EeBranch: BCA	Semester-II
Subject Code: 2101	Lecture: 02 Credit: 02
Course Opted	Ability Enhancement Compulsory Course – 2
Subject Title	**ENVIRONMENTAL SCIENCE AND RTI**

Course Objectives:
- To help the students to acquire knowledge of pollution and environmental degradation.
- To help students acquire knowledge of the environment beyond the immediate environment including distant environment.
- To help students acquire a set of values for environmental protection.
- To provide students with an opportunity to be actively involved at all levels in environmental decision making.
- Describe the benefits of RTI.
- Identify the legal and historical foundations for RTI

Course Outcomes:
Students will learn to
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- Understand the practical applicability of the Right to Information Act, 2005

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**The Multidisciplinary nature of Environmental Studies** Definition, scope and importance, Need for public awareness.	2	4
UNIT- II	2	**Natural Resources** Renewable and non-renewable resources, Natural resources and associated problems. a) Forest Resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, Dams: benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, and salinity. e) Energy resources: Growing energy needs, renewable	8	16

		and non-renewable energy sources, useof alternate energy sources. f) Land resources: Land as a resources ,land degradation ,man-induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.		
UNIT - III	3	**Ecosystem** Concept of an ecosystem, Structure and function of an ecosystem, Energy flow in the ecosystem, Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem: Forest ecosystem Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	6	12
UNIT- IV	4	**Environmental Pollution** Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, .Nuclear Hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes– biodegradable and non -biodegradable wastes. Role of an individual in prevention of pollution.	6	12
	5	**Right to Information Act:** Introduction, Right to information and obligations of public authorities, central information commission, state information commission and their duties, powers and functions of information commissions, appeals and penalties, Miscellaneous.	3	6
		TOTAL	**25**	**50**

Text Book:
1. P. Sharma 2013.Environmental Studies. University Science Press, New Delhi.

Reference Books:
1. Rajagopalan, R. 2018 Environmental Studies- From Crisis To Cure ,Oxford University Press, New Delhi.
2. Agarwal, K.C. 2001 Environmental Biology, Nidipubl. Ltd. Bikaner.
3. Bharucha Erach,Textbook onEnvironmentalStudies,UGC,NewDelhi
4. BoruaP.K., J.N. Sarma and others, A Textbook on Environmental Studies, Banlata, Dibrugarh
5. BrunnerR.C., 1989 Hazardous Waste Incineration, McGrawHillInc. 480p.
6. Clark R.S., Marine Pollution, Clanderson Press Oxford(TB).
7. Cunningham, W.P. Cooper, T.H. Gorhani,E &Hepworth, M.T. 2001, Environmental Encyclopedia, Jacio Publ. House, Mumbai, 1196p.
8. JoshiP.C. andNamitaJoshi, AText book ofEcologyand Environment, HimalayaPublishing
9. KaushikAnubhaandC.P.Kaushik ,Perspective in EnvironmentalStudies, New Age International
10. The Right to Information Act, 2005 ,SudhirNaib, Oxford University Press; 2011 edition

Branch: BCA	Semester-II
Subject Code: 2102	Lecture: 04 Credit: 04
Course Opted	Core Course -4
Subject Title	PROGRAMMING METHODOLOGY AND C++

Course Objectives:
- To understand how C++ improves C with object-oriented features.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how to overload functions and operators in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to design and implement generic classes with C++ templates.

Course Outcomes:
- Students will be able to
- Describe the object-oriented programming approach in connection with C++
- Apply the concepts of object oriented programming
- Analyze a problem and construct a C++ program that solves it
- Discover errors in a C++ program and describe how to fix them
- Illustrate the process of data file manipulations using C++

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Evolution of OOP:** Advantages and disadvantages of OOP over its predecessor paradigms. Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types. C++Program Structure, Simple Input/ Output Program, Program Comments, Identifiers, Literals, String, Character, Integer, Floating Point, Constants, Keywords, Data Types **Operators in C++, Control Structures in C++**	3	6
	2.	**Advanced Language Constructs:** Arrays, Multi dimensional arrays, Pointers, Structures	3	6
UNIT- II	3.	**Object and Classes :** Core object concepts, Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces, Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor Object as function arguments. **Functions and Variables:** Functions: Declaration and Definition, Variables: Definition,	4	8

