MK UNIVERSITY

Campus: Deesa -Highway, Opp. Hngu, Matarvadi Part, Gujrat-384265
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Choice Based Credit System

Diploma in Computer Applications (DCA)

(Semester System)

Program Specific Outcomes (PSO)

On completing Masters in the Post Graduate Diploma in Computer Applications, the students shall be able to realize the following outcomes:

PSO	Description
PSO1	Communicate computer science concepts, designs, and solutions effectively and professionally
PSO2	Apply knowledge of computing to produce effective designs and solutions for specific problems
PSO3	Use software development tools, software systems, and modern computing platforms
PSO4	To have the knowledge and the ability to develop creative solutions
PSO5	To develop skills to learn new technology
PSO6	To develop critical reasoning
PSO7	To apply computer science theory and software development concepts to construct computing-based solutions
PSO8	To design and develop computer programs/computer-based systems in the area related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications
PSO9	The ability to understand, analyse and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity
PSO10	The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real-world problems, and meet the challenges of the future
PSO11	The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics

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Structure of DCA

Scheme for

Post Graduate Diploma in Computer Application (Semester I)

Semester I

Sr.No	Course Type	Course Code	Course Name	L	T	P	Credits	Max Marks		Total Marks
								I	E	
1	MAJOR	DCA101	Fundamentals of Computer Science	4	0	0	4	30	70	100
2	MAJOR	DCA102	Mathematics for Computer Science	4	0	0	4	30	70	100
3	MAJOR	DCA103	Internet Programming	4	0	0	4	30	70	100
4	MAJOR	DCA104	Computer Organization	4	0	0	4	30	70	100
5	MAJOR	DCA105	C++ Programming	4	0	0	4	30	70	100
6	MINOR	DCA106	Combined Practical	0	0	4	4	30	70	100
Total				20	0	4	24	180	420	600

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Scheme for
Post Graduate Diploma in Computer Application (Semester II)

Semester II

Sr.No	Course Type	Course Code	Course Name	L	T	P	Credits	Max Marks		Total Marks
								I	E	
1	MAJOR	DCA201	Database Management System	4	0	0	4	30	70	100
2	MAJOR	DCA202	Data Communication and Networking	4	0	0	4	30	70	100
3	MAJOR	DCA203	Operating System	4	0	0	4	30	70	100
4	MAJOR	DCA204	PHP	4	0	0	4	30	70	100
5	MAJOR	DCA205	Combined Practical	0	0	4	4	30	70	100
6	MINOR	DCA206	Project	0	0	4	4	30	70	100
Total				16	0	8	24	180	420	600

Objectives, Course-level Learning Outcomes, Contents, and Suggested Readings

Semester I

Paper Code:DCA101
Paper Name: Fundamentals of Computer Science
(See Scheme of Examination)

Course Objectives:

CO1. To understand the characteristics of computers
CO2. To know about the generations of computers
CO3. To have knowledge about computer languages
CO4. To understand the basics of an operating system
CO5. To be acquaint with word processor, spreadsheet, and presentation
CO6. To understand and apply the concept of algorithms and algorithm analysis
CO7. To know about some unsolved problems of computer science

Learning Outcomes:

After completion of this course, the student will be able to-
LO1. Understanding of the characteristics of computers
LO2. Know about the generations of computers
LO3. Having knowledge of computer languages
LO4. Understanding of the basics of operating system
LO5. Acquaintance with word processor, spreadsheet, and presentation
LO6. Understanding and ability to design algorithms
LO7. Know about some unsolved problems of computer science

Unit I

Basics: Block Diagram, characteristics, generations of computers, classification of computers; Binary number system, Limitations of Computers, Primary and secondary memory, Input and output devices; Computer languages: Machine language, assembly language, higher-level language, 4GL. Introduction to Compiler, Interpreter, Assembler, System Softwares, Application Softwares.Operating System: Features of Windows, Linux, Macintosh, Android. Open-source software: concept and examples.

Unit II

Word Processing software: different formats for saving a word document, creating, editing documents and related operations, formatting features and related operations, spelling and grammar checker, headers and footers, creating and managing tables; printing, macros, mail merge, equation editor.

Unit III

Spreadsheet Software: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references.

Unit IV

Presentation Graphics Software: Templates, views, formatting slides, slides with graphs, animation, using special features, presenting slide shows.

