Vinoba Bhave University, Hazaribag

UNIVERSITY DEPARTMENT OF COMPUTER APPLICATIONS
VINOBA BHAVE UNIVERSITY, HAZARIBAG

COURSE STRUCTURE
CHOICE BASED CREDIT SYSTEM

The proposed CBCS system has the potential of providing a choice of a wide spectrum of subjects/branches of subjects to students in pursuit of achieving their cherished goals. This system has been globally accepted and now has become the need of the day. The UGC also has provided guidelines to the Universities for consideration and implementation of CBCS.

The University Department of Computer Applications proposes the following courses and credits to be initiated at BCA w.e.f. the session 2018 – 21. The proposed system may be modified/improved in future according to the requirements.

CORE Papers for BCA

Semester – I

Paper Code	Title	Credit	Marks
BCA F1001	Business Communications	4	100
BCA F1002	Basic Mathematics-I	5	100
BCA F1003	Business Practices And Management	4	100
BCA C1004	Introduction to Computer Science	4	100
BCA C1005	Problem Solving and Programming in C	5	100
Sessional			
BCA P1006	Computer Basics and PC Software Lab	1	50
BCA P1007	C Programming Lab	1	50
BCA P1008	Communication Skill Lab	1	50

Semester – II

Paper Code	Title	Credit	Marks
BCA F2001	Basic Mathematics II	4	100
BCA F2002	Environmental Science	4	100
BCA C2003	Database Management System	5	100
BCA C2004	Object Oriented Programming using C++	5	100
BCA C2005	Logic Design	4	100
Sessional			
BCA P2006	C ++ Programming Lab	1	50
BCA P2007	Database Management System Lab	1	50
BCA P2008	Circuit Design Lab	1	50

Semester – III

Paper Code	Title	Credit	Marks
BCA C3001	Data Structure using C	5	100
BCA C3002	Java Programming	4	100
BCA C3003	Computer Architecture	5	100
BCA C3004	System Analysis and Design	4	100
BCA C3005	Probability and Statistics	4	100
Sessional			
BCA P3006	Data Structure Lab	1	50
BCA P3007	Java Programming Lab	1	50
BCA P3008	Statistical Lab	1	50

Semester – IV

Paper Code	Title	Credit	Marks
BCA C4001	Multimedia	4	100
BCA C4002	Operating System	5	100
BCA C4003	HTML	4	100
BCA C4004	Visual Programming	4	100
BCA C4005	Computer Networks	5	100
Sessional			
BCA P4006	Multimedia Lab	1	50
BCA P4007	Visual Programming Lab	1	50
BCA P4008	HTML Lab	1	50

Semester – V

Paper Code	Title	Credit	Marks
BCA C5001	Internet Concept and Web Design	4	100
BCA C5002	Design and Analysis of Algorithms	5	100
BCA C5003	Linux Programming	5	100
BCA C5004	Computer Oriented Numerical Methods	4	100
	Elective – I	4	100
Sessional			
BCA P5005	Internet Concept and Web Design Lab	1	50
BCA P5006	Numerical Method Lab	1	50
BCA P5007	Linux Programming Lab	1	50

Semester – VI

Paper Code	Title	Credit	Marks
BCA C6001	Optimization Techniques	4	100
BCA C6002	Principle of Management	4	100
BCA C6003	Accounting and Financial Management	5	100
BCA C6004	Network Security	5	100
	Elective – II	4	100
Sessional			
BCA C6005	Project	2	100
BCA C6006	TALLY Lab	1	50

BCA-F2001 BASIC MATHEMATICS-II (BCA F2001)

TIME-3 hr　　　　　　　　**FULL MARKS-70**　　　　　　　**CREDIT-4**

The question paper shall consists of two sections: A and B. **Section A** will have eight (08) questions, out of which four (04) questions will be answered and will carry 10 marks each. **Section B** will consists of 10 short answer type questions which will cover the entire syllabus and will carry 30 marks in all., each short-answer type questions carrying 3 marks.

