Assam Don Bosco University
Programme Project Report (PPR)

Bachelor of Computer Application

i. Programme's Mission and Objectives

Creating an intense teaching and research environment that moulds individuals into competent professionals who are innovative and committed to meet real world challenges.

Mission

1. To produce competent Computer Science professionals by promoting excellence in education and training.
2. To inculcate the spirit of self-sustainability through research, consultancy, development activities and lifelong learning.
3. To extend technical expertise to meet real world challenges and play a leading role in technical innovation, creativity and application development.
4. To infuse a sense of commitment in individuals for the betterment of the society through technology.

Programme Educational Objectives (PEOs)

1. To prepare the students to have strong foundation in computer science engineering with impetus to higher studies, consultancy, research and development.
2. To prepare the students to be self sustainable and proficient to meet the real world challenges ethically and responsibly, in service to socio-economic development of the society.
3.To inculcate the spirit of life-long learning, understanding, and applying new ideas and technologies to provide novel engineering solutions in the rapidly changing environment.

ii. ***Relevance of Program with the Assam Don Bosco University Mission & Goals***

The programmes mission and objectives are in alignment with the University's mission, vision and goals, as detailed below.

Vision

The vision of Don Bosco University is:

'To mould young persons into intellectually competent, morally upright, socially committed and spiritually inspired citizens at the service of India and the world of today and tomorrow, by imparting holistic and personalized education.'

Guided by this vision and leveraging its century-old expertise in education in India and abroad, Don Bosco University is envisaged to be a centre of excellence in study and research focusing upon the following:

- Providing easier access to higher education for the under-privileged.
- Harmonizing technical excellence with human and religious values.
- Employment-oriented courses in emerging areas of contemporary technology and service.
- 'Teacher Education' as a privileged area of interest to accelerate the pace, reach and quality of education.
- Impetus to research initiatives with practical and social relevance.
- Providing a forum for debate and research on key human issues like religion & culture, peace & justice.
- Contributing to the socio-economic development of North-East India.
- Boosting international linkages and collaboration in university education.

The spirit of the university has been encapsulated in its emblem which has five distinct elements:

- The Cross' signifies its underlying Christian inspiration;
- 'The Profile of St. John Bosco' denotes its distinctive educational philosophy;
- 'The book emphasizes its commitment to academic excellence;
- 'The rays of the Rising Sun' stand for its dynamism and commitment to society; and,
- The motto, 'Carpe Diem' which meaning 'Seize the Day' challenging every Bosconian to grasp the opportunities presented by each new day and attain 'life in its fullness.'

Mission

Built on a great legacy inherited from our founding fathers, our mission is to create an environment of stimulating intellectual dialogue across disciplines and harvest ***knowledge with a cutting-edge through high quality teaching, research, and extension activities*** *leading to the generation of students who would provide leadership, vision and direction to society.*

Goal

Our goal is to realize this vision by 2025. ***Our strategy is to develop innovative programmes in basic and emerging disciplines*** *in a phased manner and to update them periodically so as to keep ourselves on track and on time. Our commitment is to involve the faculty and students in* ***interactive learning environment both within and outside the University through contextual and experiential programmes*** *so that they would be builders of a* ***worldwide-network*** *of* ***knowledge-sharin****g and excel in their performance with a winning edge in the wider context of globalization.*

iii. Nature of Prospective Target Group of Learners

This Program is designed to target working individuals who wish to further their

professional and academic qualifications, or wish to acquire domain specific knowledge and skills in their chosen profession or industry, in the field of IT and Software.

iv. Appropriateness of Programme to be conducted in Online Learning mode to acquire specific skills and competence

A IT program of this nature is apt for delivery in the Online mode, given its practical nature. It's students, who would already be working in the Software/IT industry, shall benefit from putting into practice their learnings on an ongoing basis, and shall be able to recognize aspects and applicability of their studies in their everyday work life.

v. Instructional Design

a. Curriculum Design

As per University Curriculum in place for campus programs.(Attached)

b. For Online Mode:

E-Learning Materials Quality Standard:

The online courses should comply with the following Quality standards, namely:-

(i) The courses should follow the following four quadrant approach, as per the SWAYAM Guidelines:-

(a) Quadrant-I is e-Tutorial; which shall contain: Video and Audio Content in an organized form, Animation, Simulations, video demonstrations, Virtual Labs, etc, along with the transcription of the video.

(b) Quadrant-II is e-Content; which shall contain; self-instructional material (digital Self Learning Material), e-Books, illustrations, case studies, presentations etc, and also contain Web Resources such as further references, Related Links, Open source Content on Internet, Video, Case Studies, books including e-books, research papers and journals, Anecdotal information, Historical development of the subject, Articles, etc.

(c) Quadrant-III is the Discussion forum; for raising of doubts and clarifying the same on real time basis by the Course Coordinator or his team.

(d) Quadrant-IV is Assessment; which shall contain; Problems and Solutions, which could be in the form of Multiple Choice Questions, Fill in the blanks, Matching Questions, Short Answer Questions, Long Answer Questions, Quizzes, Assignments and solutions, Discussion forum topics and setting up the FAQs, Clarifications on general misconceptions.

c. Duration of the Program

As per University duration policy for on campus programs, in conjunction with the UGC regulation in place.

d. Faculty and Support Staff Requirement

As per UGC Regulations

e. Instructional Delivery Mechanisms

Courses to be delivered in an 'online' mode with learning material in the form of E-SLM's, and Self Assessments being available for the students. Additionally, virtual live lectures and recorded lecture sessions to be provided as per a fixed schedule towards the end of each term.

f. Student Support Systems

Learner Support Service via Web, Chat, Call Support. Access to counsellors at Department on University campus. Access to E-Learning Library resources in the student portal.

vi. Procedure for admissions, curriculum transaction and evaluation

a. Admission Policy

Admissions to be conducted twice a year (January and July), and as per common regulation for online programs already in place and in effect at the time, in conjunction with UGC Regulations.

b. Minimum Eligibility

As per common regulation for online programs already in place and in effect at the time, in conjunction with UGC Regulations.

c. Fee Structure

As per fee structure in place for online programs, and as decided by fee committee from time to time.

d. Programme Delivery Methodology

Courses to be delivered under the 'online' mode of learning, with students being provided Self learning material in eBook format, along with access to online Self Assessment tools. Contact Programs Sessions to be conducted online

once per semester.

e. Web Based Tools

A Web based Portal which shall allow the student access to the following

- Admission & Enrolment Details
- Fee Details and Online Fee Payment Gateway
- Prospectus, Regulations & Syllabus
- Notifications (Admissions, fees, examinations etc)
- Course List, with completion status and scores / results
- eBook's of SLM's.
- Self Assessment Tests (unscored)
- Internal Assessments - IA1 & IA2
- Online PCP Lectures (Recorded or via Virtual Classroom session) as conducted each semester.
- Online Learners forum, for student to student interaction.
- Online Copy of the Grade sheet.
- Access to online support in the form of web chat, ticketed email support etc.

f. Evaluation Methodology – Tools & Methods

Internal Assessment marks to comprise the results of Internal Assessment Tests (IA1 & IA2) over the duration of the Semester/Term towards 30% of the final marks, whereas the End Term Assessment , conducted at Examination centres (as per UGC Regulations) to comprise of the remaining 70%.

End Term Exam Regulations to be as per regulations governing on campus programs.

Being an online program, there shall be no provision or requirement to repeat or drop a year within the program.

vii. Requirement of the laboratory support and Library Resources

Practical Subjects in this subject can mostly be covered with access to a computer, internet and software tools (available under FOSS/Open Source). Students may be asked to make arrangements for the same at their own cost.