Unit V

Computer Problem Solving: Algorithms, Efficiency, and analysis of algorithms Writing algorithms for simple problems like factorial computation, generation of the Fibonacci sequence, and checking for prime number; Examples of unsolved problems in Computer Science.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. P.K Sinha, Computer Fundamentals, BPB Publications.
2. Rajaraman, Fundamentals of Computers, Fourth Edition, Prentice-Hall India Pvt. Limited.

Suggested Readings

3. Peter Norton, Introduction to Computers, 4th Edition, TMH Ltd, New Delhi.
4. R.G. Dromey, How to solve it by Computers, Pearson Publishers, New Delhi.

5. Dorothy House, Microsoft Word, Excel, and PowerPoint: Just for Beginners.

Paper Code: DCA102
Paper Name: Mathematics for Computer Science
(See Scheme of Examination)

Course Objectives:
CO1. To learn to evaluate mathematical arguments revolving around computation
CO2. To understand the basics of Combinations and Permutations
CO3. To acquire the ability to represent relations matrices and digraphs
CO4. To acquire and apply the knowledge on Graphs and Trees to real-world applications
CO5. To have the ability to Demonstrate the working of Grammars and Languages

Course Level Learning Outcomes:
After completion of this course, the student will be able to-
LO1. Comprehend and evaluate mathematical arguments revolving around computation.
LO2. Understand the basics of Combinations and Permutations.
LO3. Represent relations matrices and digraphs.
LO4. Apply the knowledge of Graphs and Trees to real-world applications.
LO5. Demonstrate the working of Grammar and Languages.

Course Description

Unit – I

Sets: different types of sets, set operations; Basic Counting Principles, Pigeonhole Principle, Binomial Coefficients, Binomial Theorem, Permutations, Combinations; Matrices: addition, multiplication; Vectors: position vector, addition, subtraction and products of vectors.

Unit - II

Mathematical Induction, **Logic**: Propositions and logical operations, Conditional statements, Tautologies and Contradictions, Logical Equivalence, quantifiers, Propositional logic and Predicate logic.

Unit III

Basic computability theory: Chomsky Hierarchy, the concept of models of computation, the concept of types of languages and grammars.

Unit - IV

Relations: Representation of Relations, Properties of relations, transitive closure; Ordered Sets: poset, Properties, Hasse Diagram, Extremal elements of posets.

Unit V

Functions: Types of Functions, Asymptotic notations; Coordinate Systems: representation of points, straight lines, standard equation of circles.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal
Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. K.H. Rosen, Discrete Mathematics and its applications, seventh edition
2. Kolman, Busby and Ross, Discrete Mathematical Structures, Sixth Edition, PHI.

Suggested Readings

3. Schaum's Outline Of Theory and Problems of DiscreteMathematics, Third Edition.
4. C L Liu, Elements of Discrete Mathematics, TMH,
5. John Vince, Foundation Mathematics for Computer Science: A Visual Approach, Springer
6. George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, Addison Wesley
7. J. Ullman and J. Hopcroft, Introduction to Automata Theory, Languages, and Computation, Pearson Education
8. Daniel I.A. Cohen, Introduction to Computer Theory, 2ed, Wiley.
9. Peter Linz, An Introduction to Formal Languages and Automata, Sixth edition.

Paper Code: DCA103
Paper Name: Internet Programming
(See Scheme of Examination)

Course Objectives -

CO1. To gain knowledge of how the client-server model of Internet programming works
CO2. To learn the design and development of interactive, client-side, executable web applications
CO3. To acquire the ability to demonstrate how Internet programming tasks are accomplished
CO3: To know how to build tools that assist in automating data transfer over the Internet.
CO4: To understand the advantages and disadvantages of the core Internet protocols

Course Level Learning Outcomes:

After completion of this course, the student will be able to -
LO1: Explain how the client-server model of Internet programming works
LO2: Design and develop interactive, client-side, executable web applications
LO3: Demonstrate how Internet programming tasks are accomplished
LO3: Build tools that assist in automating data transfer over the Internet
LO4: Compare the advantages and disadvantages of the core Internet protocols

Course Description

Unit I

Internet Basics: Evolution of the Internet, Basic internet terms and applications, ISP, Anatomy of an e-mail Message, basics of sending and receiving, E-mail Protocol, Mailing List- Subscribing & Unsubscribing, Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, HyperText Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating Website.

Unit - II

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, Use of Forms in Web Pages.

Unity III

CSS: Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id and classes, CSS properties: Background Properties, Box Model Properties, Margin, Padding, List Properties, Border Properties, Positioning Properties.

