SEMESTER I

Branch: B.Sc.(IT)	Semester-I	
Subject Code: 1101	Lecture: 02	
	Credit: 02	
Course Opted	Ability Enhancement Compulsory Course-I	
Subject Title	Communication Skills	

Course Objectives

- To make SWOT as a tool to identify Individual's and Organization's Strengths, Weaknesses, Opportunities and Threats.
- To demonstrate the fundamental concepts and methods of communication.
- To learn positive body language for better connect.
- To enable students to build strong vocabulary for effective writing and communication.
- To promote technology driven communication through Emails, telephone and Power Point presentations.

• To facilitate fluent speaking skills in social, academic and professional situations.

Course Outcomes

- SWOT analysis will help to improve personality or business by identifying and working on it
- Positive body Language will enable students to break the barrier of unfamiliarity and helps to form a better connect with the recipients of information
- Develop interpersonal skills for effective communication by understanding methods of Communication
- Enhance verbal and non-verbal communication ability through Vocabulary Building, Body language, Presentations.
- Provide with the practical skills and knowledge necessary to express themselves clearly, with confidence and power, in a variety of speaking situations.

Module	Sr.	Topic and Details	No. of	Marks
	No.		Lectures	Weightage
			Assigned	
		Ice Braking Introduction to know more about the		
		Trainer/Teacher and Candidates		
		SWOT Analysis		
	1.	To Identify Individual and Business Strengths/	4	8
		Weaknesses/Opportunities/Threats		
		Introduction		
		• The SWOT framework		
		Application of SWOT		
		• Case study		
		Communication		
		Basics of Communication		
Unit I	2.	Factors of Communication	4	8
		• Barriers to Communication – Physical,		
		Psychological, Semantics, Organizational and		

		Interpersonal Barriers; How to overcome		
	3.	Body Language To Learn Positive body Language using Non-verbal Communication Non Verbal Communication- Personal appearance, Facial Expression, Movement, Posture, Gesture, Eye Contact etc.	4	8
	4	 Vocabulary Building Root words (Etymology) Meaning of Words in Context Synonyms & Antonyms Collocations Prefixes & Suffixes Standard Abbreviations 	2	4
	5	 Technology driven writing Email Etiquettes To Learn Email writing skills Format of Emails Features of Effective Emails Language and style of Emails 	3	6
	6	 Telephone Etiquettes To handle Telephonic round of Interview Telephone communication techniques Telephone Etiquettes 	2	4
Unit III	8	 Public Speaking Finding out environment Preparing text Composition of presentation Using Visual aids Speakers Appearance and Personality Applications of above using Group Discussion To assess Candidates' Public speaking skills Personal Interviews Conducting Mock/Personal Interviews to perform well during Interviews 	6	12
	1	TOTAL	25	50

Recommended Readings:

- 1. Urmila Rai and S. M. Rai, 'Business Communication', Himalaya Publishing House
- 2. Alan Sarsby, SWOT Analysis-a guide to SWOT for Business Studies Students
- 3. Sanjay Kumar & Pushp Lata, 'Communication Skills A workbook ', New Delhi: Oxford University Press.
- 4. M Ashraf Rizvi, 'Effective Technical Communication', McGraw-Hill.
- 5. Locker, Kitty O. Kaczmarek, Stephen Kyo. (2019). 'Business Communication: Building Critical Skills', McGraw-Hill.
- 6. Murphy H, 'Effective Business Communication', McGraw-Hill.

7. Raman & Sharma, 'Technical Communication: Principles and practice', New Delhi: Oxford UniversityPress.

Branch: B.Sc.(IT)	Semester-I	
Subject Code: 1102	Lecture: 04	
	Credit: 04	
Course Opted	Core Course-1 (Theory)	
Subject Title	PROBLEM SOLVING USING C	

Course Objectives:

- The course is designed to provide complete knowledge of C language.
- Students will be able to develop logics which will help them to create programs, applications in C.
- Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage. Able to define data types and use.
- By learning the basic programming constructs, they can easily switch over to any other language in future.
- The students will be able to develop applications

Course Outcomes:

- Students will be able to develop logic which will help them to create programs in C.
- Demonstrate an understanding of computer programming language concepts.
- Ability to design and develop Computer programs, analyze, and interpret the concept of pointers, declarations, initialization, operations on pointers and their usage.
- Able to define data types and use.
- By learning the basic programming constructs, they can easily switch over to any other language in future.
- The students will be able to develop applications

