Rayat Shikshan Sanstha's

SADGURU GADGE MAHARAJ COLLEGE, KARAD.

(An Autonomous)

Accredited By NAAC with 'A⁺ (3.63 CGPA)' GradeISO-9001-2015 Certified

Affiliated to Shivaji University, Kolhapur

Bachelor of Computer Application

DEPARTMENT OF COMPUTER SCIENCE

Under the Faculty of Commerce and Management

Choice Based Credit System (CBCS)

Regulations in accordance with **National Education Policy**
to be implemented from Academic Year 2024-25

Syllabus For

B.C.A. Part – II

SEMESTER III & IV

(Syllabus to be implemented from June 2024)

B.C.A. Part–II

Semester– III Part- II
NMJT23-371 Object Oriented Programming with C++ -

Credits – 2   **Theory: 30 Teaching Hours**

Course Outcomes- At the end of this course student will be able to:

CO1. Understand the features of C++ supporting object oriented programming.

CO2. Understand the relative merits of C++ as an object oriented programminglanguage.

CO3. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance andpolymorphism.

CO4. Understand advanced features of C++ specifically stream I/O and file handling.

Unit	Contents	Hours Allotted
I	**Principles of Objective Oriented Programming** History of OOP, Introduction to Object Oriented Programming, Basic Concepts of Object Oriented Programming, Benefits of Object Oriented Programming, Object Oriented Languages, Difference between C and C++. **Beginning with C++** Tokens, Keywords, Identifiers and Constants, Data Types, Type Compatibility, Variables, Operators in C++, Operator Precedence, Control Structures (Conditional, Unconditional and Looping).	07
II	**Functions in C++, Classes & Objects** Concept of Function, main() Function, Inline Functions, Function Overloading, Specifying a Class, Data members and Member Functions, Access Specifiers, Friend Function, Static data Member, Object declaration and Initialization, Arrays of Objects **Constructors & Destructors, Inheritance** Constructors-Definition, Use of Constructors, Types of Constructors (Default, Parameterized, Copy, Dynamic), Destructors-Definition, Use, Inheritance-Definition, Types of Inheritance (Single, Multiple, Multilevel, Hierarchical, Hybrid)	08
III	**Pointers, Virtual Functions &Polymorphism** Pointer, Pointer to Object, this pointer, Pointer to Derived Classes, Polymorphism: Meaning, compile Time and Run time polymorphism, Rules for Operator Overloading, Operator Overloading (Unary & Binary)-with member function and friend function.	07

IV	**Working with Files** File-Definition, Use, Classes for File Stream Operations, Opening and Closing a File, File Opening Modes, File Pointers, Manipulation of File Pointer(using-seekg,seekp,tellg,tellp), Input Output Operations- get ( )Put ( ), read ( ) Write ( ).	**08**

Reference Books:-

1. Object Oriented Programming using C++ books By Yashwant Kanetkar
2. Object Oriented Programming with C++ by E Balagurusami.
3. Object Oriented Programming in C++ by Rajesh K Shukla
4. The C++ Programming Language written by BjarneStroustrup.
5. Object Oriented Programming in C++ by Robert Lafore
6. Test Your Skills in Object Oriented Programming with C++ by R S Salaria

NMJT23-372 Database Management System

Credits – 2   **Theory: 30 Teaching Hours**

Course Outcomes: At the end of this course students will be able to:
CO1. To Know the Fundamentals of Databases.
CO2. To understand how to use Databases in day to day
Applications. CO3. Design ER Models to represent simple database
application scenariosCO4. Improve the database design by
normalization.