Unit - IV

Java Script: Introduction to Client-Side Scripting, Introduction to JavaScript, Comments, Variables in JS, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), JavaScript Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm),

Unit V

JS Events, Onload, Onunload, Onsubmit, OnFocus, Onchange Event, Onblur Event, Onmouseover, Onclick, Ondbclick Events, JS Arrays, Working with Arrays, JS Objects, Window object, Document object, JS Functions, getElementById, innerHTML property, inner Text property, form validation, email validation.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. Thomas A. Powell, HTML: The Complete Reference, Osborne/McGraw-Hill
2. Deitel, Deitel and Nieto, Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.

Suggested Readings

3. E Stephen Mack, Janan Platt, HTML 4.0, No Experience Required, 1998, BPB Publications.
4. Sybex, HTML Complete, BPB Publications.
5. V.K Jain, Internet and Web Page Designing, BPB Publications.
6. Ivan Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, java script, Perl CGI, BPB publications.

Paper Code: DCA104
Paper Name: Computer Organization
(See Scheme of Examination)

Course Objectives:

CO1: To understand the structure, function, and characteristics of computer systems.
CO2: To understand the design of the various functional units and components of computers.
CO3: To Identify the elements of modern instruction sets and their impact on processor design.
CO4: To acquire the ability to explain the function of each element of a memory hierarchy,
CO5: To identify and compare different methods for computer I/O

Course Level Learning Outcomes:

After completion of this course, the student will be able to-
LO1: Understand the structure, function, and characteristics of computer systems.
LO2: Understand the design of the various functional units and components of computers.
LO3: Identify the elements of modern instruction sets and their impact on processor design.
LO4: Explain the function of each element of a memory hierarchy,
LO5: Identify and compare different methods for computer I/O.

Unit I

Components of a Computer: Processor, Memory, Input-Output Unit, Difference between Organization and Architecture, Hardware-Software Interaction. **Number System:** Concept of Bit and Byte, types, and conversion.

Unit II

Complements: 1's complement, 2's complement. **Binary Arithmetic:** Addition, overflow, subtraction, multiplication (booth's algorithm), and division algorithm. **Logic gates:** Boolean Algebra, Map Simplification.

Unit III

Combinational circuits: Half Adder, Full Adder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop, Excitation Tables, State Diagram, State Table, Registers, Counters.

Unit IV

Input-Output Organization: Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Data Transfer, Priority Interrupt, Direct Memory Access, I/O Processor. **Memory Organization:** Types and capacity of Memory, Memory Hierarchy, Associative Memory, Buffer, Cache Memory, Virtual Memory.

Unit V

Intel 8085 Microprocessor: Introduction, ALU, Timing and Control Unit, Register Set, Data and Address Bus, Addressing modes, Complete Intel 8085 Instruction set, Instruction format, Opcode and Operand, Word Size, Instruction Cycle, Pin Configuration, Intel 8085 programs.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. M. Morris Mano, Computer System Architecture, Pearson, Prentice Hall.
2. J.P. Hayes, Computer Architecture & Organization, Tata McGraw Hill

Suggested Readings

3. Malvino Leach and Jerald A. Brown, Digital Computer Electronics, McGraw Hill.
4. Ramesh Gaonkar, Microprocessor Architecture, Programming, and Application With the 8085, PENRAM.
5. B.Ram, Fundamentals of Microprocessor and Microcomputers, Danpat Rai Publications.

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Paper Code: DCA105

Paper Name: C++ rogramming

(See Scheme of Examination)

Course Objectives:

CO1. To declare, initialize and process variables, constants, and arrays
CO2. To read and print values from the keyboard
CO3. To create statements for decisions and loops
CO4. To define functions and return values
CO5. To create classes, objects, and constructors
CO6. To understand and apply OO design concepts

Course Level Learning Outcomes:

After completion of this course, the student will be able to-
LO1. Declare, initialize and process variables, constants, and arrays
LO2. Read and print values from the keyboard
LO3. Create statements for decisions and loops
LO4. Define functions and return values.
LO5. Create classes, objects, and constructors.
LO6. Understand and apply OO design concepts.

Unit I

Object-Oriented System Object-Oriented Paradigm: need, characteristics, applications. Basics of C++, branching, looping, and jump statements.

Unit II

Functions: need, types, passing arguments by value and reference, recursive function, pointers, and functions. **Arrays**: need, types, array and function, array and pointers.

Unit III

Class: Basics, static data members, Inline Function, Constructors and Destructors: need, types, usage, **Inheritance** - need, usage, types, compile-time and run-time polymorphism, overloading and overriding, virtual function, friend function, abstract class.