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT -I	1	 Introduction to problem solving: Concept: Steps in problem solving (Define Problem, Analyze Problem, Explore Solution), Problem solving techniques : (Trail & Error, Brain Storming, Divide & Conquer). Algorithms and Flowcharts (Definitions, Characteristics, Advantage & Disadvantages, Symbols, Examples), Pseudo-code(Definition, Conditional statements, Loops),etc 	4	16
	2	 Overview of programming languages: Definition of the program, Concept- Source code, Object code, Compilation, Interpretation, Execution, Input and Output, Debugging etc. 	4	

		• Expressions, control structures; subroutines, Storage management; scoping rules; bindings for names		
	2	Introduction to 'C' Language : History of C Programming, Structures of 'C' Programming, Simple example, Basic Input/ Output, Function as building blocks.	4	
		Language Fundamentals : Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.		
UNIT-II	4	 Operators : Types of operators, Precedence and Associativity, Expression, Statement and types of statements, Build in Operators and function. Console based I/O and related built in I/O Function: printf(), scanf(), getch(), getchar(), putchar(),etc; Concept of header files, Preprocessor directives: #include, #define, Conditional statements and Loops. Storage types: Automatic , external, register and static variables 	6	20
UNIT- III	5	 Control structures Decision making structures : If, If-else, Nested If, Nested If –else, else-if- ladder,Switch case Loop Control structures : While, Do-while, For Loop, Nested for, while, do-while loop. Jumping statements: break, continue, goto, exit. 	8	34
	6	Functions: Definition, Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Recursion, String Functions	6	
	7	Pointers: Introduction to pointers, Pointer notation, Pointer arithmetic,Null Pointer,pointer to pointer.	3	
UNIT- IV	8	 Arrays: Definition, Declaration, Initialization, Bounds checking, One-Dimensional Array, Two-Dimensional 	6	30

	Array,Passing array to a function, pointer to Array.		
9	 Structure and Union: Introduction to Structure, Definition, Declaration of Structure Variables, .Dot Operator, Nested Structure, Array of Structure, pointer to structure, Introduction to Union, Difference between Structure and Union . 	4	
10	 Dynamic memory allocation : Malloc(),Calloc(),Realloc(),free(). File Handling: Concept of File, Definition, File operations(create, open, read, move, write, close), File opening Mode, Closing a file, Input/output operations, Creating and reading a file, Command Line Argument. 	5	
	Total	50	100

Text and Reference Books :

- 1. C: The Complete Reference (Fourth Edition), Tata McGraw-Hill Education Pvt. Ltd., 2000
- 2. C programming E.Balagurusamy Tata McGray Hill, 1990
- 3. Ramkumar and Agrawal, "Programming in ANSI C", Tata McGraw Hill, 1996.
- 4. Y.P Kanetkar, "Let Us "C", , Infinity Science Press, 2008
- 5. Venu Gopal, "Programming in C", Tata Mcgraw-Hill Publishing company Limited, 1997

Branch: B.Sc(IT)	Semester-I	
Subject Code: 1201	Lecture: 02	
	Credit: 02	
Course Opted	Core Course-1 (Practical)	
Subject Title	PROBLEM SOLVING USING C LAB	

Course Objectives:

- To enable the students to learn a programming language.
- To learn problem solving techniques
- To teach the student to write programs in C and to solve the problems.

Course Outcomes:

The student would be able

- Read, understand and trace the execution of programs written in C language.
- Write the C code for a given algorithm.

- Implement Programs with pointers and arrays, perform pointer arithmetic, and use the preprocessor. •
- Write programs that perform operations using derived data types.
- Implement simple file operations

Module s	Sr.No.	Topic and Details	No. of Lectures/ Practicals Assigned	Marks Weightage %
UNIT-I	1	• Implementations of Operators : Built in Operators and function, Arithmetic, Logical, Relational, bitwise, Precedence and Associativity, composite statements. Unary, binary and ternary operators.		
	2	• Concept of header files, Preprocessor directives: #include, #define. And macros implementations,	4	08
	3	 Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); 		
UNIT- II	4	• Implementation of Control Statement: Decision Making Statements, if, Nested if, if-else, Nested if-else, if- else-if, switch, etc. The Conditional Expression, static variables		
		 Implementation of Iterative Statements- The for loop, . The while loop, The do-while loop, Implementation of Jumping Statements- The goto & label, The break & 		
	5	 continue, The exit() function Implementation of Functions: Defining and accessing, passing arguments, Function prototypes, function calling mechanism, call by value, call by reference, recursive function. 	12	24
		 Implementation of String Manipulations 		
	6	• Implementation of Pointer Declaration and Initialization of Pointer variables, pointer Arithmetic, Pointers and Character Strings		