Units	Content	Hours allocated
1	**Introduction of Database** 1.1 Introduction 1.2 Definition of DBMS 1.3 file processing system Vs DBMS 　1.3.1 Limitation of file processing system 　1.3.2 Comparison of File processing system and DBMS 1.4 Advantages and Disadvantages of DBMS 1.5 Users of DBMS 　　1.5.1 Database Designers 　　1.5.2 Application programmer 　　1.5.3 Sophisticated Users 　　1.5.4 End Users 1.6 Capabilities of good DBMS 1.7 Types of Database System: 　　1.7.1 Centralized database system 　　1.7.2 client-server system 1.7.3 Distributed database system.	07
2	**Organization of Database System** 2.1 Introduction 2.2. Logical and Physical Files 　2.2.1 Logical and Physical Files Definitions 　2.2.2 File Structure 2.3 Basic File Operations 　　2.3.1 Opening Files 　　2.3.2 Closing Files 　　2.3.3 Reading and Writing 　　2.3.4 Seeking 2.4 File Organization 　　2.4.1 Field and Record structure in file 　　2.4.2 Record Types 2.5 Types of file organization 2.5.1 Files of Unordered Records (Heap Files) 2.5.2 File of Ordered Records (Sorted Files) 2.5.3 Hash Files 2.5.4 Indexed file	08

| 3 | **Data Models**
3.1 Introduction
3.2 Data Models
      3.2.1 Object Based Logical Model
      3.2.2 Record Base Logical Model
          a. Relational Model
          b. Network Model
          c. Hierarchical Model
3.3 Entity Relationship Model
      3.3.1 Entity Set
      3.3.2 Attribute
      3.3.3 Relationship Set
3.4 E-R Model terms Introduction
      a. Relation   b. Tuple   c. Attribute   d. Cardinality
      e. Degree   f. Domain
3.5 Keys- 3.5.1 Super Key, 3.5.2 Candidate Key, 3.5.3 Primary Key
      3.5.4 Foreign Key
3.6. Relational Database Design
      3.6.1 Introducti
      on
      3.6.2Normaliza
      tion
      3.6.3 Normal Form
         3.6.1. 1 NF, 3.6.2 2 NF, 3.6.3 3 NF | 07 |
| 4 | **Relational algebra**
4.1 Introduction
4.2 Operations- a. Select, b. Project, c. Union, d.
Difference,e.Intersection, f. Cartesian Product, g.
Natural Join
4.3. SQL (Structured Query Language)
      4.3.1 Introduction
      4.3.2 History of SQL
      4.3.3 Basic Structure
      4.3.4 DDL Commands
      4.3.5 DML Commands
      4.3.6 Simple Queries
      4.3.7 Nested Queries
      4.3.8 Aggregate Functions
      4.3.9 Clauses | 08 |

References:
1 Database System Concepts By Henry korth and A. Silberschatz
2. An Introduction to Database System by Bipin Desai
3. File Structure by Michael J. Folk, Greg, Riccardi
4. Teach Yourself SQL in 14 days by Jeff Parkins and Bryan Morgan
5. Database Management System by Raghu Ramakrish

NMNT23-373 Entrepreneurship Development

Credit:02   **Marks:50**

Course objectives:
1. To learn Business Plans, Finance, Opportunity in different businesses.
2. To learn Entrepreneurship techniques.

UNIT No.	Description	No. of Periods
I	**Introduction to Entrepreneurship :** Evolution, Concept and definition of an entrepreneur, Characteristics, function and types of entrepreneurs, Qualities of an Entrepreneur, Growth of Entrepreneurship in India, Role of Entrepreneurship in Economic Development, Women Entrepreneurship in India.	15
II	**Business Opportunity Identification**: Search for Business Ideas, Market Assessment, Sources of Information and Environmental Analysis, Entrepreneurial opportunities in India, Business Opportunity identification and selection.	15
III	**Business Plan Preparation and Project Finance** Meaning of Business plan, Significance and Contents of a Business Plan, developing Business Plan, Presenting Business Plan and Preparation of project report. Project Finance: Introduction, Types of Finance, Sources of Finance, Venture Capital, Start-up and Make-in-India program, MUDRA. Support Agencies: Support to Entrepreneurs by DIC, SIDBI, SIDCO, SSIB, NSIC, SISI, Other Institutions etc. Entrepreneurship promotion by Government through various schemes.	15
IV	**Digital Entrepreneurship:** Meaning and Introduction**,** New Opportunities and Challenges, Choosing a Digital Business Idea, Creating a Digital Business Design. Digital Business Model. Digital business platforms. Different Electronic interface to consumers. Components of business website. IT Entrepreneurs: Azim Premji, N.R. Narayan Murthy and Shiv Nadar	15

Course Outcomes

1. Define characteristics, function and types of entrepreneurs and know the role of Entrepreneurship in Economic Development.
2. Identify Business Opportunities and prepare business plan.
3. Know project finance agencies.
   Understand New Opportunities and Challenges in digital entrepreneurship.