As per the syllabus/curriculum, should there be need for special equipment/laboratory access (other than the above mentioned regular computer lab or internet connectivity), the same shall be arranged by student on their own which shall be notified by prior intimation.

Provisions also shall be made for access to virtual lab's and simulators via the students online study portal.

Library resources can be accessed online.

viii. Cost Estimate of the Programme and the provisions

Upon receipt of approval from the UGC, the Finance Committee may set aside budgetary provisions towards Programme Development, Programme Delivery, Programme Maintenance. Once the programs are operational, fee receipts from the program may be used to cover the same, as per the guidance of the Syndicate and Finance Committee.

ix. Quality Assurance mechanism and expected programme outcomes

The expected outcome from these programs is a measurable increase in the skills and knowledge of the student in his/her area of study, and that increase should be reflected in a proportional increase in available job opportunities / role or profile changes in his or her current job or industry, and a change / increment in earning capability .

A Centre for Internal Quality Assurance shall be setup within 1 year of the launch of these programs (as per UGC requirements). The CIQA, working in collaboration with the Department , shall put in place a continuous quality measurement and improvement framework, using both student – teacher feedback, and outcome measurement on data gathered from students during and after completion of their programs via surveys. The findings, action taken report and results shall be published and made available via the CIQA each year in the form of a report.

Bachelor of Computer Application

Term	Course	Credits
1	Communication Skills in English	4
1	Data Structure	4
1	Computer Fundamentals and Windows Based Application	4
1	Programming in C	4
2	OOPS with C++	4
2	Mathematics	4
2	DBMS	4
2	Computer Organization and Architecture	4
3	Operating Systems	4
3	Data Communication	4
3	Computer Graphics	4
3	Client Server Architecture	4
3	Indian Constitution	4
4	Unix and Shell Programming	4
4	Software Engineering	4
4	Java Programming	4
4	Environmental Studies	4
4	Distributed Database Management Systems	4
5	System Programming	4
5	Internet Programming	4
5	Application Programming	4
5	Algorithm and Analysis	4
6	MIS and Enterprise Resource Planning (ERP)	4
6	Computer Network and Security	4
6	Ecommerce	4
6	Project Work	6

Bachelor of Computer Applications

Semester I

Course Name- Communication Skills in English

Course Outline-

Topics	**Unit Reference (from Text)**
Introduction to business communication; process of communication; components of communication; factors of communication.	Unit 1- Basics of Communication
Introduction to non-verbal communication; personal appearance; facial expressions; movements; posture; gestures; eye contact; vocal communication techniques.	Unit 2- Non-verbal Communication
Introduction to barriers to communication; physical barriers; psychological barriers; semantic barriers; organisational barriers; interpersonal barriers.	Unit 3- Barriers to Communication
Purpose of listening; cognitive process of listening; barriers to listening; overcoming listening barriers; guidelines for improving listening skills.	Unit 4- Listening Skills
Introduction to note-making; writing an effective note.	Unit 5- Note-making
Types of visuals; use of audio-visuals; principles to use audio-visuals; use and applications of audio-visual equipment.	Unit 6- Audio-visual Aids
Preparing for the presentation; structure of the presentation; plan the presentation; mastering the techniques of delivery; impromptu speaking; rehearsing the presentation; guidelines for final speech; handling question-and-answers session.	Unit 7- Oral Communication
Various spelling rules; silent consonant letters in some words; variant spellings.	Unit 8- Spelling Rules
Compound words with hyphens; use of hyphens with numbers; use of hyphen with prefixes; compound words without hyphens; prefixes without hyphens.	Unit 9- Hyphenation
Numbers spelled out; numbers expressed in figures;	Unit 10- Transcribing Numbers

large numbers.	
Introduction to effective writing; diction; effective sentences; effective paragraphs.	Effective Writing

Course Text- Professional Communication by Aruna Koneru.

Course Name- Computer Fundamentals

Course Outline-

Introduction, Evolution of Computers, Generation of Computers, Classification of Computers, Computing Concepts, The Computer System, Applications of Computers	Unit 1: Understanding the Computer
Introduction, Central Processing Unit, Internal Communications, Machine Cycle, The Bus, Instruction Set	Unit 2: Computer Organization and Architecture
Introduction, Memory Representation, Random Access Memory, Read Only Memory, Storage Systems, Classification of Storage Systems, Solid-state Storage Devices, Storage Evolution Criteria	Unit 3: Memory and Storage Systems
Introduction, Keyboard, Pointing Devices, Scanning Devices, Optical Recognition Devices, Digital Camera, Voice Recognition System, Data Acquisition Sensors, Media Input Devices	Unit 4: Input Devices

Introduction, Display Monitors, Printers, Classification of Printers, Plotters, Voice Output Systems, Projectors, Terminals	Unit 5: Output Devices
Introduction, Decimal System, Binary System, Hexadecimal System, Octal System, 4-bit Binary Coded Decimal (BCD) Systems, 8-bit BCD Systems, 16-bit Unicode, Conversion of Numbers	Unit 6: Computer Codes
Different Types of Binary Arithmetic Operations, Signed/Unsigned Numbers, Complements of Binary Numbers, Binary Subtraction Using Complements, Representing Numbers, Integer Arithmetic, Floating-Point Arithmetic, Errors in Arithmetic, Laws of Arithmetic	Unit 7: Computer Arithmetic
Introduction, Elements of Boolean Algebra, Basic Postulates of Boolean Algebra, Boolean Operations, Principle of Duality, Basic Laws of Boolean Algebra, Demorgan's Theorem, Boolean Expressions, Venn Diagram	Unit 8: Boolean Algebra of Switching Circuits

Introduction, Basic Logic Gates, Derived Logic Gates, Conversation of Boolean Functions, Adder Circuits, Flip-Flop Circuits, Application of Flip-Flops	Unit 9: Logic Gates and Digital Circuits
Introduction, Types of Computer Software, System Management Programs, System Development Programs, Standard Applications Programs, Unique Application Programs, Problem Solving, Structuring the Logic, Using the Computer	Unit10: Computer Software
Introduction, History of Operating Systems, Functions of Operating Systems, Process Management, Memory Management, File Management, Device Management, Security Management, Types of Operating Systems, Providing User Interface, Popular Operating Systems	Unit 11: Operating Systems
Introduction, MS-DOS, MS Word System, MS Excel System, MS PowerPoint System, MS Access System, MS Publisher	Unit 12: Microsoft Software

Course Text- Fundamentals of Computers by E Balagurusamy

Course Name- Data Structures

Course Outline-

Topics	**Unit Reference *(from Text)***
Basic Concept of Data, Data Structures, Linear Data Structures, Non-Linear Data Structures Operations on Data , Structures Problem Analysis, Algorithm Complexity, Big O Notation	Chapter 2- Data Structures and Algorithm: An Introdcution
Use of Various Data Structures for Searching and Sorting, Searching, Linear Search, Binary Search, Sorting, Comparison of Different Search Algorithms, Internal Sorting, Comparison of Various Sorting Algorithms	Chapter 3- Searching and Sorting
Memory Representation of Stacks, Applications of Stacks, Recursion, Reversing Strings, Polish Notation, Memory Representation of Queues, Circular Queue, Priority Queue, Multiple Queue Implementation	Chapter 4- Stacks and Queues
Singly-Linked Lists, Memory Representation, Operations, Circular Linked Lists Traversing, Insertion Deletion, Doubly-Linked Lists Insertion, Deletion, Dynamic Storage Management: Application of a Doubly-Linked List, Generalized Lists, Garbage Collection, Stack using Linked List Queue using Linked List	Chapter 6- Linked Lists
Trees: Definition and Basic Concepts, Binary Trees, Forms of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Binary Search Tree Searching a Node Inserting a Node Deleting a Node, Binary Tree Traversals, Threaded Binary Tree, Threaded Storage Representation, Applications of Trees, Set Representation, B-Trees, B+ Trees	Chapter 7- Trees