UNIT- III	7	 Implementation of 1-D and multi dimension Array, One-Dimensional Array, Two-Dimensional Array, Passing array to a function, pointer to Array. 	5	10
	8	• Programs Using Structure and Union : Defining and Declaring Structure Variables, .Dot Operator, Nested Structure, Array of Structure, pointer to structure, Examples of Union.		
	9	 Programs using Dynamic Memory Allocation : Malloc(),Calloc(),Realloc(),free(). 		
UNIT- IV	10	 Programs using I/O Operations File Handling : File operations(create, open, read, move, write, close) Input/output operations on file Character by – (fgetc, fputc), Reading and writing files 	4	8
		Total	25	50

Text and Reference Books:

- 1. C: The Complete Reference (Fourth Edition), Tata McGraw-Hill Education Pvt. Ltd., 2000
- 2. C programming E.Balagurusamy Tata McGray Hill, 1990
- 3. Ramkumar and Agrawal, "Programming in ANSI C", Tata McGraw Hill, 1996.
- 4. Y.P Kanetkar, "Let Us "C", , Infinity Science Press, 2008
- 5. Venu Gopal, "Programming in C", Tata Mcgraw-Hill Publishing company Limited, 1997

Branch: B.Sc.(IT)	Semester-I	
Subject Code: 1103	Lecture: 04	
	Credit: 04	
Course Opted	Core Course-2 (Theory)	
Subject Title	Introduction to IT & Operating Systems	

Learning outcomes:

a) To understand basic organization of computer and different computer peripherals and interfaces,

b) To define different number systems their interconversion and binary arithmetic.

c) To understand the basics of Networking

d) To understand the main components of an operating system and their functions.

e) To describe the various CPU scheduling algorithms and remove deadlocks.

f) To understand the concepts and implementation Memory management policies and virtual memory.

g) To use disk management and disk scheduling algorithms for better utilization of external memory.

Modules	Sr.	Topic and Details	No. of	Marks
	No.	_	Lectures	Weightage
			Assigned	%
		Number Systems: Binary, Octal Decimal Hexadecimal and Their interconversion, Computer Arithmetic.		6
	1	 Computer Software: System and Application Software. Type of Computers: Digital, Analog, Hybrid Computers 	3	
UNIT –I	2	Definition : Data, Information; Characteristics and Interpretation, Data & its logical & physical concepts Definition of Computer, Features, Block Diagram of Computer System, Computer Generations, Primary Memory Devices: RAM, ROM, PROM, EPROM, CACHE Memory, Registers.	3	6
UNIT – II	3	Secondary Storage Devices: : Sequential and Direct Access Devices, Magnetic and Optical Storage, Flash Drive/USB Pendrive Printers: Impact and Non-Impact Printers. Computer Languages: Machine, Assembly, High Level	2	4
	4	Networks: Type of Networks (LAN, MAN, WAN, etc), Network configuration: topologies, Layered approach for network Models, TCP/IP and the OSI Reference Model And Working, Comparison of TCP/IP and OSI reference model, WWW, HTTP, e-Mail, GIAS, Search engine,	6	12

		Domain name etc.		
UNIT – III	5	Operating System: Purpose of Operating Systems, OS Structure, Services of Operating System. Types of Operating System (Explain concepts): Single processor systems, Multiprogrammed, Batch, Time sharing-Interactive, Multitasking, Multiprocessor systems, Parallel systems, Distributed systems, Special purpose systems, Real Time systems, Multimedia systems Handheld Systems	8	16
	6	Processes: Concept, process states, Scheduling, Operations on Processes, Cooperating Process, Process Synchronization. Threads: Concept, Multithreading models, Threading issues	10	20
UNIT –IV	7	CPU Scheduling: Concept, Scheduling Criteria, Scheduling Algorithms (FCFS, SJF, RR, Priority). Memory Management: Concept, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging (Concepts only) –	12	24
	8	Page Replacement policies : Least Recently used(LRU) Optimal (OPT) , Second Chance (SC), Firstin First Out (FIFO), , Not recently used (NRU).Deadlock:Concept,SystemModel,Characterization, HandlingDeadlock, Detection,	6	12
		Prevention, Avoidance. TOTAL	50	100