References Books:
1. Dr. Dilip Sarwate, Entrepreneurship Development and Project Management, Everest Publishing house
2. Vasant Desai, Dynamics of Entrepreneurship development and Management, Himalaya Publishing House

3. David H Holt, Entrepreneurship and New Venture Creation, Prentice Hall
4. Paul Ajit Kumar, Paul, Entrepreneurship Development, Himalaya Publishing House Mumbai
5. Raj Shankar – Entrepreneurship: Theory and Practice‖ – Vijay Nicole Imprints Pvt. Ltd.
S.S. Khanka – Entrepreneurial Development – S. Chand And

NSEC-II 23-374 PHP- II

Credits -2   **Theory: 30 Teaching Hours**

Course Outcomes- At the end of this course student will be able to:
CO1: Understand the basics of PHP programming language and its role in web development
C02: Implement functions and arrays in PHP to solve programming problems
CO3: Design web forms using HTML and process user input using PHP.
CO4: Execute file uploads and perform file handling operations in PHP applications.

Unit	Content	Hours Alloted
1	**Working with Forms and User Input:** HTML forms and form elements, Retrieving user input with $_GET and $_POST, Form validation and sanitization, Handling file uploads **Working with Database-MySQL:** Introduction to databases and MySQL, Connecting to a MySQL database, SQL queries: SELECT, INSERT, UPDATE, DELETE, Prepared statements and preventing SQL injection, Retrieving and displaying data from a database	15
2	**Session Management and Cookies:** Understanding sessions and cookies, Creating and destroying sessions, Storing session data, Managing user authentication and authorization **File Handling and Directory Operations:** Working with files and directories, Reading from and writing to files, File uploads and file permissions, File and directory manipulation functions	15

References:
1. "PHP and MySQL Web Development" by Luke Welling and Laura Thomson
2. "Learning PHP, MySQL & JavaScript" by Robin Nixon
3. "Programming PHP" by RasmusLerdorf, Kevin Tatroe

NSEC-III 23-375 Software Engineering –III

Credits – 2   **Theory: 30 Teaching Hours**

Course Outcomes- At the end of this course students will be able to:

CO1. Compare and chose a process model for a software project development.

CO2. Identify requirements analyze and prepare models.

CO3. Prepare the SRS, Design document, Project plan of a given softwaresystem.

CO4. Work as an individual and as part of a multidisciplinary team to developand deliver quality software.

Units	Contents	Hours Allotted
I	**Introduction:** Software Engineering approach, Need of engineering aspect for Software Design, SDLC, Software Crisis, Software Process, Process models (Classical Waterfall Model, Build-n- Fix Model, Iterative Waterfall Model, PrototypingModel, Evolutionary Model and Spiral Model)	07
II	**Software Requirement Analysis and Specifications:** Software Requirement Specifications, Need of SRS, Steps for constructinggood SRS, Behavioral and Non-Behavioral requirements, Analysis Model	08
III	**Software Design:** Design Concepts & Principle, problem partitioning, abstraction, and top down and bottom up-design, Cohesion & Coupling, How to measure degree of Cohesion andCoupling, Function Oriented Design, DFDs, Structure Chart, Object Oriented Design.	07
IV	**Software Testing:** Validation and Verification, Black Box testingapproach, White Box testing approach, Levels of testing: Unit Testing, Integration Testing, Validation testing, System testing and debugging. Software Maintenance: Software Maintenance Process and its types.	08

Reference Books :-

1. Ian Sommerville. Software Engineering, Pearson Education (Addison Wesley).

2. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

3. Waman S. Jawadekar,"Software Engineering: Principles and Practice", McGraw Hill.

4. R. S. Pressman, "Software Engineering – A practitioner's approach", 3rd ed., McGraw Hill Int.Ed., 1992.

5. K.K.Agrawal&Yogesh Singh, "Software Engineering", New Age Publication.

NSEC-IV 23-376 AI- I

Credits -2   **Theory: 30 Teaching Hours**

Course Outcomes- Upon successful completion of this course, the students will be able to:
   CO1. Identify AI problems and their features.
   CO2. Use predicate calculus and propositional logic for knowledge
        representation.
   CO3. Describe the statistical data numerically by using correlation,
        regression and curve fittings.
   CO4. Use heuristics in search based problems.Use semantic networks, conceptual
        dependencies scripts and frames for information representation