Course Text- Data Structures Using C by A.K. Sharma

Course Name- Programming in C

Course Outline-

Topics	**Unit Reference *(from Text)***
Introduction to C Language- History of 'C' Language, Developing a C Program, Source Code, Object Code, Linking and Loading, Program Execution, Executing a C Program in the UNIX System, Entering Program Compilation Execution, Sample C Program, Variation in the Main Function, Tokens, The C Character Set, Identifiers Keywords Data Types, Variables, Size of Variables, Constants, Integer Constants, Character Constants, Floating Point or Real Numbers, Enumeration Constant String Constants Symbolic Constants, Type Modifiers Escape Sequences Arrays, Array Declaration Expressions and Statements	Chapter 1- Overview of C Chapter 2- Constants, Variables and Data Types
Operators and Expressions- Arithmetic Operators, Unary Operators, Relational Operators, Logical Operators, Assignment Operators Conditional Operator, Type Conversion, Arithmetic Conversion, Typecasting Library Functions	Chapter 3- Operators and Expressions
Data Input and Output- Input and Output Functions, Use of printf(), Conversion Characters, Octal and Hex Conversion, Variation in printf(), Interactive Programming, Use of scanf(), Single Character Input/Output, Unformatted Input/Output, Strings—gets() and puts() Standard Library for Strings Use of gets() and puts()	Chapter 4- Managing Input and Output Operations

Control Statements- Branching, If Statement, If...else Statement, Nesting of the if...else Statements Logical Operators and Branching Conditional Operator and if...else, Loops and Control Constructs, Iteration using if, For Statement, Symbolic Constants and Looping, Other Forms of the for Loop The while Loop Do...while, Linear Search, Switch Statement Break, Continue, Return Significance of the	Chapter 5- Decision Making and Branching Chapter 6- Decision Making and Looping
Arrays and Strings- Arrays, Defining an Array, Passing Arrays to Functions, Multidimensional Arrays Triangular Matrices Matrix Multiplication, Strings: One-Dimensional Character Array, Array of Strings, Binary Search	Chapter 7- Arrays Chapter 8- Character Array and Strings
Functions- Modular Programming Overview, Function Prototypes, Function Call – Passing Arguments to a Function, Function Arguments, Function Definition Scope Rules for Function Library Functions, Return Values, Recursion, Implementation of Euclid's gcd Algorithm, Program Structure- Storage Class Specifiers, auto or Automatic Variables register Variables extern Variables, static Variables, External Static Variable, Initialization, Multi file Program	Chapter 9- User-Defined Functions
Structures and Union- Structures, Defining and processing a Structure, User-Defined Data Types, Array of Structures, Structures and Pointers, Passing Structures to Functions, Structures to Functions Self-Referential Structures Union	Chapter 10- Structures and Unions

Pointers- Pointer Fundamentals, A Pointer is also a Variable, Pointer to Void Null Pointer Pointer Arithmetic,Passing Pointers to Functions, Pointers and Functions, Function Declaration Function Declarator Function Call, Return Statements, Pointers and One-Dimensional Array, Finding the Greatest Number in an Array, Pointer Notations for Arrays, Arrays and Pointers, Multidimensional Arrays, Receiving Inputs at Chosen Points, Pointers and Strings, String Functions, To print a Substring, To analyse a Text File, Array of Pointers, Sorting Character Strings Dynamic Allocation of Memory Pointer Comparison, Structure Pointers	Chapter 11- Pointers
Data Files- Why Files? ,File Pointer, Opening and closing a Data File, Concept of Binary Files, Formatted I/O Operations with Files Writing and reading a Data File Unformatted Data Files, Processing a Data File, File Copy, Line Input/Output, Use of the Command Line Argument, Personal File of an Employee	Chapter 12- File Management in C

Course Text- Programming in ANSI by E. Balagurusamy

Bachelor of Computer Applications

Semester II

Course Name- Mathematics

Course Outline-

Topics	**Reference from Text Book**
Define Statistics, Variable and Attribute, Primary Data and Secondary Data, Population and Sample, Complete Enumeration and Sample Survey, Statistical Enquiry, Classification, Tabulation, Mechanical Tabulation	Unit 1- Introduction: Scope, Data Collection and Classification
Permutation, Fundamentals Rule of Counting, Results on Permutation	Unit 2- Permutation
Combination, Result of Combination	Unit 3- Combination
Set, Methods of Set Representation and Notation, Types of Sets, Venn Diagram, Set Operations, Union (Set Addition), Intersection (Set Multiplication), Complement, Difference, Set Operations, Laws of Algebra of Sets, Duality, Verification of Laws (Using Venn Diagram), Proof of the Laws of Set Algebra, Number of Elements in a Set	Unit 4- Set Theory
Define Logarithm, Laws of Logarithm, Common Logarithm and Natural Logarithm, Antilogarithm	Unit 5- Logarithm
Binomial Theorem, General Theorem of $(a+x)^{n,}$ Middle Term (s) of $(a+x)^{n,}$	Unit 6- Binomial Theorem

Equidistant Terms and Coefficients, Greatest Binomial Coefficient (s), Properties of Binomial Coefficient (s)	
Simple Interest, Compound Interest, Interest Compounded Continuously, Rate of Interest, Nominal and Effective Rate of Interest, Growth and Depreciation	Unit 7- Compound Interest
Immediate Annuity or Ordinary Annuity, Annuity Due, Deferred Annuity, Perpetual Annuity or Perpetuity, Amortisation, Sinking Fund	Unit 8- Annuities
Rounding of Numbers, Absolute, Relative and Percentage Errors, Significant Figures, Short Processes of Calculation, Roots and Reciprocals Expressed as Power, A.P. Series and G.P. Series, Sum and Sum of the Squares of Numbers, Inequalities, Concept of 'Function', Polynomial, Sigma Notation, Simple Interpolation	Unit 9- Other Useful Mathematics Devices

Course Text- Business Mathematics by NG Das and JK Das.

Course Name- Computer Organization and Architecture

Course Outline-

Topics	**Reference from Text Book**
Historical Background, Classification	Chapter 1 – Introduction
Basic Structure of Computer Hardware, Fundamental Units, Basic Operational concepts, Bus Structure, Building Blocks of a Computer	Chapter 2- Overview Computer
Boolean algebra, Logic Gates, Combinational Circuits, Arithmetic Circuits, Sequential Circuits, Registers and Counters, Memory Circuits, Solved Examples	Chapter 3 - Fundamentals of Digital and Logical Circuits
Addition and Subtraction, Multiplication Algorithms, Booth's Algorithm, Division Algorithm, Division of signed Integers, Floating-Point Number Representation, Floating-Point arithmetic and Unit Operations, Pipelined ALU	Chapter 4- Computer Arithmetic
Processor Architecture and Organization, Processor Operation, Register set, Stack Organization, Interrupts, Intel 8085 Microprocessor, Intel 8086 Microprocessor, Intel 8051 Microcontroller, RISC and CISC Processors, Intel 80386 Processor, Intel Pentium 4 Processor	Chapter 5- Processor Basics
High level, Assembly and Machine language, Functions and Characteristics of Instructions, Addressing Modes, Instruction Formats and Fields, 8085 Instruction Set, 8086 Instruction set,	Chapter 6- Instruction Set and Assembly Language Programming