Text Books

- 1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, Sixth Edition, 2018
- Silberschatz, Galvin, Gagne "Operating System Principles" John Wiley & Sons, 7th Edition, 2006

REFERENCES:

- 1. Dr. Madhulika Jain, "Information Technology Concept", BPB Publication 2nd Edition., 2018
- 2. Andrew Tanenbaum, Modern Operating Systems, Prentice Hall., 2nd Edition, 2001.
- 3. William Stallings, Operating Systems, Prentice Hall, 6th Edition 2009
- 4. Harvey M. Deitel, An introduction to operating systems. Addison-Wesley, 2nd Edition 1990
- 5. Andrew Tanenbaum & Albert Woodhull, Operating Systems: Design and Implementation. Prentice-Hall, 3rd Edition 2006
- 6. Douglas Comer, Operating System Design The XINU, 2nd Edition

Branch: B.Sc(IT)	Semester-I
Subject Code: 1202	Lecture: 04
	Credit: 04
Course Opted	Core Course 2 - Practical
Subject Title	UNIX/LINUX- Operating Systems – LAB

Module	Sr.No	Topic and Details	No. of	Marks
S			Lectures/Practicals	Weigh
			Assigned	tage %
UNIT-I	1	Getting started –Commands	3	6
	2	The Unix Architecture and command usage –	2	4
		Commands, General-purpose utilities		
UNIT-	3	The File system –Commands	2	4
II	4	Handling ordinary files, Basic file attributes	2	4
UNIT-	5	The vi Editor	5	10
III	6	Simple Filters, Filters using regular	3	6
		expressions - use of grep command		
UNIT-	7	Introduction to shell concept and writing shell	5	10
IV		script		
	8	Essential Shell Programming	3	6
		Total	25	50

Text and reference Books:

- 1. The Linux Kernel Book Rem Card, Eric Dumas and Frank Mevel Wiley Publications sons, 2003
- 2. Unix Concepts and Applications by Sumitabha Das, Fourth Edition, TMH, 2017
- 3. MySQL Bible Steve Suehring John Wiley sons, 2002
- 4. Programming PHP Rasmus Lerdorf and Levin Tatroe O'Reilly Publications, 2002
- 5. Terry Collings, Kurt Wall, "Red Hat Linux Network and System Administration" 3rd edition Wiley.
- 6. Neil Mathews, "Beginning Linux Programming" 4th edition, Wrox Press, 2007
- 7. P.Koparkar, "Unix For You", Tata McGraw-Hill, 2001
- 8. Y.P.Kanetkar, "Unix Shell programming", BPB publications, 1st Edition 2013

Branch: B.Sc.(IT)	Semester-I
Subject Code: 1104	Lecture: 04
	Credit: 04
Course Opted	Core Course-3 (Theory)
Subject Title	Mathematics-I

Course Objective:

- To introduce fundamental concepts of differential and applications of discrete structures and differential equations in the field of computer science
- Work with matrices and determine if a given square matrix is invertible.
- To learn about First order differential equations
- To introduce the basics of the theory of sets and some of its applications.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Find the inverse of a square matrix. Solve the matrix equation Ax = b using row operations and matrix operations. Find the determinant of a product of square matrices, of the transpose of a square matrix, and of the inverse of an invertible matrix
- Will understand First order differential equations
- Will learn the basics of the theory of sets and some of its applications

Modules	Sr.	Topic and Details	No. of	Marks
	No.		Lectures Assigned	Weight age %
UNIT-I	1	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 using matrices and determinants; solving equations using determinants; eigen values and eigen vectors of a matrix	14	28
UNIT-II	2	Differential Equation First order differential equations; practical approach to Differential equations; first order and first degree differential equations; homogeneous equations. Linear equations; ; Exact Differential Equations.	14	28
UNIT-III	3	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
	4	Properties of integers: Definition of GCD, LCM, Theorems Euclidean algorithm and problems	5	10

	5	Relations: Definitions of Relation, Reflexive Relation, Symmetric Relation, Transitive relation, Equivalence Relation	6	12
UNIT-IV	6	Functions :DefineFunction ,Injective functions ,Surjectivefunctions, Bijectivefunctions, Compositefunction, Inverse of a function, Domain and Range	5	10
		Total	50	100

Outcomes:

On the successful completion of the course, the student will be able to:

- Apply the knowledge of matrices to solve the problems
- Understand the theory and techniques of set, functions ,relation .
- Understand some basic properties discrete structures, and be able to relate these to practical examples.
- Apply the knowledge and skills obtained to investigate and solve problems related to differential equations .