Unit	Content	Hours Alloted
1	**AI- Its Root and Scope** Early history and applications, Attitude towards intelligence, knowledge and human artifices, Overview of AI application areas, AI- A summary	15
2	**Representation and Search** The proportional calculus, The predicate calculus, Using inference rules to produce predicate calculus expression, Graph theory, Strategies for state space search, Introduction to heuristic search, Hill climbing and dynamic programming, Best first search algorithm, Using heuristics in games	15

References:
1 Artificial Intelligence; structures and strategies for complex problem
   Solving by Gorge F Luger
2. Artificial Intelligence: A guide to intelligent
   systems by Michael Negnevistsky
3. Getting started with TensorFlow by Giancarlo Zaccone.

Lab Course Based On Object Oriented Programming with C

Credits - 2

Course Outcomes- At the end of this course student will be able to:

CO1. Implement object oriented programming concepts using C++
Language.CO2. Apply the principles of virtual functions and
polymorphism.
CO3. Analyzing and handling files using C++.
CO4. Implement concept of Function Overloading and Operator Overloading.

Sr.No.	Title Of Experiments
1.	WAP to understand the structure of C++ program
2.	WAP Simple Program using Class and Object.
3.	WAP to find greatest number among the given three numbers using class.
4.	WAP to find mean of data members of two classes using friend function.
5.	WAP to demonstrate Static data member.
6.	WAP to demonstrate Array of Object.
7.	WAP using Constructor (with and without Parameter).
8.	WAP using Destructor.
9.	WAP to demonstrate Types of Inheritance.
10.	WAP using Virtual Function.
11.	WAP to Overload Unary and Binary Operators with member function and friendfunction.
12.	WAP to Overload Binary Operator with member function and friend function.
13.	WAP for file handing- Opening file using Constructor.
14.	WAP for file handing- Opening file using open( ) method.
15.	WAP for working with multiple files.

Lab Course Based on DBMS

Credits – 2

Course Outcomes: At the end of this course students will be able
to:CO1. Understand the basic working of internet and its main
services.
CO2. Create web pages using HTML & Applying CSS Styles in web page
development.CO3. To understand how to use Databases in day to day
Applications.
CO4. Design ER Models to represent simple database application scenarios

Sr. No.	Title of the Experiment
1	Create tables for the information given below by giving appropriate integrity constraints as specified.
2	Create table for the information given below by choosing appropriate data types and integrity constraints as specified.
3	1. Create the following tables (primary keys are underlined.). Property(pno,description, area) Owner(oname,address,phone) An owner can have one or more properties, but a property belongs to exactly oneowner . Create the relations accordingly, so that the relationship is handled properly and the relations are in normalized form (3NF). a) Insert two records into owner table. b) insert 2 property records for each owner . c) Update phone no of "Mr. Nene" to 9890278008 d) Delete all properties from "pune" owned by " Mr. Joshi"
4	To understand & get a Hands-on on Select statement
5	To understand & get a Hands-on on using set operations (union ,intersect and except) with select statement.

6	Create the following relations, for an investment firm emp(emp-id ,emp-name, address, bdate) Investor(inv-name , inv-no, inv-date, inv-amt) An employee may invest in one or more investments; hence he can be an investor.But an investor need not be an employee of the firm. Create the Relations accordingly, so that the relationship is handled properly andthe relations are in normalized form (3NF). Assume appropriate data types for the attributes. Add any new attributes, as required by the queries. Insert sufficient number of records in the relations / tables with appropriate values as suggested by some of the queries. Write the following queries & execute them. 1. List the distinct names of customers who are either employees, or investors orboth. 2. List the names of customers who are either employees, or investors or both. 3. List the names of employees who are also investors. 4. List the names of employees who are not investors.
7	To understand & get a Hands-on on nested queries & subqueries, that involvesjoining of tables.

