Udemy

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : **10 Marks**		**External Assessment**: University Exam (UE) : **15 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Hands-on Lab Practice	2 Marks	Practical record file	3 Marks
Viva	3 Marks	Viva voce practical	5 Marks
Lab Test from practical list	3 Marks	Table works/ Exercise Assigned (02) in practical exam	4Marks
Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training	2 Marks	Reports of excursion/ Lab visits/ Industrial training/ Survey/ Collection/ Models	3 Marks
Total ***Excursion/ Lab visits/ Industrial Training is compulsory***	**25 Marks**	**Total**	**75 Marks**

PART A: Introduction				
Program: Certificate	Class: II SEM	Year: I Year	Session: 2021-22	
Subject: Computer Application				
1.	Course Code	BCAH 202		
2.	Course Title	**Digital Electronics**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major IV**		
4.	Pre-Requisite (if any)	Basic knowledge of computer.		
5.	Course Learning Outcomes(CLO)	• Understand and Represent Data in Different Binary Formats • Design, Simplify and evaluate Boolean Equations and Circuits • Explain and Analyze Basic Building Blocks of Digital Electronics and Computer • Design and Analyze Simple Combination & Sequential Circuits • Analyze the Basic Computer Organization and Programming • Understand the Organization of I/O Devices and Computer Memory Mapping:		
6.	Credit Value	3 Credit		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hours per day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	Data types and Number systems, Binary number system, Octal & Hexa-decimal number system, 1's & 2's complement, Binary Fixed-Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow, Floating Point Representation, Codes, ASCII, EBCDIC codes, Gray code, Excess-3 & BCD, Error detection & correcting codes.	12
II	Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, DeMorgan's theorem, MAP Simplification. Minimization techniques, K-Map, Sum of Product & Product of Sum.	12
III	Combinational & Sequential circuits, Half Adder & Full Adder, Full subtractor, Flip -flops- RS, D, JK & T Flip-flops,Multiplexer, Demultiplexer, Encoder, Decoder.	12

IV	I/O Interface, Properties of simple I/O devices and their controller, isolated versus memory-mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data transfer, Handshaking, Asynchronous serial transfer, I/O Processor	12
V	Auxiliary memory, Magnetic Drum, Disk & Tape, Semi-conductor memories, Memory Hierarchy, Associative Memory, Virtual Memory, Address space & Memory Space, Address Mapping, Page table, Page Replacement, Cache Memory.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Reading:

1. BARTEE, "Digital Computer Fundamentals " TMH Publication
2. MALVINO, " Digital Computer Electronics " TMH Publication
3. MORRIS MANO, "Computer System Architecture PHI Publication

Suggestive digital platform web links:

https://archive.nptel.ac.in/courses/106105163/
https://archive.nptel.ac.in/courses/106106166/
https://archive.nptel.ac.in/courses/106103180/
https://archive.nptel.ac.in/courses/106102157/
https://archive.nptel.ac.in/courses/106106134/

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **40** Marks
University Exam (UE): **60** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	04 × 05 = 20 08 × 05 = 40 **Total Marks: 60**

PART A: Introduction				
Program: Certificate	Class: III SEM	Year: II Year	Session: 2021-22	
Subject: Computer Application				
1.	Course Code	BCAH-203		
2.	Course Title	**Data Base Management System**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor II**		
4.	Pre-Requisite (if any)	Students must have the basic Knowledge of computer systems and database.		
5.	Course Learning Outcomes(CLO)	Upon successful completion of this course, students will be able to: 1. Understand and describe the basic concepts and terminology of Database Management System. 2. Analyze and Design the database of applications using ER modelling and Normalization. 3. Evaluate business information problem and find out the data requirements of organization. 4. Demonstrate the database schema, data modelling and normalization process with the help of example. 5. Implement the database design using appropriate database tools.		
6.	Credit Value	6 Credit		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hours per day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	DBMS Concepts and architecture Introduction, Review of file organization techniques, Database approach v/s Traditional tile accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, Functions of DBA and designer. Entities and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database, **Various data models:** Basic concepts of Hierarchical data model. Network data model, and Relational data model, Comparison between the three types of models.	12
II	**Relational Data models:** Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints, Intension and Extension, **Relational Query languages:** Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union	12

	etc.	
III	Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations. SQL: Data definition in SQL, update statements and views in SQL QUEL & QBE: Data storage and definitions. Data retrieval queries and update statements etc.	12
IV	**Data Base Design:** Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and losslessjoin, problems with null valued and dangling tuples, multivalued dependencies. Distributed databases, protection, security and integrity constraints, concurrent operation on databases, recovery, transaction processing, basic concepts of object oriented data base system and design.	12
V	Case study of relational database management systems: Oracle and Microsoft access, Oracle tools.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Reading:

1.Data Base Management System by C.J. Date

2. Data Base Management System by Ullman

3. Fundamental of database system byElmasri/Navathe the Benjamin / Cunnings Publishing company inc.

4. Data base design by GioWiederhold, McGraw Hill

5. Fundamental of Data Base Management System by Leon & Leon, Vikas Publishing House Pvt. Ltd.

Suggestive digital platform web links:

https://nptel.ac.in/courses/106105175
https://ocw.mit.edu/courses/6-830-database-systems-fall-2010/pages/lecture-notes/
https://nptel.ac.in/courses/106104135

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **40** Marks
University Exam (UE): **60** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	04 × 05 = 20 08 × 05 = 40 **Total Marks: 60**

PART A: Introduction				
Program: **Diploma**		Class: **BCA**	Year: **I Year**	Session: **2021-22**
Subject: **Computer Applications**				
1.	Course Code	**BCAH-204**		
2.	Course Title	**Basic Statistics and Numerical Analysis**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Generic Elective**		
4.	Pre-Requisite (if any)	Students must have basic analytical aptitude.		
5.	Course Learning Outcomes (CLO)	**On successful completion of the course the students shall be able to:** The course will enable the students to: 1. Understand numerical methods to find the solution of a system of linear equations. 2. Compute interpolation value for real data. 3. Find quadrature by using various numerical methods. 4. Solve system of linear equations by using various numerical techniques.		
6.	Credit Value	**Theory - 6 Credits**		
7.	Total Marks	Max. Marks: **40+60**	**Min. Passing Marks**: **40**	

PART B: Content of the Course

No. of Lectures (in hours per week): **3 lectures Per week**

Total No. of Lectures: **90 Hrs.(120 lectures)**

Unit	Topics	No. of Lectures
I	**Statistics:** Frequency Distribution, Measure of Central Tendency: Mean, Mode, Median, Measures of variation: Mean deviation Standard Deviation,	12
II	Correlation Analysis, Karl Pearson's coefficient of Correlation, spearman's rank Correlation, regression, lines of regression, Index number	12
III	Types of errors, Error approximation, truncation error, rounding error. Solution of transcendental equation by: Bisection, false position, Newton-Raphson Methods.	12
IV	**Interpolation:** Lagrange interpolation, Finite difference operators, Interpolation formula using Differences, Gregory-Newton Forward Difference Interpolation, Gregory-Newton Backward Difference Interpolation.	12
V	**Numerical Integration:** Newton- Cote's formulae, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Gauss Integration.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Text Books:

Reference Books:

Suggested Readings:

Text Books:

1. S. S. Sastry: Introductory Methods of Numerical Analysis, Prentice Hall India Learning Private Limited, Fifth edition, 2012.
2. E. Balagurusamy: Numerical Methods, Tata McGraw Hill Publication, 2017.
3.B.M. Agrawal Business Mathematics & Statistics kitab Mahal ,Agra
4.K.L.Gupta & S.M.Shukla, Statistical analysis,Sahitya Bhavan Publication,Agra

Reference Books:

1. M. K. Jain, S. R. K. Iyengar, R. K. Jain, Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
2. Saxena H. C.: Finite Differences & Numerical Analysis, S Chand, 2010.

Suggested Digital Platforms Web links:

https://epgp.inflibnet.ac.in
https://www.highereducation.mp.gov.in/?page=xhzIQmpZwkylQo2b%2Fy5G7w%3D%3D

Suggested Equivalent online courses:

https://nptel.ac.in/courses/111106101/
https://nptel.ac.in/courses/111107105/
https://nptel.ac.in/courses/111107107/
https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/1476

Suggestive digital platform web links

https://byjus.com/maths/trigonometry/
https://www.skillsyouneed.com/num/trigonometry.html
https://www.mathsisfun.com/algebra/trigonometry.html
https://www.mbacrystalball.com/blog/2015/10/09/set-theory-tutorial/
https://plato.stanford.edu/entries/set-theory/basic-set-theory.html

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **40** Marks
University Exam (UE): **60** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	$04 \times 05 = 20$ $08 \times 05 = 40$ **Total Marks: 60**