8051 Instruction Set, Assembly Language programming, Assembler, Intel 80386 Processor Intel Pentium 4 Processor	
Memory Classification, Cache Memory, Main Memory, Secondary Memory, Virtual Memory, Memory management, Intel 80386 Memory Organization, Pentium 4 Memory Organization, Memory Decoding	Chapter 7 – The Memory System
Basic Input/output Structure of Computers, Asynchronous Data Communication, Serial and Parallel Communication, Programmed I/O (Polling), Interrupt Driven I/O, Interrupt Controller (8259), DMA, Device Drivers, Slandered I/O Interfaces (buses), Bus Arbitration, I/O Processor,	Chapter 8 – Input /Output Organization
Control Unit(CU), Micro Operation, Control of the Processor, Hardware Implementation,	Chapter 10- Control Unit operation

Course Text- Computer Organization and Architecture by Subrata Gho

Course Name- Database Management System

Course Outline-

Topics	**Reference from Text Book**
Need of Database System, Advantages of Database System, Developments in Database System, Application Areas, Cost and Risk of Database System, DBMS Architecture and Data Independence, Database Models, Database Schema versus Database Instance, DBMS Languages, Modules of DBMS, Centralized and Client/Server Database Systems, Classification of DBMSs, Database Design Process	Chapter 1- Database System
Concepts of E-R Model, E-R Diagram, Enhanced E-R Model, Notations for E-R Diagrams, Unified Modeling Language	Chapter 2- Conceptual Modeling
Relational Model Concepts, Relational Database Schema, Relational Database Instance, Keys, Data Integrity, Constraint Violation while Updating Data, Mapping E-R Model to Relational Model	Chapter 3- The Relational Model
Relational Algebra, Relational Calculus, Expressive Power of Relational Algebra and Relational Calculus	Chapter 4- Relational Algebra and Calculus
Basic Features of SQL, Data Definition, Data Manipulation Language, Queries in SQL, Additional Features of SQL, Accessing Databases from Applications	Chapter 5- Structured Query Language
Features of Good Relational Design, Decomposition,	Chapter6- Relational Database Design

Functional Dependencies, Normal Forms, Insufficiency of Normal Forms, Comparison of BCNF and 3 NF, Higher Normal Forms, Denormalization	
Hierarchy of Storage Devices, Redundant Arrays of Independent Disks, New Storage Systems, Accessing Data from Risk, Placing File Records on Disk Blocks Organization of Records in Files	Chapter 7- Data Storage and Indexing
Desirable Properties of a Transaction, States of a Transaction, Concurrent Execution of Transactions, Transaction Schedules, SQL Transaction Statements	Chapter 9- Introduction to Transaction Processing
Locking, Lock-Based Techniques, Specialized Locking Techniques, Performance of Locking, Timestamp-Based Technique, Optimistic Technique, Multiversion Technique, Dealing with Deadlock	Chapter 10- Concurrency Control Techniques
Types of Failures, Caching of Disk Pages, Recovery Related Steps During Normal Execution, Recovery Techniques, Recovery for Concurrent Transactions, ARIES Recovery Algorithm, Recovery from Catastrophic Failures	Chapter 11- Database Recovery System

Course Text- Introduction to Database Systems by ITL Education Solutions Ltd.

Course Name- Object Oriented Programming with C++

Course Outline-

Topics	**Reference from Text Book**
Software Crisis, Software Evolution, Procedure-Oriented Programming, Object Oriented Programming Paradigm, Basic concepts of Object-Oriented Programming, Benefits of OOP, Objects –Oriented Languages Application of OOP	Chapter 1 – Principles of Object-Oriented Programming
Define C++, Application of C++, Simple C++ Program, C++ statements, Structure of C++ Program, Creating the Source File, Compiling and Linking	Chapter 2- Beginning with C++
Tokens, Keywords, Identifiers and Constants, Basic Data Types, User-Defined Data Types, Storage classes, Derived Data Types, Symbolic Constants, Type compatibility Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope resolution operators, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operators, Expressions and Their Types, Special Assignment Expressions, Implicit conversions, Operator Overloading, Operator precedence, ControlStructures	Chapter 3- Tokens, Expressions and Control Structures
The Main Function,	Chapter 4- Functions in C++

Function Prototyping, Call by Reference, Return By Reference, Inline Functions, Default Arguments, Recursion, Function overloading, Friend and virtual functions, Math Library Function	
C Structures Revisited, Specifying a Class, Defining Member Functions, AC++ Program with Class, Making an Outside Function Inline, Nesting of member Functions, Private Member Functions, Arrays with a Class, Memory Allocation for objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friendly functions, Returning Objects, Const Member Functions, Pointers to Members, Local Classes	Chapter 5- Classes and Objects
Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of objects, Copy constructors, Dynamic constructors, Constructing Two-Dimensional Arrays, Const Objects Destructors	Chapter 6 – Constructors and Destructors
Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operations, Overloading Binary Operators Using Friends, Manipulation of Strings Using Operators, Some Other Operator Overloading Examples, Rules for Overloading Operators, Type Conversions	Chapter 7- Operator Overloading and Type Conversions

Defining Derived Classes, Single In heritance, Making a Private Number Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Member Classes: Nesting of Classes	Chapter 8- Inheritance: Extending Classes
Pointers, Pointers to Objects, This pointer, Pointers to derived Classes, Virtual Functions, Pure Virtual Functions, Virtual Constructors and Destructors	Chapter 9 -Pointers, Virtual Functions and Polymorphism
C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output With Manipulators	Chapter 10- Managing Console I/O Operations
Classes or File Stream Operations, Opening and Closing a File, Detecting end-of-file, More about Open(): File Modes, File Pointers and Their Manipulators, Sequential Input and Output Operations, Updating a File:Random Access, Error Handling During File Operations, Command-Line Arguments	Chapter 11- Working with Files

Course Text- Object Oriented Programming with C++ by E Balagurusa ny.

Bachelor of Computer Application

Syllabus- Semester III

Course Name- Client Server Computing

Course Outline-

Client–Server Computing, Peer-to-Peer Network, Client–Server Network, Client–Server Model, Butler Pyramid Model of Client–Server Computing, Client–Server Layers, Types of Client–Server Architecture, Two-Tier Architecture, Three-Tier Architecture, Multi or N-Tier Architecture, Client–Server-based Services, Heterogeneous Computing, Cross-Platform Computing, Cross-Platform Software, Distributed Computing, Distributed Systems Management, Complexity Management Scope of Distributed Systems Management, Systems Management Mechanisms, Distributed Systems Management—Requirement and Framework, Software Distribution Requirements, Golden Rules of Client–Server Implementation, Costs of Client–Server Computing, Strategies for Cost Reduction	CLIENT–SERVER COMPUTING
Fundamentals of Client–Server Design, Client–Server System Interaction, Load Balancing Between Client and Server, Interaction, Types of Communication, Synchronous Communication, Asynchronous Communication, Communication Techniques, Remote Procedure Call (RPC), Native Communication Protocol, Messaging, Object Orientation, Communication Protocols, Client–Server Interaction Protocols, Techniques for implementing Client–Server Applications, Optimizing Applications for Client–Server Communication, Client–Server Application System Implementation, Request Acceptance and Dispatching, Execution of Request, Client–Server Interaction using Messages, Client–Server Interaction Protocol, Request and Response Communication Channel, Client–Server Interaction using DHCP Servers	DESIGN
Multiprogramming, Multitasking, Single Tasking and Multitasking, Cooperative Multitasking/Time-Sharing, Preemptive Multitasking/Time-Sharing, Memory Protection, Memory Swapping, Programming in a Multitasking Environment, Process Management in Multitasking Operating Systems, Multiprocessing, Processor Symmetry, Processor Coupling, Instruction	MULTITASKING