8	To understand & get a Hands-on on nested queries & subqueries, that involves joining of tables, to demonstrate set cardinality.
9	Assignment related to small case studies (Each case study will involve creating tables with specified constraints, inserting records to it & writing queries for extracting records fromthese tables)
10	Assignment related to small case studies (Each case study will involve creating tables with specified constraints, inserting records to it & writing queries for extracting records fromthese tables)

Note: All practical's are done through My SQL

B.C.A. Part–II Sem-IV
NMJT 23-471 Data Structure Using C++

Credits – 2   **Theory: 30 Teaching Hours**

Course Outcomes:- At the end of this practical paper students will be able to:

CO1:Use and implement appropriate data structure for the required problems using aprogramming language such as C++.
CO2:Write programs for various searching & sorting techniques.CO3:Implementing various data structures viz.
Stacks, Queues. CO4:Implementation of Linked Lists and
Trees.

Units	Content
I	**Introduction to data structures** Introduction to Array, Introduction to Data Structures, Concept of Abstract Datatypes, Array as ADT,Data structures and its types,Data structures operations
II	**Searching and Sorting and Methods** Introduction to Searching and Sorting, Searching: Linear search, Binary searchand hashing, Sorting: Bubble Sort,Insertion sort, Selection sort, Merge sort,
III	**Stacks and Queues** Introduction to stack, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C++, Application of stack: Prefix and PostfixExpressions Evaluation, Definition of queue, Operations on queue, Types of queue-Linear, Circular, Applications of queue
IV	**Linked Lists and Trees** Introduction to Pointer,Introduction to linked lists, Implementation of Linked list, Types of Linked List: Singly, Doubly and Circular, Operations on linear linked list: Traversal, Insertion, Deletion, Searching Trees : definition, terminologies, representation, types, Tree Traversal-(Preorder, Inorder, Postorder)

Reference Books:
1. Data Structure Using C++ by YashavantKanetkar
2. Classic Data Structures-D. Samanta, Prentice Hall India Pvt. Ltd.
3. Data Structures using C and C++-YedidyahLangsam, Moshe J. Augenstein, Aaron M.Tenenbaum, Pearson Education
4. Data Structures: A Pseudo code approach with C, Richard Gilberg ,Behrouz A. Forouzan,Cengage Learning
5. Data Structures Using C & C++ by Rajesh K. Shukla, Wiley india

Pvt. LtdAlgorithms and Data Structures, Niklaus Wirth, Pearson Education

NMJT 23-472 RDBMS

Credits – 2   **Theory: 30 Teaching Hours**

Course Outcomes- At the end of this course students will be able to:

CO1. Enhance the knowledge and understanding of database analysis and design.CO2. Enhance programming skills and techniques using SQL and PL/SQL.

CO3. Use the relational Model and how it is supported by SQL and PL/SQL.

CO4. To solve database problems using SQL and PL/SQL by using Cursors and Triggers.

Units	Contents	Hours Allotted
I	**Relational Database Management System:** 1.1 Concept of RDBMS, Difference between DBMS andRDBMS, Features of RDBMS. 1.2 Introduction of Oracle, Role and responsibilities of DBA. 1.3 RDBMS Terminology- Relation, Tuple, Cardinality,Attribute, Degree, Primary Key, Domain, Codd's Rules 1.4 Relational Model, Functional Dependencies,Normalization and its types.	15
II	**INTRODUCTION TO SQL:** 2.1 Features of SQL, Data types, 2.2 Classification of SQL Commands – DDL (create, alter,drop), DML (insert, Update, delete), DCL (grant, revoke), TCL (rollback, commit). 2.3 SQL Integrity Constraints-(Primary key, Foreign key,unique key, not null, default, check) 2.4 Select statement with group by and order by clause 2.5 SQL Operators-arithmetic, relational, Logical, Like,Between, IN operator 2.6 SQL Functions- Arithmetic functions, ConversionFunctions, Date function, Aggregate functions, String functions.	15
III	**JOIN AND SUB QUERIES:** 3.1 Join types - Inner Join, Outer Join, Cross Join and self-Join 3.2 Sub-queries, Multiple sub queries, nesting of sub queries,sub queries in DML commands.	15