Text & Reference Books:

- Kolman, Busby and Ross, "Discrete mathematical Structures and graph theory", 6th Edition, 2009
- Alan Doerr, K. Levasseur, "Applied discrete structure for computer science", Galgotia publications, 1988
- P. N. Wartikar & J. N. Wartikar, "Elements of Applied Mathematics", 7th, Pune Vidyarthi Graha, 1988,
- Grewal. B.S, "Higher Engineering Mathematics", 41 st Edition, Khanna Publications, Delhi, 2011.
- Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 2011.

Branch: B.Sc(IT)	Semester-I
Subject Code: 1105	Lecture: 02
	Credit: 02
Course Opted	Skill Enhancement Course - 1
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	Marks
S			Lectures	Weigh
			Assigned	tage %
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 Subsidiary Books, 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

Reference and Text 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
- 4. S.N. Maheshwari& S.K. Gupta "Introduction to Accounting" 2016

SEMESTER II

Branch: B.Sc.(IT)	Semester-II
Subject Code: 2101	Lecture: 02
-	Credit: 02
Course Opted	Ability Enhancement Compulsory Course-II
Subject Title	Environmental Science

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.

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.

Module	Sr.	Topic and Details	No. of
	No.		Lectures
			Assigned
		The Multidisciplinary nature of environmental studies	
Unit I	1.	Definition, scope and importance	2
		Need for public awareness.	
		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. 	
Unit II	1.	b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.	8
		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, water logging, and salinity.	

		e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.	
		f) Land resources: Land as a resources, land degradation, man- induced landslides, soil erosion and desertification.	
		g) Role of an individual in conservation of natural resources Equitable use of resources for sustainable lifestyles.	
		Ecosystem	
		\Box Concept of an ecosystem.	
		Structure and function of an ecosystem.	
		• Energy flow in the ecosystem.	
		 Food chains, food webs and ecological pyramids. 	
Unit III	1.	• Introduction, types, characteristics features, structure	6
		and function of the following ecosystem:	
		a. Forest ecosystem	
		b. Grassland ecosystem	
		d Aquetic accessions (nonde streams lakes rivers occors	
		estuaries)	
		Environmental Pollution	
		Definition Causes effects and control measures of .	
		a Air pollution	
		b Water pollution	
	1.	c Soil pollution	6
		d Noise pollution	
Unit IV		e Thermal pollution	
Unitiv		f Nuclear hazards	
		• Solid waste Management: Causes, effects and control	
		measures of urban and industrial wastes – biodegradable and	
	2.	non biodegradable wastes.	2
		□ Role of an individual in prevention of pollution.	5
		Disaster Management: Floods, earthquake, cyclone and	
		landslides	
		Total	25

Recommended Readings:

1. Rajagopalan, R. 2018 Environmental Studies- From Crisis To Cure, Oxford University Press, New Delhi.

2. Agarwal, K.C. 2001 Environmental Biology, Nidi publ. Ltd. Bikaner.

3. Bharucha Erach, Text book on Environmental Studies, UGC, New Delhi, 2017

4. Borua P.K., J.N.Sarma and others, A Text book on Environmental Studies, Banlata, Dibrugarh, 1989

- 5. Brunner R.C., 1989 Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- 6. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB), 2001
- 7. J. P. Sharma 2013. Environmental Studies. University Science Press, New Delhi.
- 8. Jadav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.

9. Joshi P.C. and Namita Joshi, A Text book of Ecology and Environment, Himalaya Publishing, 2009

Branch: B.Sc(IT)	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++

Modules	Sr.	Topic and Details	No. of	Marks
	No.		Lectures	Weightage
			Assigned	%
Unit- I	1	INTRODUCTION: MODELING CONCEPTS, CLASS MODELING: What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development 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.	Assigned 5	%
		 C++ProgramStructure Simple Input/OutputProgram Program Comments Identifiers Literals String, Character, Integer, Floating Point, Constants Keywords 		

		• DataTypes		
		Operators in C++		
		Control Structures in C++		
	2	Advanced Language Constructs		
		Arrays		
		Multi dimensional arrays	3	6
		• Pointers		
	2	Structures		
	3	Object and Classes :		
		Core object concepts		
		• Encapsulation, Abstraction,		
		Polymorphism		
		Classes, Messages Association,		
		Interfaces		
		• Implementation of class in C++,		
		• C++ Objects as physical object,	4	8
		• C++ object as data types constructor.		0
		• Object as function arguments.		
		Functions and Variables		
		• Functions: Declaration and Definition		
Unit- II		• Variables: Definition, 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	6	12
		Functions and Friend Functions		
		Constructors		
		Multiple Constructors and Initialization		
		Using Destructors to Destroy Instances		
	5	Polymorphism		
	-	• Syntax for Operator overloading		
		Overloading unary operations		
Unit III		Overloading binary operators	8	16
		 Data conversion 	Ū	10
		 Dittalls of operators overloading and conversion 		
Oline III		keywords		
		Memory management		
		New and Delete		
	6	Pointers to objects	8	16
		Formers to objects		
		• Debugging pointers.		