and Data Streams, Advantages and Disadvantages of Multiple Processors, Child and Parent Processes, Developing Server Applications using Processes, Threads, Multithreading, Multithreading Models, Thread Cancellation, Thread Pools, Benefits of Multithreading, Server Communication Model	
What is a Process?, Process States, Process Control Block, Cooperating Processes and Independent Processes, Implementation of Scheduling, Schedulers, Processing Queues, Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Avoidance by using Banker's Algorithm, Detection and Recovery, Context Switching, Buffering, CPU Scheduler, Dispatcher, Scheduling Criteria, Scheduling Algorithms, Pre-emptive Scheduling, Non-Pre-emptive Scheduling, First Come First Served, Round Robin, Priority-based Scheduling, Pre-emptive or Non-Pre-emptive Priority Scheduling Algorithm, Shortest Job First (SJF), Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling, Multiple Processor Scheduling Real-Time Scheduling, Critical Section, Mutual Exclusion, Semaphores, Drawbacks of Semaphores	SYNCHRONIZATION
Network Communication, the OSI Model, Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, Cryptography, Interfaces, Inter-Process Communication, Child Process, Parent Process, Pipes, Sockets, Types of Sockets, Socket States and Client–Server Model, Creating a Socket, Binding a Socket, Listening to the Socket, Accepting Connections, Connecting to the Daemon, Messaging, Semaphores, Initializing a Semaphore Set, Controlling Semaphores, Semaphore Operations, Building Portable Client–Server Applications, Procedural Designs Using C, Object-Oriented Designs Using C++, Object, Encapsulation, Objects and their Classes, Messages and Methods, Overriding, Architecting Platform-Independent Source Code, Client–Server Application Architecture Using Frameworks	NETWORK COMMUNICATION

Course Text- Client Server Computing by Dawna Dewire.

Course Name- Computer Graphics

Course Outline-

Topics	**Reference from Text Book**
Display Devices, Pixel, Resolution, Image Resolution vs Dot Pitch, Aspect Ratio, Cathode Ray Tube (CRT), Raster Scan Display, Random Scan Display, Direct View Storage Tube (D VST), Flat Panel, LCD, Raster Scan Systems, Random Scan Systems- Input Devices, Keyboard, Mouse, Trackball, Joystick, Digitizer and Graphics Tablet, Touch Panel, Light Pen, Data Glove, Voice Recognition System, Hard Copy Devices, Printer, Impact vs Non-impact Technologies, Dot Matrix Printer, Line Printer, Inkjet Printer, Laser Printer, Electrostatic Printer , Plotter, Graphics Software	Unit 2- Overview of Graphics Systems
Line Drawing Algorithms, Simple Digital Differential Analyzer (DDA), DDA Algorithm, Bresenham's Circle Generation, Bresenham Algorithm (Pseudocode) Midpoint Circle Algorithm, Character Generation, Line Attributes, Area Fill Attributes, Character Attributes, Bundled Attributes, Inquiry Functions	Unit 3- Output Primitives Unit 4- Attributes of Output Primitives
Translation, Rotation, Rotation about Origin, Rotation about an Arbitrary Pivot Point, Scaling, Scaling with Respect to the Origin, Scaling with Respect to any Arbitrary Point, Reflection, Reflection about X axis, Reflection about Y axis, Reflection about the Straight Line y = x, Reflection about the Straight Line y =-x, Reflection Relative to the Origin, Shear-Matrix Representation, Homogeneous Coordinates, Composite Transformations, Inverse Transformation, General Pivot Point Rotation, General Fixed Point Scaling, Reflection through an Arbitrary Line, Raster Methods for Transformations, 2D Viewing, Viewing Pipeline, Viewing Transformations, Concepts of Window and Viewport, Window to Viewport Transformation, Clipping Operations, Point Clipping, Line Clipping, Cohen-Sutherland Line Clipping, Sutherland-Hodgman Algorithm for Polygon Clipping, Curve Clipping, Text Clipping	Unit 5- Two-Dimensional Geometric Transformations Unit 6- Two-Dimensional Viewing
Editing Structure, Graphical User Interface, Elements of GUI, Guidelines for Designing an	Unit 7- Structures and Hierarchical Modeling Unit 8- Graphical User Interfaces and

Effective GUI, Interactive Input Methods, Interactions with a Mouse, Mouse Programming (In C), The User Dialogue, Input of Graphical Data, Input Functions, Interactive Picture Construction Techniques, Interactives Devices, Techniques of Picture Construction	Interactive Input Methods
Three-Dimensional Graphics Packages', Polygon Surfaces, Polygon Tables, Polygon Meshes, Sweep, Representation, Constructive Solid Geometry (CSG) Methods, Octrees, Quad Trees, Types of Quad Trees, Common Applications of Quad Trees	Unit 9- Three-Dimensional Concepts Unit 10- Three-Dimensional Object Representations

Course Text- Computer Graphics by Donald D. Hearn and M. Pauline Baker.

Course Name- Data Communications

Course Outline-

Topics	**Reference from Text Book**
DATA COMMUNICATION CONCEPTS- Network Classification, LAN, MAN, WAN, Wireless Networks, Internet, Narrow Band and Broadband ISDN,	Unit 1- Data Communications
Network Models, OSI Model, Layers and their Functions in OSI Model, TCP/lP Protocol Suite,	Unit 2- Network Models
Signal and Data, Channel, Baud Rate or Data Rate, Bandwidth, Bit Rate, Simplex and Duplex Communication, Protocols and Standards, Transmission Impairments, Attenuation –Distortion, Channel Noise, Throughput	Unit 3- Data and Signals
Asynchronous Transfer Modes, Communication Concepts	Unit 4- Digital Transmission
MULTIPLEXING- Physical Layer and Media, , FDM, TDM and Spread Spectrum,	Unit 6- Multiplexing
Guided Media, Unguided Media	Unit 7- Transmission Media
Circuit Switched Networks, Virtual Circuit Networks, Datagram Networks	Unit 8- Switching
Data Transfer Networks, Dial-Up Modems, Digital Subscriber Line	Unit 9- Using Telephone and Cable Networks for Data Transmission
DATA LINK LAYER- Error Detection and Correction, Block Codes, Cyclic Codes, Point-to-Point protocol (PPP), Frame Relay, Connecting Devices: Hubs, Switches, Repeaters, Bridges, Routers, Gateway, Satellite Networks, Cellular Telephony	Unit 10- Error Detection and Correction
Framing, Flow and Error Control, Sliding Window Protocol,	Unit 11- Data Link Control
ALOHA, CSMA, CSMA/CD, Channelization Methods,	Unit 12- Multiple Access
LAN Topologies and Protocols, CSMA/CD and IEEE 802.2, Wired LAN, Media Access Control, LAN Hardware, LAN Operating Systems, Transmission Media - Bounded Media, Ethernet Standards, EEE Standards, IEEE 802 Standards for LANs and MANs, IEEE 802.2 LLC-Logical Link Control Layer, IEEE 802.3 Ethernet Technologies, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring, IEEE 802.6 Distributed Queue Dual Bus, Wireless LAN	Unit 13- Wired LANs: Ethernet Unit 14- Wireless LAN's

Connecting Devices: Hubs, Switches, Repeaters, Bridges, Routers, Gateway	Unit 15- Connecting LANs, Backbone Networks, and Virtual LANs
Satellite Networks, Cellular Telephony, Frame Relay	Unit 16- Wireless LAN's: Cellular Telephone and Satellite Networks Unit 18- Virtual-Circuit Networks: Frame Relay and ATM
NETWORK LAYER- Network Layer, Logical Addressing, Multicasting and Broadcasting, Internet Protocol: IPv4, IPv6, IPv4 Addressing, Internet Protocol Version 6 (IPv6), Address Mapping, Unicasting, ICMP, IGMP	Unit 19- Network Layer: Logical Addressing Unit 20- Network Layer: Internet Protocol Unit 21- Network Layer: Address Mapping, Error Reporting and Multicasting Unit 22- Network Layer: Delivery, Forwarding and Routing
TRANSPORT AND APPLICATION LAYERS- Transport Layer, UDP, TCP, Congestion Control, Open and Closed Loop, Quality of Service, Application Layer, Domain Name System (DNS) Name Space, Domain Name Systems and Resolution, Remote Logging, Electronic Mail, File Transfer, WWW, HTTP, Multimedia Communication, Voice Over IP	Unit 23- Process-to-Process Delivery: UDP, TCP, and SCTP Unit 24- Congestion Control and Quality of Service Unit 25- Domain Name System Unit 26- Remote Logging, Electronic Mail and File Transfer Unit 27- WWW and HTTP Unit 29- Multimedia

Course Text- Data Communications and Networking by Behrouz A Forouzan.