	3.3 Correlated queries, Indexes, Sequences. Views-CreateView, Drop, View and its Advantages. , Denial of service (DoS), Firewall and proxy server.	
IV	**INTRODUCTION TO PL/SQL:** 4.1 Introduction to PL/SQL, Block Structure 4.2 Data types in PL-SQL 4.3 Control Structures-Branching statements, IterativeControl statements. 4.4 Cursors –Concept, Types- Implicit, Explicit, Procedure tocreate explicit cursors, Cursor Attributes. 4.5 TRIGGERS: Concept and types.	15

Reference Books:-

1) SQL, PL/SQL: The Programming Language- Ivan Bayross- (BPB)
2) Structured Query Language- by Osbome
3) SQL by Scott Ullman.
4) SQL & PL/SQL Black Book for Oracle by Dr,P.S.Deshpande.

NSEC-V 23-474 AI-II

Credits -2   **Theory: 30 Teaching Hours**

Course Outcomes- Upon successful completion of this course, the students will be able to:
  CO1. Identify AI problems and their features.
  CO2. Use predicate calculus and propositional logic for knowledge representation.
  CO3. Describe the statistical data numerically by using correlation, regression and curve fittings.
  CO4. Use heuristics in search based problems. Use semantic networks, conceptual dependencies scripts and frames for information representation

Unit	Content	Hours Alloted
1	**Representation and intelligence** Issues in knowledge representation, Brief history of AI representational schemes, Introduction to conceptual graphs, Type, individuals and names, Generalization & specialization. **Rule based expert system** Introduction, K rules as knowledge, representation, schemes, Expert system development teams, Structure, Characteristics, Forward chaining and backward chaining inference techniques., Media Advisor: A Demonstration, Conflict resolution, Advantages and disadvantages	15
2	**Uncertainty management in rule based expert system** Introduction, Basic probability theory, Bayesian reasoning, Forecast, Certainty factors theory and evidential reasoning, Comparison of Bayesian reasoning and certainty factors. **TensorFlow- Basic Concept** Machine learning and deep learning concepts, TensorFlow- general overview, Installing TensorFlow, first working session, Data Flow graph, TensorFlow Programming model, How to use TensorBoard.	15

References:
1 Getting started with TensorFlow by Giancarlo Zaccone.
2. Artificial Intelligence: A guide to intelligent systems by Michael Negnevistsky.
3. Introduction to Artificial Intelligence by Dan W. Patterson.

Credits -2   **Theory: 30 Teaching Hours**

Course Outcomes:

CO1: Characterize privacy, legal and ethical issues of information security.

CO2: Define the security controls sufficient to provide a required level of
      confidentiality, integrity, and availability in an organization's computer
      systems and networks.

CO3: Propose solutions including development, modification and execution of incident response plans.

CO4: Diagnose attacks on an organization's computer systems and networks.

Module	Content	Hours Allotted
I	**Overview of Networking Concepts** Basics of Communication Systems , Transmission Media , Topology and Types of Networks , TCP/IP Protocol Stacks , Wireless Networks , The Internet **Information Security Concepts** Information Security Overview: Background and Current Scenario ,Types of Attacks ,Goals for Security ,E-commerce Security ,Computer Forensics, Steganography **Security Threats and Vulnerabilities** Overview of Security threats ,Weak / Strong Passwords and Password Cracking , Insecure Network connections, Malicious Code, Programming Bugs, Cyber crime and Cyber terrorism, Information Warfare and Surveillance **Cryptography / Encryption** Introduction to Cryptography / Encryption, Digital Signatures, Public Key infrastructure, Applications of Cryptography, Tools and techniques of Cryptography	15
II	**Security Management Practices** Overview of Security Management, Information Classification Process , Security Policy, Risk Management, Security Procedures and Guidelines, Business Continuity and Disaster Recovery, Ethics and Best Practices **Security Laws and Standards** Security Assurance, Security Laws, IPR , International Standards , Security Audit, SSE-CMM / COBIT etc	15

References:-

1. A Beginners' Guide to Computer Hacking, Basic Security, And Penetration Testing
   Author: John Slavio
2. Hacking: The Art Of Exploitation   Author: Jon Erickson
3. Penetration Testing: A Hands-On Introduction to Hacking   Author: Georgia Weidman
4. The Hacker Playbook   Author: Peter Kim

NSEC-VII 23-476 Cyber Security-II

Credits -2   **Theory: 30 Teaching Hours**

Course Outcomes:

CO1: Apply critical thinking and problem-solving skills to detect current and future attacks on   an organization's computer systems and networks.