		Declaration, and Scope, Dynamic Creation and Derived Data, Arrays and Strings in C++		
	4.	**Inheritance:** Concept of inheritance, Derived class and based class, Types of inheritance, Classes within classes, Functions and Friend Functions **Constructors:** Multiple Constructors and Initialization, Using Destructors to Destroy Instances	8	16
UNIT - III	5.	**Polymorphism:** Syntax for Operator overloading, Overloading unary operations, Overloading binary operators, Data conversion, Pitfalls of operators overloading and conversion keywords.	8	16
	6.	**Memory management:** New and Delete, Pointers to objects, Debugging pointers.	8	16
UNIT-IV	7.	**Files and streams:** iostream hierarchy , Standard Input/output Stream Library, Programming using Streams, Basic Stream Concepts. **File input and output:** Reading a File, Managing I/O Streams, Opening a File – Different Methods, Checking for Failure with File Commands, Checking the I/O Status Flags, Dealing with Binary Files	8	16
	8.	**Class templates:** Implementing a class template, Implementing class template member functions, Using a class template, Function templates, Class template specialization, Template parameters, Static members and variables **Exception Handling:** Try, throw and catch constructs, rethrowing an exception, Catch all Handlers.	8	16
		TOTAL	**50**	**100**

Text Books:

1. E. Balguruswamy, 'Object Oriented Programming with C++', Tata McGraw – Hill Education, 2008

2. K.R Venugopal 'Mastering C++', Tata McGraw-Hill Education, 1997

References:

1. B.Stroustroup 'C++ Programming Language' (3rd Edition). Addison Wesley, 1997

2. B.chandraNarosa 'A Treatise On Object Oriented programming using C++'- Publications, 1998

3. Herbert Schildt, "The Complete Reference CN", Tata McGraw-Hili, 2001

Branch: BCA	Semester-II
Subject Code: 2201	Lecture: 02 Credit: 02
Course Opted	Core Course -4 Practical
Subject Title	PROGRAMMING METHODOLOGY AND C++ LAB

Course Objectives:

Will enable students to

- Identify and practice the object-oriented programming concepts and techniques
- Practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.

Course Outcomes:

Students will be able to:

- Create 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

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Evolution of OOP**: Simple Programs on fundamental Data Types and I/O operators, Derived data types, Symbolic constants, variables and Reference variables **Operators and decision control structures**: Programs to implement if statements, Switch statements, Loop statements, Functions in C++: Main function, function proto type, Call by reference, return by reference, Inline functions, Default arguments, Const Arguments, Function overloading,	3	6
	2.	**Advanced Language Constructs:** Programs on Arrays, Multi dimensional arrays, pointers and structures.	2	4
UNIT- II	3.	**Objects and Classes:** Classes and Object, Programs for memory allocation for objects, Arrays of objects, Returning objects, Const Member functions, Pointers to members. **Functions and Variables:** Programs to implement Defining a function, declaration and calling a function, function arguments, Default values for parameters, friend function, Dynamic creation and derived data and use of arrays and strings with functions.	2	6

	4.	**Inheritance :** Programs for Inheritance Single, Multiple, Multilevel, Hierarchical inheritance, Hybrid inheritance, Virtual base class, Abstract class, Constructors in derived classes, Nesting of classes. **Constructors and Destructors :** Implementations of Constructors(Parameterized Constructors, Multiple constructors in a class, Constructors with default arguments, Copy constructors, Dynamic constructors)Destructors	4	8
UNIT - III	5.	**Polymorphism:** Programs for Operator Overloading (Unary, Binary, Using friend functions etc.)	2	5
	6.	**Memory Management :** Programs on memory management using new and delete and pointers to objects	2	5
UNIT- IV	7.	**Files and Streams :** Programs for Managing Console I/O Operations and Working with files: C++ Stream and Classes, Unformatted I/O operations, Put(),get(), getline(),write(), Formatted console I/O operations, Ios class functions and flags, Manipulators, User defined output functions. **File input and output**: Implementation of Opening and closing files, Detecting End of file, File modes, File pointers and their manipulations, Sequential input and output operations, Reading and writing class object, Command line arguments.	5	8
	8.	**Templates:** Implementations of Class template, Class template with multiple parameters, Function template. **Exception Handling:** Implementations of try, catch and throw statement for handling the exceptions.	5	8
		TOTAL	25	50

Text Books:

1. E. Balguruswamy, 'Object Oriented Programming with C++', Tata McGraw – Hill Education,2008

2. K.R Venugopal 'Mastering C++', Tata McGraw-Hill Education, 1997

Reference Books:

1. B.Stroustroup 'C++ Programming Language' (3rd Edition). Addison Wesley, 1997

2. B.chandraNarosa 'A Treatise On Object Oriented programming using C++'- Publications, 1998

3. Herbert Schildt, "The Complete Reference CN", Tata McGraw-Hili, 2001

Branch: BCA	Semester-II
Subject Code: 2103	Lecture: 04 Credit: 04
Course Opted	Core Course -5
Subject Title	DATABASE MANAGEMENT SYSTEM

Course Objectives:
- To introduce the concept of database management systems
- Learn to organize, maintain and retrieve - efficiently, and effectively - information from a database management system
- To present the concepts and techniques relating to query processing by SQL
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency and recovery in multiuser database environments

Course Outcomes:
- Able to find and understand the Concept Of database approach.
- Able to find and understand database architecture and data modeling, data Normalization.
- Design and draw ER and EER diagram for real life problem.
- Able to find and understand the commands of SQL.
- Able to understand the concept of transaction, concurrency and recovery.

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Introduction to Database Systems:** Database Approach, Traditional File system, Actors, Data Abstraction, Database Applications	6	14
	2.	**Database Systems and Architecture:** Three Tier Architecture, Centralized and Client-Server Architecture	3	6
UNIT- II	3.	**Data Models**: Network data model, Hierarchical data model, Relational data model.	3	6
	4.	Introduction to RDBMS, Object-oriented database, Distributed Database, No SQL, Graph Database	3	8
	5.	**Data Modeling**: ER Diagram Concepts, EER Diagram, Relational Database Design by ER and EER to Relational Mapping	7	12
UNIT - III	6.	**Normalization:** Functional Dependencies, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF	7	10
	7.	**Structure Query Language:** DDL, DML, TCL, DCL, Triggers, Functions, Query Optimization	7	16
UNIT- IV	8.	**Transaction Processing System Concepts:** Why concurrency control, ACID Properties, Schedule &	6	12

		Serialiability		
	9	**Concurrency Control Techniques:** 2PL, Timestamp Ordering, Optimistic Concurrency Control technique	5	10
	10.	**Database Recovery:** Recovery concepts, Caching, Checkpoints, Transaction Rollback	3	6
		TOTAL	**50**	**100**

Text Book:

1) Korth,Siberschatz,"Database System Concepts",McGraw-Hill,27-Jan-2010

Reference Books::

1) Elmarsi and Navathe,"Fundamentals of Database Systems",McGraw-Hill,2010

2) Bayross,"Oracle-the complete reference",Ivan: BPB Publications

3) "Upgrade to oracle 8",DataproInfoWorld Ltd.

4) GioWiderhold,"Database Design",McGraw-Hill 1995

Branch: BCA	Semester-II
Subject Code: 2202	Lecture: 02 Credit: 02
Course Opted	Core Course -5 Practical
Subject Title	DATABASE MANAGEMENT SYSTEM LAB

Course Objectives:

- Understand, appreciate and effectively explain the underlying concepts of database technologies

Course Outcomes:

- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	Database Creation, Table Creation & DDL commands	4	8
	2.	Operation on Databases: DML Commands	3	6
UNIT- II	3.	Data Query language: Select Commands	3	6
	4.	Altering table & fields, Views	4	8
UNIT - III	5.	Writing and defining Constraints	3	6
	6.	Join Command	4	8
UNIT- IV	7.	Implementation of Nested Queries	4	8
		TOTAL	25	50

Text Book:

1. Korth,Siberschatz,"Database System Concepts",McGraw-Hill,27-Jan-2010

Reference Books::

1. Elmarsi and Navathe,"Fundamentals of Database Systems",McGraw-Hill,2010

2. Bayross,"Oracle-the complete reference",Ivan: BPB Publications

3. "Upgrade to oracle 8",DataproInfoWorld Ltd.

4. GioWiderhold,"Database Design",McGraw-Hill 1995.

5. Oracle 8i The Complete Reference: Loney, Koch

Branch: BCA	Semester-II
Subject Code: 2104	Lecture: 04 Credit: 04
Course Opted	Core Course -6
Subject Title	**MATHEMATICS I**

Course objectives:
- To understand the concepts of discrete structures viz. sets, relations and functions etc. and graph theory.
- To understand, apply and solve problems using given method.