Course Name- Indian Constitution

Course Outline-

Topics	**Unit Reference (from Text)**
Framing of Indian Constitution	Meaning of Term Constitution, Importance, Development of Indian Constitution *(Pages 1-38)*
Philosophy of the Constitution	Salient Features of Indian Constitution *(Pages 39-54)*
Preamble	Amendment of the Preamble, Importance of the Preamble *(Pages 55-63)*
Constitution and Amendments	Balance between Rigidity and Flexibility, Parliamentary Democracy with an Elected Principle, Procedure of Amending the Constitution *(Pages 116-144)*
Human Rights	Meaning and Importance, Universal Declaration of Human Rights, Development of Human Rights and Fundamental Rights, International Law and Position of India, Social and Gender Discrimination, Torture and Genocide, two Human Rights Covenants *(Pages 145-160)*
Specific Fundamental Rights	Fundamental Rights and Duties, Special Privileges for SC/STs, Backward Classes, Woman, Children and religious and Linguistic Minorities *(Pages 78-101)*
Directive Principles of State Policy	Distinction between Fundamental Rights and Directive Principles, Classification of the Directive Principles, Values and Limitations, Reorganization of States and National Integration *(Pages 180-193)*
Union Executive	President, Prime Minister, Council of Minister *(Pages 195-250)*
Union Legislature	Composition of Parliament, Chairman of the House, Lok Sabha, Rajya Sabha, Indian Federalism and Political Parties *(Pages 251-277)*
State Government	Legislatures, Governors, Chief Ministers and Council of Minister *(Pages 278-298)*

Central- State Relations	Legislative, Administrative and Financial, Adult Franchise and Election Commission *(Pages 299-323)*
Judiciary	Supreme Court and High Court *(Pages 346-368)*

Course Text- Indian Constitution by *Manoj Sharma*

Course Name- Operating Systems

Course Outline-

Topics	**Reference from Text Book**
Need and Services of Operating system, Classification of operating system, Single user, Multi user, Simple batch processing Multiprogramming, Multitasking, Parallel system, Distributed system, Real time system	Unit 3- Overview of Operating Systems
Process concept, Process scheduling, Threads, CPU scheduling, Basic concept, Scheduling criteria, Scheduling algorithms	Unit 5- Process Management Unit 7- Scheduling
Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance, Detection and Recovery, Critical sections, Synchronization hardware, Semaphores, Combined approach to deadlock handling	Unit 8- Deadlocks
Memory Concept, Logical versus physical Address space, Swapping, Partition, Segmentation	Unit 11- Memory Management
Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing	Unit 12- Virtual Memory
File concept, Access methods, Directory structure, Single level, Two levels, Three structures, Acyclic graph, General graph directory, File protection, Allocation methods, Contiguous allocation, Linked allocation, Index allocation, Free space management	Unit 13- File Systems and I/O Management
Disk structure, Disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk scheduling algorithms	Unit 14- Implementation of File Operations
Authentication, Program threats and system threats, Encryption	Unit 15- Security and Protection
Inter process communication	Unit 16- Distributed Operating Systems
Mechanism and policy, Files in Distributed Systems, Distributed File System, Domain of protection, Access matrix	Unit 20- Distributed File Systems

Course Text- Operating Systems by Dhananjay M. Dhamdhere.

Bachelor of Computer Applications

Semester IV

Course Name- Software Engineering

Course Outline-

Topics	**Reference from Text Book**
Define Software Engineering, Size Factors, Quality and Productivity Factors, Managerial Issues	Chapter 1- Introduction to Software Engineering
Defining the Problem, Developing Solution Strategy, Plan the Development Process, Plan an Organization Structure, Other Planning Activities	Chapter 2- Planning a Software Project
Software Cost Factors, Software Cost Estimation Techniques, Staffing- Level Estimation, Estimating Software Maintenance Costs	Chapter 3- Software Cost Estimation
Software Requirements Specification, Formal Specification Techniques, Languages and Processors for Requirements Specification	Chapter 4- Software Requirements Definition
Design Concepts, Modules and Modularization Criteria, Design Notations, Design Techniques, Detailed Design Considerations, Real-Time and Distributed System Design, Test Plans, Milestones, Walkthroughs and Inspections, Design Guidelines	Chapter 5- Software Design
Type Checking, Separate Compilation, User-Defined Data Types, Data Abstraction, Scoping Rules, Exception Handling, Concurrency Mechanisms	Chapter 7- Modern Programming Language Features
Quality Assurance, Walkthroughs and Inspections, Static Analysis, Symbolic Execution,	Chapter 8- Verification and Validation Techniques

Unit Testing and Debugging, System Testing, Formal Verification	
Enhancing Maintainability during Development, Managerial Aspects of Software Maintenance, Configuration Management, Source-Code Metrics, Other Maintenance Tools and Techniques	Chapter 9- Software Maintenance

Course Text- Software Engineering Concepts by Richard Fairley

Course Name- Java Programming

Course Outline-

Topics	**Reference from Text Book**
Object-Oriented Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, Applications of OOP	Chapter 1- Fundamentals of Object-Oriented Programming
Java History, Java Features, Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment	Chapter 2- Java Evolution
Simple Java Program, Java, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Installing and Configuring Java, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style	Chapter 3- Overview of Java Language
Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Value of Variables, Standard Default Values	Chapter 4- Constants, Variables and Data Types
Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators,	Chapter 5- Operators and Expressions

Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions	
Decision Making with if Statement, Simple if Statement, The if…Else Statement, Nesting of if…Else Statements, The Else if Ladder, The Switch Statement, The ? : Operator	Chapter 6- Decision Making and Branching
The While Statement, The Do Statement, The For Statement, Jumps in Loops, Labelled Loops	Chapter 7- Decision Making and Looping
Define Class, Fields Declaration, Methods Declaration, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Methods with Varargs, Visibility Control	Chapter 8- Classes, Objects and Methods
One-Dimensional Arrays, Creating an Array, Two-Dimensional Arrays, Strings, Vectors, Wrapper Classes, Enumerated Types, Annotations	Chapter 9- Arrays, Strings and Vectors

Defining Interfaces, Extended Interfaces, Implementing Interfaces, Accessing Interface Variables	Chapter 10- Interfaces: Multiple Inheritance
Java API Packages, System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes, Static Import	Chapter 11- Packages: Putting Classes Together
Create Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the “Runnable” Interface, Inter-Thread Communication	Chapter 12- Multithreaded Programming
Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing our Own Exceptions, Using Exceptions for Debugging	Chapter 13- Managing Errors and Exceptions
Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags, Displaying Numerical Values, Getting Input from the User, Event Handling	Chapter 14- Applet Programming

Graphics Class, Lines and Rectangles, Circles and Ellipses, Arcs, Polygons, Line Graphs, Control Loops in Applets, Bar Charts, AWT Package, Swings	Chapter 15- Graphics Programming
Streams, Stream Classes, Byte Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input/Output Exceptions, Creating of Files, Reading/Writing Characters, Reading/Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Random Access Files, Interactive Input and Output	Chapter 16- Managing Input/Output Files in Java
Overview of Interfaces, Overview of Classes, Overview of Algorithms	Chapter 17- Java Collections

Course Text- Programming with Java by E Balagurusamy.