CO2: Diagnose attacks on an organization's computer systems and networks.

CO3: Apply business principles to analyze and interpret data for planning, decision-making, and   problem solving in an information security environment.

CO4: Effectively communicate in a professional setting to address information security   issues.

Module	Content	Hours Allotted
I	**Access Control and Intrusion Detection** Overview of Identification and Authorization , Overview of IDS , Intrusion Detection Systems and Intrusion Prevention Systems **Server Management and Firewalls** User Management, Overview of Firewalls, Types of Firewalls , DMZ and firewall features Chapter **Security for VPN and Next Generation Technologies** VPN Security ,Security in Multimedia Networks , Various Computing Platforms: HPC, Cluster and Computing Grids , Virtualization and Cloud Technology and Security	15
II	**Security Architectures and Models** Designing Secure Operating Systems , Controls to enforce security services , Information Security Models **System Security** Desktop Security, email security: PGP and SMIME , Web Security: web authentication, SSL and SET , Database Security **OS Security** OS Security Vulnerabilities, updates and patches ,OS integrity checks , Anti-virus software , Configuring the OS for security , OS Security Vulnerabilities, updates and patches **Wireless Networks and Security** Components of wireless networks , Security issues in wireless	15

References:-

1. The Web Application Hacker's Handbook: Finding and Exploiting Security   Flaws Author: Dafydd Stuttard and Marcus Pinto
2. Hackers & Painters: Big Ideas From The Computer Age Author: Paul   Graham
3. Penetration Testing: A Hands-On Introduction to Hacking Author: Georgia Weidman

NMJP 23-479 Lab Course based Data Structure using C++

Credits – 4

Course Outcomes:- At the end of this practical paper students will be able to:

CO1: Choose appropriate data structure to represent data items in real world.CO2: Design programs using data structures like stack, queues, binary tree.
CO3: Develop programs of searching and sorting.
CO4: Develop programs using static and dynamic implementation.

List of Experiments:	
1.	Write a program to implement stack using static method.
2.	Programs to implement applications of stack.
3.	Write a program to implement Queue using static method.
4.	Programs to implement applications of queue.
5.	Write a program to create linked list, add node to linked list and Remove node fromlinked list.
6.	Write a program to implement types of linked list.
7.	Write a program to implement stack and queue dynamically.
8.	Write a program to sort given elements using bubble sort, insertion sort, and selection sort
9.	Write a program to search given element using Linear Search.
10.	Write a program to search given element using Binary Search.

NMJP 23-480 Lab Course based on RDBMS

Credits-2

Course Outcomes- At the end of this course student will be able to:

CO1. Translate an information model into a relational database schema and to implement the schema using RDBMS.
CO2. Apply relational database theory to create database tables for SQL queries.
CO3. Apply advanced SQL features like views, indexes, synonyms, etc. for database management.CO4. Analyze PL/SQL structures using PL/SQL block: functions, procedures, cursors and triggers for database applications.

Sr. No.	Title Of The Experiment
1.	SQL queries on DDL statements.
2.	SQL queries on DML statements.
3.	SQL queries on Operators-relational, Logical, Like, Between, IN operator
4.	SQL queries on Oracle Functions and clauses
5.	SQL queries on Join
6.	Creating Views and index
7.	PL-SQL block on branching statement.
8.	PL-SQL block on looping statement.
9.	PL-SQL blocks to create explicit cursor.
10.	PL-SQL blocks to study attributes of explicit cursor.
11.	PL-SQL blocks to create Trigger.

Question Paper Pattern

Duration: 2 Hours

Total Marks –40

Instructions: 1) All Questions are Compulsory.
    2) Figures to the right indicate full marks.

Que. No.	Type of question	Marks
1	MCQ	8
2	Long answer question(Any 2 out of two)	16
3	Short notes on (Any four out of five)	16