UNIT 1: ABSTRACT ALGEBRA
Group, Subgroups, Ring, Integral Domain, Field and Introduction of Boolean algebra. **[Q-2]**

UNIT 2: LINEAR ALGEBRA
Spaces and Subspaces, Basic and Dimension of Vector Spaces, Linear Transformation, Their Nullity and Rank. **[Q-2]**

UNIT 3: MATRIX ALGEBRA
Elementary Transformation, Inverse of a Matrix by Row Operation, Rank, Solution of a System of Linear Simultaneous Equation by Matrix Methods, Eigen Values and Eigen Vectors, Quadratic Forms. **[Q-2]**

UNIT 4: ANALYTICAL GEOMETRY OF 3-DIMENSIONS
Rectangular, Spherical, Polar and Cylindrical Coordinates, Direction Cosines, Planes, Straight Lines, Shortest Distance Between Two Skew Lines, Sphere. **[Q-2]**

TEXT BOOKS:

1. "Modern Algebra" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.
2. "Matrices" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.
3. "Analytical Geometry of the Dimensions" By Dasguta Prasad, Bharti Bhawan
4. "Advanced Course in Modern Algebra" By Prof Dr.K.K.Jha, New Bharat Prakashan Delhi- 6.
5. "Krishna Series" Analytical Geometry of three Dimensions" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.

BCA – F2002 ENVIRONMENTAL SCIENCE (BCA F2002)

TIME-3 hr   FULL MARKS-70   CREDIT-4

The question paper shall consists of two sections: A and B. **Section A** will have eight (08) questions, out of which four (04) questions will be answered and will carry 10 marks each. **Section B** will consists of 10 short answer type questions which will cover the entire syllabus and will carry 30 marks in all., each short-answer type questions carrying 3 marks.

UNIT – 1: ENVIRONMENTAL AWARENESS, ECOLOGY AND ENVIRONMENT:

Multidisciplinary nature of environmental science, Definition, scope, importance and need for public awareness. Concept of an ecosystem, structure and function of an ecosystem, producer, consumer and decomposer, energy and nutrient flow biogeochemical cycles, food chain, food web, ecological pyramid.
[Q-2]

UNIT – 2: ENVIRONMENTAL POLLUTION

Segments of environment, sources, pathways and fate of environmental pollutants, causes of environmental pollution, physical, chemical, and biological transformation of pollutants, population explosion, environment and human health, human rights, value education, women and child welfare.
 [Q-2]

UNIT – 3: AIR POLLUTION

Various segments of atmosphere and their significance, classification of air pollutions, toxic effects, sampling and analysis, stationary and mobile emission, sources and their control, photochemical smog, sulphurous smog, green house effect, global warning, ozone depletion, Air (prevention and control of pollution) Act.   **[Q-2]**

UNIT – 4: WATER POLLUTION

 Water resources sources of water pollution, various pollutants, their toxic effect, portability of water, municipal water supply, disinfection, characteristics of waste water, primary and secondary waste water treatment, BOD and COD measurement and their significance, rain water harvesting, water shed management, Water (pollution and control) Act. **[Q-2]**

TEXT BOOK
1. De A. K., Environmental Chemistry, Wiley Eastern Ltd.

RECOMMENDED BOOKS:

1. Miller T.G.Jr., Environmental Science, Wadswarth Publishing Co. (TB)
2. Sharma B.K., 2001, Environmental Chemistry, Goel Publishing House, Meerut
3. Odem, E.P., 1971, Fundamentals of Ecology, W.B.Sannders Co. U.S.A.

DATABASE MANAGEMENT SYSTEM (BCA C2003)

TIME-3 hr   **FULL MARKS-70**   **CREDIT-5**

The question paper shall consists of two sections: A and B. **Section A** will have eight (08) questions, out of which four (04) questions will be answered and will carry 10 marks each. **Section B** will consists of 10 short answer type questions which will cover the entire syllabus and will carry 30 marks in all., each short-answer type questions carrying 3 marks.

Unit 1:
Introduction to Databases. Database Management system, Need for DBMS-the file based system, Limitations of file based system, the Database Approach, The Logical DBMS architecture-three level architecture of DBMS, the need for three levels architecture. Physical DBMS Architecture-DML precompiler, DDL compiler, File Manager, Database Manager, Query Processor, Database Administrator, Datafiles indexes & Data Dictionary.   **[Q-2]**

Unit 2:
Data Models- Relational, Network, Hierarchical, ER Model. Relational Model-Domain, Attributes, Tuple and Relation, Keys of the relations-primary key, foreign Key, candidate key, alternate key, composite key. Relational Constraints-Domain, Key and Integrity constraints. Relational algebra-Basic set Operation (UNION, INTERSECTION, SET DIFFERENCE, Cartesian Product), Relational operations- SELECT, PROJECT, JOIN, DIVISION. **[Q-2]**