		Files and streams		
		• iostream hierarchy		16
		Standard Input/output Stream Library		
1		Programming using Streams, Basic Stream		
1		Concepts.		
	7	File input and output:	8	
	/	Reading a File	0	10
1		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		
Unit IV	8	Class templates:		16
		• Implementing a class template		
		• Implementing class template member functions		
		• Using a class template		
		Function templates		
		Class template specialization		
		• Template parameters, Static members and	8	
		variables	0	10
		Exception Handling:		
		• try		
		• throw and		
		catch constructs		
		• rethrowing an exception		
		• Catch all Handlers.		
		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: B.Sc(IT)	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

Modules	Sr.	Topic and Details	No. of	Marks
	No.		Lectures	Weightage
			Assigned	%
	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	3	6
		to implement if statements, Switch statements, Loop	5	0
Unit- I		statements, Functions in C++: Main function, function		
		proto type, Call by reference, return by reference, Inline		
		functions, Default arguments, Const Arguments,		
		Function overloading,		
	2	Advanced Language Constructs:		
		Programs on Arrays, Multi dimensional arrays, pointers	2	4
		and structures.		
	3	Objects and Classes:		
		Classes and Object, Programs for memory allocation for		
		objects, Arrays of objects, Returning objects, Const		
		Member functions, Pointers to members.	2	
		Functions and Variables:		6
		Programs to implement Defining a function, declaration		0
		and calling a function, function arguments, Default		
		values for parameters, friend function, Dynamic creation		
Unit- II		and derived data and use of arrays and strings with		
		functions.		
	4	Inheritance :		
		Programs for Inheritance Single, Multiple, Multilevel,		
		Hierarchical inheritance, Hybrid inheritance, Virtual base		
		class, Abstract class, Constructors in derived classes,	4	8
		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		
	5	Polymorphism:		
		Programs for Operator Overloading (Unary, Binary,	2	5
Unit III		Using friend functions etc.)		
Unit- III		Memory Management :		
	6	Programs on memory management using new and delete	2	5
		and pointers to objects		
		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(),		
	7	Formatted console I/O operations, Ios class functions and	5	8
		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		
Unit- IV		manipulations, Sequential input and output operations,		
		Reading and writing class object, Command line		
1		arguments.		
1		Templates:		
		Implementations of Class template, Class template with		
		multiple parameters, Function template.		
	8	Exception Handling:	5	8
		Implementations of try, catch and throw statement for		
		handling the exceptions.		
		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

Branch: B.Sc.(IT)	Semester-II
Subject Code: 2103	Lecture: 04
	Credit: 04
Course Opted	Core Course- 5(Theory)
Subject Title	Data Structures using 'C'

Module	Sr No.	Topic and Details	No of Lectures Assigned	Marks Weight age %
UNIT-I	1	Introduction to data structure, Classification of data structure, Operations performed on data structures	4	-
	2	 Algorithm Analysis Algorithm Characteristics, Space complexity, Time complexity. Asymptotic notation(Big O, 0, Omega and Theta 	6	20
	3	 Arrays Linear data structure, arrays, operations on an array,two dimensional arrays, multi dimensional arrays. Searching, Sequential and binary search. Sorting, bubble sort, insertion sort, selection sort 	8	16
UNIT- II	4	 Linked Lists Linked list, static representation, dynamic representation Circular linked list, Insertion and deletion operations doubly linked list, 	6	12
	6	 Stacks Stacks representation, static and dynamic operation, Polish Notation, Postfix expression evaluation, Conversion into other notations, recursive function 	5	10
UNIT- III	7	 Queue Queue representation static and dynamic, operation, Circular queue, Deque, Priority queues. 	5	10
	8	 Trees Trees, Binary tree ,Traversal (Inorder,Preorder,Postorder), Memory representation Binary search tree, Heap,Heap sort, height balanced trees—AVL trees 	6	12