Course Name- Distributed Database Management Systems

Course Outline-

Topics	**Reference from Text Book**
Features of Distributed versus Centralized Databases, Distributed Database Management Systems (DDBMSs)	Chapter 1- Distributed Databases- An Overview
Review of Databases and Computer Networks	Chapter 2- Review of Databases and Computer Networks
Reference Architecture for Distributed Databases, Types of Data Fragmentation, Distribution Transparency for Read-Only Applications, Distribution Transparency for Update Applications, Distributed Database Access Primitives, Integrity Constraints in Distributed Databases	Chapter 3- Levels of Distribution Transparency
A Framework for Distributed Database Design, Design of Database Fragmentation, Allocation of Fragments	Chapter 4- Distributed Database Design
Equivalence Transformation for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries	Chapter 5- Translation of Global Queries to Fragment Queries
Framework for Query Optimization, Join Queries, General Queries	Chapter 6- Optimization of Access Strategies
Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions	Chapter 7- Transaction Management
Foundations of Distributed Concurrency Control, Distributed Deadlocks,	Chapter 8- Distributed Concurrency Control

Concurrency Control Based on Timestamps, Optimistic Methods for Distributed Concurrency Control	
Concepts, Nonblocking Commitment Protocols, Reliability and Concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart	Chapter 9- Distributed DBMS Reliability
Catalog Management in Distributed Databases, Authorization and Protection	Chapter 10- Distributed Database Administration

Course Text- Distributed Databases Principles and Systems by Stefano Ceri and Giuseppe Pelagatti

Course Name- Unix and Shell Programming

Course Outline-

Topics	**Reference from Text Book**
History, Define UNIX, UNIX Components, UNIX Commands, Basic Commands, Getting Help, Command Substitution, Multiple Commands, Aliases- Alternate Names to Commands	Chapter 1- Introduction to UNIX
UNIX Files, Categories of Files, Hidden Files- Dot Files, File System- Organizing the Unix Files, Path Names- Reaching a Required File, Home Directory, Directory Commands, Dot (.) and Double Dot (. .) File Names, File Related Commands, Wild Cards-Filename Generation, Displaying the Contents of File, Printing of Files, Comparing Files	Chapter 2- Files and File Organization
Files Ownership, File Attributes, The *Is* Command, The *file* Command, The *chmod* Command, The *chown* Command, The *chgrp* Command, Times Associated with File, The unmask Command	Chapter 3- File Attributes and Permissions
Standard I/O, Redirection, Pipe and Pipeline, Mixing Inputs from Standard Input and a File, Filter, The tee Command, Terminal (/dev/tty) and Trash (/dev/null) Files,	Chapter 4- Standard I/O, Redirection Pipes and Filters

Sample Database File, Handling Columns and Fields, The *sort* Command, The *uniq* command, The *tr* command	
The vi Editor, Editing with vi, Moving the Cursor, Editing, Copying and Moving Text, Pattern Searching, Repeating Last Editor Command, Undoing Commands, Joining Lines, Writing Selected Lines on to Separate File, Using the Shell from vi, Configuring the vi Environment	Chapter 5- The vi Editor
Regular Expressions, The *grep* Family, The *egrep* Command, The *fgrep* Command, The Stream Editor- sed	Chapter 6- Regular Expressions- grep Family of Commands and the sed
Meaning of Process, Parent and Child Processes, Types of Processes, Foreground and Background Processes, Internal and External Commands, The *ps* Command, Process Creation, The *nohup* Command, The *nice* Command, The *time* Command, Signals, The *trap* Command, The *sty* Command, The *kill* Command, The *wait* Command, Job Control, Command History, Scheduling Jobs Execution	Chapter 7- The Process
Shell Variables, The *export* Command, The *.profile* File, The First Shell Script,	Chapter 8- Shell Programming

The *read* Command, Positional Parameters, The $? Variable, The *set* Command, The *exit* Command, Branching Control Structures, Loop-Control Structures, The *continue* and *break* Statements, The *expr* Command, Real Arithmetic in Shell Programs, The *here* Document (<<), The sleep Command, Debugging Scripts, The script Command, The eval Command, The exec Command	
Communication Process, The news Command, Message of the Day- *The motd,* The *mesg* Command, The *write* Command, The *wall* Command, The *talk* Command, The *finger* Command, Electronic Mail	Chapter 10- Basic Communication Tools

Course Text- Introduction to UNIX and SHELL Programming by M.G. Venkateshmurthy.

Course Name: Environment Studies

Course Outline:

Topics	**Reference from Text Book**
Definition, Scope, Importance, Institutions in Environment, People In Environment	The Multidisciplinary Nature of Environmental Studies
Introduction and Natural Resources and Associated Problems a) Forest Resources: Use And Over-Exploitation, Deforestation, Case Studies. Timber Extraction, Mining, Dams and their Effects on Forests and Tribal People. b) Water Resources: Use And Over-Utilization Of Surface and Ground Water, 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	Natural Resources
a) Food Resources: World Food Problems, Changes caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer/ Pesticide Problems, Water Logging, Salinity, Case Studies b) Energy Resources: Growing Energy Needs, Renewable/ Non-renewable Energy Sources, Use Of Alternate Energy Sources, Case Studies c) Land Resources: Land as a Resource, Land Degradation, Man-Induced Land-Slides, Soil Erosion and Desertification. (i) Role of an Individual in Conservation of Natural Resources (ii) Equitable Use of Resources for Sustainable Lifestyles	Food, Energy and Land Resources
Concept of an Ecosystem (i) Structure and Functions of an Ecosystem, (ii) Producers, Consumers and Decomposers (iii) Energy Flow in the Ecosystem (iv) Ecological Succession (v) Food Chains, Food Webs And Ecological Pyramids	Ecosystems

Introduction, Types, Characteristic Features, Structure and Function of the Following Ecosystem: (i) Forest Ecosystem (ii) Grassland Ecosystem (iii) Desert Ecosystem (iv) Aquatic Ecosystems (Ponds, Lakes, Streams, Rivers, Estuaries, Oceans)	Types of Ecosystem
(i) Introduction – Definition: Genetic, Species, Ecosystem Diversity (ii) Biogeographic Classification of India (iii) Value Of Biodiversity: Consumptive, Productive Use, Social, Ethical, Aesthetic and Option Values (iv) Biodiversity at Global, National and Local Levels (v) India as a Mega Diversity Nation (vi) Hotspots of Biodiversity. Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts (vii) Endangered and Endemic Species of India (viii) Conservation of Biodiversity: In-Situ and Ex-Situ	Biodiversity And Its Conservation
Definition, Causes, Effects and Control Measures of: (i) Air Pollution (ii) Water Pollution (iii) Soil Pollution (iv) Marine Pollution (v) Noise Pollution (vi) Thermal Pollution (vii) Nuclear Hazards	Environmental Pollution
(i) Solid Waste Management: Types, Collection, Causes, Effects and Control Measures of Municipal Urban and Industrial Wastes. (ii) Role of an Individual in Prevention of Pollution (iii) Pollution Case Studies (iv) Disaster Management: Floods, Earthquakes, Cyclones, Landslides	Solid Waste Management and Disaster Management