Unit 3:
ER Model- Entities, Attributes and their types, Relationship and Relationship sets, Degree, Cardinality, ER-Diagrams, Enhanced feature of ER Model- Specialization, Generalization and Aggregation. Codd's rules, Relational Schemas, Database Integrity & Normalization (1NF, 2NF, 3NF, BCNF). **[Q-2]**

Unit 4:
SQL, Categories of SQL Commands, Views, constraints, types of constraints, Integrity constraints (Entity Integrity Constraint and Referential Integrity Constraint), SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. **[Q-2]**

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TEXT BOOKS:
   1. Fundamental of Database Systems- Elmasri Navathe- Pearson Education Asia

2. Database- Principles, Programming and Performance- Parick O' Neil Elizabeth O' Niel, [Harcort] Asia PTE Limited

REFERENCES BOOKS:
1. An Introduction to Database Systems- C. J.Date, Addison Wesley, Pearson Education Press
2. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan Tata McGraw Hill.

OBJECT ORIENTED PROGRAMMING USING C++ (BCA C2004)

TIME-3 hr   **FULL MARKS-70**   **CREDIT-5**

The question paper shall consists of two sections: A and B. **Section A** will have eight (08) questions, out of which four (04) questions will be answered and will carry 10 marks each. **Section B** will consists of 10 short answer type questions which will cover the entire syllabus and will carry 30 marks in all., each short-answer type questions carrying 3 marks.

UNIT 1: INTRODUCTION, BASIC TERMS AND IDEAS

Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators. **[Q-2]**

UNIT 2: 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, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes. **[Q-2]**

UNIT 3: 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. **[Q-2]**

UNIT 4: GENERIC FUNCTION, FILES AND EXCEPTION HANDLING

Template function, function name overloading, overriding inheritance methods, Run time polymorphism, Multiple Inheritance. Streams and files, Namespaces, Exception handling, Generic Classes. **[Q-2]**

TEXT BOOK:

1. E. Balaguruswamy, "Object Oriented Programming using C++", TMH, 2017.

REFERENTIAL BOOKS & WEBSITE:

1. A.R.Venugopal, Rajkumar, T. Ravi hanker "Mastering C++", TMH, 1997**.**
2. S.B.Lippman & J.Lajoie, " C++ Primer", 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl – Dennis Ritchie
3. R.Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004
4. D.Parasons, "Object Oriented Programming using C++", BPB Publication.
5. www.spoken-tutorial.org, spoken tutorial IIT Bombay

LOGIC DESIGN (BCA C2005)

TIME-3 hr   **FULL MARKS-70**   **CREDIT-4**

The question paper shall consists of two sections: A and B. **Section A** will have eight (08) questions, out of which four (04) questions will be answered and will carry 10 marks each. **Section B** will consists of 10 short answer type questions which will cover the entire syllabus and will carry 30 marks in all., each short-answer type questions carrying 3 marks.

UNIT 1: BOOLEAN ALGEBRA AND LOGIC GATES

Digital Systems, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic. Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Ot, Digital Logic Operations, Digital Logic Gates, Integrated Circuits. **[Q-2]**

UNIT 2: GATE - LEVEL MINIMIZATION

 The Map Method, Four - Variable Map, Don't - Care Conditions, SOP & POS Simplification, NAND and NOR Implementations, Exclusive - OR Function. **[Q-2]**

UNIT 3: COMBINATIONAL LOGIC

Combinational Circuits,   Design Procedure, Binary Adder - Subtractor, Decimal Adder, Decoders, Encoders, Multiplexers. **[Q-2]**

UNIT 4: SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure. **[Q-1]**

UNIT 5: REGISTERS AND CIRCUITS

 Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters. **[Q-1]**

TEXT BOOK:

M.Morris Mano- Digital Design, 3rd Edn, Pearson Education, New Delhi - 2005.

REFERENCE BOOK:

A.B.Marcovitz- Introduction to Logic Design, TMH, New Delhi - 2002.

C++ PROGRAMMING LAB (BCA P2006)

TIME-3 hr   **FULL MARKS-50**   **CREDIT-1**

Experiment problems of C++ Programming lab will be from the theory classes of BCA C2004

DATABASE MANAGEMENT SYSTEM LAB (BCA P2007)

TIME-3 hr   **FULL MARKS-50**   **CREDIT-1**

Experiment problems of Database Management System lab will be from the theory classes of BCA C2003

CIRCUIT DESIGN LAB (BCA P2008)

TIME-3 hr   **FULL MARKS-50**   **CREDIT-1**

Experiment problems of Circuit Design lab will be from the theory classes of BCA C2005