UNIT- IV	9	 Graphs, Representation, adjacency matrix, adjacency list, adjacency multi –list, Depth first search, Breadth first search Minimum spanning tree 	6	12
	10	Hash tables, hashing and collision resolution techniques	4	8
	Total			100%

Text Book: Data Structure by Lipshutz ,Schaum's Outline, MCGRAW-HILL, 1986 **References:**

- Fundamentals of Data Structure Horowitz and Sahani, 2004
- Data Structure in C Tanenbaum, 2003
- Fundamentals of computer algorithms Horowitz and Sahani. 2nd Edition, 2008
- Classic Data Structure D. Samanta, PHI publication, 2nd Edition, 2009
- Data management and File Structure Mary E.S. Loomis. PHI, 1990

Branch: B.Sc(IT)	Semester-II
Subject Code: 2202	Lecture: 02
	Credit: 02
Course Opted	Core Course -5 Practical
Subject Title	Data Structures using 'C' LAB

Course Objectives:

- To introduce the concepts of data structures including arrays, linked list, stack and queues.
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the world.
- To create programs using data structure algorithms and also techniques of sorting and searching.

Course Outcomes:

- Select appropriate data structures as applied to specified problem definition.
- Implement operations like traversing, insertion, deletion and searching etc. on various data structures.
- Students will be able to implement linear and non linear data structures.
- Implement appropriate sorting and searching techniques for given problems.

Modules	Sr.No.	Topic and Details	No. of	Marks Weightego
			Assigned	weightage %
UNIT-I	1	Arrays: Implementations of Array and Operations- Insertion, deletion of an element from one dimensional array, Traversing of array	2	4
	2	Linked Lists: Singular Implementation of List and Linked List and Operations- Inserting, Deleting of nodes etc	2	4
UNIT II	4	Stack: Stack Implementation, Operations on stack(Push Pop). Implementation of stack using pointer,	4	8
UNIT-III	5	Queue: Implementation of Queue Implementation, Operations on queue(Insertion and deletion)	3	6
	6	Trees: Implementation of tree as Array and Linked lists and Traversal (Inorder, Preorder, Postorder)	4	8

UNIT-IV	7	Graphs: Implementation of Graph traversal (BFS, DFS Shortest path)	3	6
	8	Searching & Sorting: Implementation of searching (Sequential, Binary search) Sorting (Bubble sort, Selection sort, Insertion Sort.)	4	8
		Total	25	50

Branch: B.Sc.(IT)	Semester-II
Subject Code: 2104	Lecture: 04
	Credit: 04
Course Opted	Core Course- 6
Subject Title	Mathematics II

Course Objective:

The subject aims to provide the student with:

- Mathematics fundamental necessary to formulate, solve and analyze computer science problems.
- An understanding of Fourier Series and Laplace Transform to solve real world problems.
- An understanding of numerical methods.
- An understanding of Complex integration.

Course Outcomes:

The student will be able to

- Analyze and solve computer science problems
- Understand the applications of Fourier Series and Laplace Transform to solve real world problems
- Apply numerical methods to find solutions of algebraic equations using different methods viz. Bisection method, Regula Falsi, Newton Raphson's, Ramanujan's method, Matrix Inversion and Gauss Elimination
- Understand Complex Integration

Modules	Sr.	Topic and Details	No. of	Marks
	No.		Lectures	Weight
			Assigned	age %
	1	Vectors	12	24
LINIT I		Vectors in two and three dimensions, Vector algebra,		
UNIT-I		Vector function in two and three variables, Vector		
		differentiations, Gradient Divergence and curl, Double and triple integral		
	2	Fourier series	10	20
UNIT-II		Definition, Fourier coefficient ,Determination of Fourier		
		series of simple function, Fourier series of even and odd		
		Function		
	3	Laplace transform	10	20
UNIT-III		Laplace transform of simple functions, Inverse Laplace transform, application of Laplace transform		
	4	Complex Numbers	8	16
UNIT-IV		Complex Numbers and The Complex Plane, Cartesian Polar and Exponential form, Argand's diagram, De Movier's theorem, Function of a complex Variable,		

		Complex integration, Simple example		
	5	Numerical Methods	10	20
		Roots of non-linear equations a)Bisection Method b)Regula-falsi Method c)Newton-Raphson Method Direct solution of linear equation a) Matrix Inversion, b) Gauss-Elimination Method		
Total			50	100

Course Outcomes:

On completion of the course students will be able to

- Solve vectors related problems in computer science domain.
- Solve the problems using Laplace transforms.
- Analyze and solve the problems using Fourier Series.
- Identify and Solve problems using Complex Integration.
- Understand numerical techniques to find the roots of nonlinear equations and solution of system of linear equations.