(i) From Unsustainable to Sustainable Development (ii) Urban Problems Related to Energy (iii) Water Conservation, Rain Water Harvesting, Watershed Management (iv) Resettlement and Rehabilitation of People; its Problems and Concerns. Case Studies	Social Issues and the Environment
(i) Environmental Ethics: Issues and Possible Solutions (ii) Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Nuclear Holocaust. Case Studies (iii) Wasteland Reclamation (iv) Consumerism and Waste Products	Environmental Issues
(i) Environment Protection Act (ii) Air (Prevention and Control of Pollution) Act (iii) Water (Prevention and Control of Pollution) Act (iv) Wildlife Protection Act (v) Forest Conservation Act (vi) Issues Involved in Enforcement of Environmental Legislation	Environmental Legislation
(i) Population Growth, Variation Among Nations (ii) Population Explosion – Family Welfare Program	Human Population and the Environment
(i) Human Rights (ii) Value Education (iii) HIV/AIDS (iv) Women and Child Welfare	Environmental and Human Health
Introduction, Role of Information Technology in Environment Education, Environment Awareness Programs, Role of Public In Environment Education	Environment Education
Environment Economics, Environment Impact Assessment, Environment Management System And Life Cycle Assessment	Environmental Management

Course Text: Environmental Studies by Erach Bharucha

Bachelor of Computer Applications

Semester V

Course Name- Algorithm and Analysis

Course Outline-

Topics	**Reference from Text Book**
Define Algorithm, Fundamentals of Algorithm Problem Solving, Important Problem Types, Fundamental Data Structures	Unit 1- Introduction
Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non Recursive and Recursive Algorithms, Example: Fibonacci Numbers	Unit 2- Fundamentals of the Analysis of Algorithm Efficiency
Selection Sort and Bubble Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search	Unit 3- Brute Force
Merge Sort, Quick Sort, Binary Search, Binary Tree Traversals and Related Properties, Multiplication of Large Integers and Strassen's Matrix Multiplication	Unit 4- Divide and Conquer
Insertion Sort, Depth-First Search and Breadth-First Search, Topological Sorting, Algorithms for Generating Combinatorial Objects	Unit 5- Decrease and Conquer
Presorting, Balanced Search Trees, Heaps and Heapsort, Problem Reduction	Unit 6- Transform-and-Conquer
Sorting by Counting, Input Enhancement in String Matching, Hashing	Unit 7- Space and Time Tradeoffs
Computing a Binomial Coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions	Unit 8- Dynamic Programming
Prim's Algorithm, Kruskal's Algorithm, Dijkshta's Algorithm, Huffman Trees	Unit 9- Greedy Technique
Lower Bound Arguments, Decision Trees, P, NP, and NP-Complete Problems	Unit 11- Limitations of Algorithm Power
Backtracking, Branch-and-Bound, Approximation Algorithms for NP-hard Problems	Unit 12- Coping with the Limitations of Algorithm Power

Course Text- Introduction to the Design and Analysis of Algorithms by Anany Levitin.

Course Name- Application Programming

Course Outline-

Topics	**Reference from Text Book**
The Web, Three-Tier Architecture	Unit 1- Database Applications and the Web
Overview of PHP, Conditions and Branches, Loops, Functions, Working with Types, User-Defined Functions	Unit 2- The PHP Scripting Language
Arrays, Strings, Regular Expressions, Date and Times, Integers and Floats	Unit 3- Arrays, Strings and Advanced Data Manipulation in PHP
Classes and Objects, Inheritance, Throwing and Catching Exceptions	Unit 4- Introduction to Object-Oriented Programming with PHP 5
Database Basics, MySQL Command Interpreter, Managing Databases and Tables, Inserting, Updating and Deleting Data, Querying with SQL SELECT, Join Queries, Case Study	Unit 5- SQL and MySQL
Querying a MySQL Database Using PHP, Processing User Input, MySQL Function Reference	Unit 6- Querying Databases
Overview on PEAR, Core Components, Packages	Unit 7- PEAR
Database Inserts, Updates and Deletes, Issues in Writing Data to Databases	Unit 8- Writing to Web Databases
Validation and Error Reporting Principles, Server-Side Validation with PHP, JavaScript and Client-Side Validation	Unit 9- Validation with PHP and JavaScript
Introducing Session Management, PHP Session Management, Case Study, Use of Session, PHP Session API and Configuration	Unit 10- Sessions
HTTP Authentication, HTTP Authentication with PHP, Form-Based Authentication, Protecting Data on the Web	Unit 11- Authentication and Security
Errors, Common Programming Errors, Custom Error Handlers	Unit 12- Errors, Debugging and Deployment

Course Text- PHP and MySQL by Huge E. Williams and David Lane.

Course Name- Internet Programming

Course Outline-

Topics	**Reference from Text Book**
Internet, WWW, Web Browsers and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox	Unit 1- Introduction
Origins of HTML and XHTML, Basic Syntax, Standard XHTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic Differences between HTML and XHTML	Unit 2- Hypertext Markup Language Unit 3- More HTML
Introduction, Level of Style Sheets, Style Specification Formats, Selector Forms, Property Value Forms, Font Properties, List Properties, Color, Alignment of Text, The Box Model, Background Images, The and Tags, Conflict Resolution	Unit 4- Cascading Style Sheets Unit 5- Cascading Style Sheets Two
Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics, Primitives, Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructor, Pattern Matching Using Regular Expressions, Errors in Scripts, Examples, The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events and Event Handling, Handling Events from the Body Elements, Button Elements, Text Box and Password Elements, The DOM 2 Event Model, The Navigator Object, DOM Tree Traversal and Modification	Unit 6- An Introduction to JavaScript Unit 7- Objects in JavaScript
Introduction to Dynamic Documents, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements	Unit 8- Dynamic HTML with JavaScript
Origins and Uses of Perl, Scalars and their Operations, Assignment Statements and Simple Input and Output, Control Statements, Fundamentals of Arrays, Hashes, References, Functions, Pattern Matching, File Input and Output, Examples, The Common Gateway Interface, CGI Linkage, Query String Format, CGI PM Module, A Survey Example-	Unit 9- Programming in Perl 5 Unit 10- CGI Scripting

Cookies	
Introduction, Syntax, Document Structure, Document Type Definitions, Namespaces, XML Schemas, Displaying Raw XML Documents, Displaying XML Documents with CSS, XSLT Style Sheets, XML Processors, Web Services	Unit 14- XML: Defining Data for Web Applications

Course Text- Web Programming (Building Internet Applications) by Chris Bates.

Course Name- System Programming

Course Outline-

Topics	Reference from Text Book
Evolution and Components of System Programming, Assembler, Loaders, Compilers, Macros, Interpreters, Linkers	Unit 1- Background
General Machine Structure, Machine Language and Assembly Language	Unit 2- Machine Structure, Machine Language and Assembly Language
Functions of Assembler, General Design Procedure, Design of Assembler, Table Processing Searching and Sorting Techniques	Unit 3- Assemblers
Macro Language and Processors, Feature of Macro Facility, Macro Instruction, Arguments	Unit 4- Macro Language and the Macro Processor
Loader Schemes, Compiler and Go Loader, General Loader Scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct Linking Loaders	Unit 5- Loaders
Importance of High Level Language, Features, Data Types and Data Structure, Storage Allocation, Accessing Flexibility, Functional Modularity	Unit 6- Programming Languages

Course Text- Systems Programming by John J. Donovan.

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