Course Outcomes:
- Have a better understanding of sets, relations and functions
- Be able to understand Permutation and Combinations, Mathematical induction, Binomial Theorem and Graph Theory.
- Apply logic and construct simple mathematical proofs and solve problems.
- Demonstrate different traversal methods for graph

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Set Theory**: Definition of Sets, Subsets, Cardinality of Sets, types of sets: Equal Sets, Universal Sets, Finite and Infinite Sets, proper set, power sets, Operations on Sets: Union, Intersection, Complement of Sets, set difference, Cartesian Product, Venn Diagrams, and Algebra of sets	6	12
	2.	**Properties of integers:** Definition of GCD, LCM, Theorems Euclidean algorithm and problems	6	12
UNIT- II	3.	**Relations:** Definitions of Relation, Reflexive Relation, Symmetric Relation, Transitive relation, Equivalence Relation Recurrence relation: Definitions and problems	6	12
	4.	**Functions** : Define Function ,Injective functions ,Surjective functions, Bijective functions, Composite function, Inverse of a function, Domain and Range	6	12
UNIT - III	5.	**Permutations and Combinations** : Definitions: Permutation, Combination and problems	6	12
	6.	**Binomial theorem and Mathematics Induction:** Binomial Theorem : Statement and problems, Mathematical Induction: principles and problems	6	12
UNIT- IV	7.	**Matrices and Determinants** Definition of a matrix; Operations on matrices; Square Matrix and its inverse; determinants; properties of determinants; the inverse of a matrix; solution of equations	8	16

		using matrices and determinants; solving equations using determinants.		
	8.	**Graph theory:** Graphs, types of graphs, Handshaking Lemma, Isomorphism of graphs, Subgraphs, Complement of graph.	6	12
		TOTAL	**50**	**100**

Text Book:

1. Kolman, Busby and Ross, "Discrete mathematical Structures and graph theory"

Reference Books:

1. Alan Doerr, K. Levasseur, "Applied discrete structure for computer science", Galgotia publications, 1988

2. Trembley&Manohar, "Discrete mathematical Structures with application to computer science", McGraw Hill, 1987.

3. Swapan Kumar Chakraborty, BikashKantiSarkar, Discrete Mathematics, Oxford Higher Education, 2011

4. 5.C. L. Liu, D. P. Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, Tata Mcgraw-Hill, 3 rd Edition, 2008.S.

Branch: BCA	Semester-II
Subject Code: 2105	Lecture: 02 Credit: 02
Course Opted	Skill Enhancement Course - 2
Subject Title	PRINCIPLES & PRACTICES OF ACCOUNTS

Course objective:-

- Introduces students to the world of accounting and understanding basics concepts of accounting to final account.
- The objective of the course is to strengthen the fundamentals of accounting and provide strong foundation for other accounting courses.
- It will be demonstrated how a practical understanding and interpretation of accounting reports and other accounting tools can improve decision-making in the organization.

Course Outcomes:-

- Students will be able to learn fundamental accounting concepts, Conventions & terminologies.
- Students will be able to describe the importance, functions & objectives of books of entry, subsidiary books, bank reconciliation statement and Final accounts.
- Students will be able to prepare books of entry, subsidiary books, bank reconciliation statement and Final accounts using double entry book keeping.

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
UNIT- I	1.	**Introduction to Book – Keeping & Accountancy** Accounting Terminologies, Accounting Principles, Basic Concepts, Double Entry Book – keeping System, Types of Vouchers & Specimen of Vouchers. **Journal:** Meaning, Importance and Utility of Journal Specimen of Journal ; Writing of Journal Entries on the basis of vouchers	6	12
UNIT- II	2.	**Ledger** Meaning, Need and Specimen of Ledger Posting of Entries from Journal to Ledger. **Subsidiary Books** Meaning, Need and Types of SubsidiaryBooks, Purchase Book, Sa les Book, Purchase Return Book, Sales Return Book, Simple Cash Book with Only Cash Column, Cash Book with Cash and Discount Columns, Cash Book with Cash, Bank and Discount Columns & Analytical Petty Cash Book.	6	12
UNIT - III	3.	**Bank Reconciliation Statement**:- Importance, Types **Trial Balance and Rectification of Errors**:- Objective, Preparation of Trial Balance	6	12
UNIT- IV	4.	Final Accounts: Trading and Profit & Loss Account, Balance Sheet	7	14
		TOTAL	25	50

Text Book:

1. S.N. Maheshwari& S.K. Gupta "Introduction to Accounting" 2016

Reference Books:

1. Fundamentals of Accounting, Kalyani Publishers, S P Jain and K L Narang 2017.
2. Fundamentals of Accounting, Universal Publications, B S Raman, 2017
3. Accounting for Managers, Himalaya Publishing House, R Venkata Raman and Srinivas, 2017