Text & Reference Books:

- Murray Spiegal, "Vector Analysis", McGraw Hill, 1974.
- P. N. Wartikar & J. N. Wartikar, "Elements of Applied Mathematics", 7th, Pune Vidyarthi Graha, 1988,
- Mathematical methods for Engineer and Science Students by Engle field. Schaun Series, Vector Analysis, Spigel, 2009
- E. Balaguruswamy, Numerical Methods Tata McGraw Hill Publication
- Grewal. B.S, "Higher Engineering Mathematics", 41 st Edition, Khanna Publications, Delhi, 2011.
- Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 2011.
- S.S. Shastri "Introductory methods of numerical analysis" Vol-2, PHI, SECOND edition, 1994

Branch: B.Sc.(IT)	Semester-II	
Subject Code: 2105	Lecture: 02	
	Credit: 02	
Course Opted	Skill Enhancement Course - 2	
Subject Title	Technical Writing	

Course Objectives

- To emphasis need and importance of Technical Communication
- To acquaint with process of Technical Writing
- To introduce various user guides
- To introduce the concept of Translation and Localisation
- To understand the importance of working environment

Course Outcomes

- Understand the process of Technical Writing
- Understand Various User Guides
- Aware about the concepts of Translation and Localization
- Aware about the Working environment required for technical writing
- Writing Project Proposal, Software Project Documentation and Report writing

Module	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage
Unit I	1.	 Technical Communication Definition of Technical Communication Need for Technical Communication Importance of Technical Communication Attributes of Technical Communication 	2	4
	2.	Role of Technical Author	1	2
	3.	Process of Technical Writing	1	2
Unit II	2.	 Technical Publications User guides Administering guides Deployment guides Installation guides Implementation guides Troubleshooting guides 	3	6
Unit III	5.	 Technical Leaflets Objectives Components of Technical Leaflets Preparing Technical Leaflets 	2	4
Unit IV	6.	 Technical Specifications & Descriptions Requirement Specifications Functional Specifications Design Specifications Test Specifications Writing Technical Descriptions Writing Processes and Procedures 	3	6

		Development Models	1	2
Unit V	7.	• Waterfall		
		• Agile		
	0	Translation and Localization	2	4
	0.	Fundamental Concepts	2	4
		Working environment		
	0	Working with SMEs	2	4
	9.	• Working in global audience	2	4
		Telephone etiquettes		
		Technical Summaries		
	10	 Types of Technical Summaries 	2	4
	10.	Importance of Summaries		4
		Format of writing Summaries		
		Project Proposals		
		 Objectives 		
	11.	Types of Proposal	2	4
		Parts of Proposal		
		Writing the Proposal		
		Software Project Documentation		
	12	 Proposal 	2	4
	12.	 System Specifications 	<i>L</i>	-
		User Manual		
	13.	Reports Making and Note Making	2	4
TOTAL			25	50

Recommended Readings:

- 1. Technical Writing Process and Product by Sharon T. Gerson & Steven M. Gerson, Pearson Education Inc.
- 2. Technical Writing and Profession by Thomas N. Huckin & Leslie A. Olsen, Macmillan
- 3. Writing and Life by Don Knefel, CBS College Publishing
- Business Correspondence and Report Writing by R.C. Sharma & Krishna Mohan 3rd Edition Tata McGraw-Hill
- 5. Beginner's Guide to Technical Writing by John Evans
- 6. Thirty Minutes before presentation by Patrick Forsyth, Kogan Page India Pvt Ltd.
- 7. Writing and Analyzing effective Computer System Documentation by Ann Stuart, University of Evansville, Indiana
- 8. How to write a Computer Manual -A Handbook of Software Documentation by Jonathan Price, The Benjamin-Cummings Publishing Company, California
- 9. Technical Documentation by A. J. Marlow, NCC Blackwell
- 10. The Elements of Style by William Strunk Jr.
- 11. Technical Writing for Dummies by Sheryl Lindsell-Roberts
- 12. Technical Communication, 9th edition by Mike Markel
- 13. The Insider's Guide to Technical Writing by Krista Van Laan
- 14. Technical Writer Career Guide by ClickHelp
- 15. Microsoft Manual of Style