Unit IV

Operator overloading: need, rules, through member function and through friend function. String handling, String class, Templates, Additional Features for C++ 11, C++14 and C++17

Unit V

Searching: Linear Search, Binary Search. **Sorting:** Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Shell Sort, Merge sort, Radix Sort, Counting Sort, Bucket Sort.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)

Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal
Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. E. Balagurusamy, Object-Oriented Programming With C++ , Tata Mcgraw Hill.
2. Herbert Schildt, C++ The Complete Reference, Tata Mcgraw Hill.

Suggested Readings

3. Schaum Series, Object Oriented Programming With C++, Tata Mcgraw Hill.
4. Paul J. Deitel and Harvey M. Deitel, C++11 for Programmers (Deitel Developer), Prentice Hall; 2nd edition.
5. Marc Gregoire, Nicholas A. Solter and Scott J.Kleper, Professional C++, Goodreads Publications.
6. Bjarne Stroustrup, A Tour of C++.
7. Bartłomiej Filipek, C++17 in Detail.

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Paper Code: DCA106

Paper Name: Practicals of C++ rogramming (See Scheme of Examination)

Course Objectives:

CO1. To declare, initialize and process variables, constants, and arrays
CO2. To read and print values from the keyboard
CO3. To create statements for decisions and loops
CO4. To define functions and return values
CO5. To create classes, objects, and constructors
CO6. To understand and apply OO design concepts

Course Level Learning Outcomes:

After completion of this course, the student will be able to-
LO1. Declare, initialize and process variables, constants, and arrays
LO2. Read and print values from the keyboard
LO3. Create statements for decisions and loops
LO4. Define functions and return values.
LO5. Create classes, objects, and constructors.
LO6. Understand and apply OO design concepts.

S. No.	Laboratory Exercises
1.	Write a Program to design a class having static member function named *showcount() which has the property of* displaying the number of objects created of the class.
2.	Write a Program using class to process Shopping List for a Departmental Store. The list include details such as the Code No and Price of each item and perform the operations like Adding, Deleting Items to the list and Printing the Total value of a Order.
3.	Write a Program which creates & uses *array of object of a class.(for eg.* implementing the list of Managers of a Company having details such as Name, Age, etc..).
4.	Write a Program to find Maximum out of Two Numbers using *friend function.* *Note: Here one number is a member of one class and the other number is member of some other class.*
5.	Write a Program to swap private data members of classes named as *class_1, class_2* using friend function.

6.	Write a Program to design a class complex to represent complex numbers. The complex class should use an external function (use it as a friend function) to add two complex numbers. The function should return an object of type complex representing the sum of two complex numbers.
7.	Write a Program using *copy constructor* to copy data of an object to another object.
8.	Write a Program to allocate memory dynamically for an object of a given class using class's constructor.
9.	Write a Program to design a class to represent a matrix. The class should have the functionality to insert and retrieve the elements of the matrix.
10.	Write a program to design a class representing complex numbers and having the functionality of performing addition & multiplication of two complex numbers using operator overloading.
11.	Write a Program to overload operators like *, <<, >> using friend function. The following overloaded operators should work for a class *vector*.
12.	Write a program for developing a matrix class which can handle integer matrices of different dimensions. Also overload the operator for addition, multiplication & comparison of matrices.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

8. E. Balagurusamy, Object-Oriented Programming With C++ , Tata Mcgraw Hill.
9. Herbert Schildt, C++ The Complete Reference, Tata Mcgraw Hill.

Suggested Readings

10. Schaum Series, Object Oriented Programming With C++, Tata Mcgraw Hill.
11. Paul J. Deitel and Harvey M. Deitel, C++11 for Programmers (Deitel Developer), Prentice Hall; 2nd edition.
12. Marc Gregoire, Nicholas A. Solter and Scott J.Kleper, Professional C++, Goodreads Publications.
13. Bjarne Stroustrup, A Tour of C++.
14. Bartłomiej Filipek, C++17 in Detail.

Semester II

Paper Code: DCA201
Paper Name: Database Management System
(See Scheme of Examination)

Course Objectives:

CO1: To understand the need for a DB approach and understand the components and roles of DBMS
CO2: To know how to write SQL queries for the given problem statement
CO3: To apply DB system development life cycle to business problems
CO4. To develop ER diagram for representing the conceptual data model
CO5: To convert ER diagram into a set of relations representing the logical data model
CO6: To implement a collection of ties in the chosen DBMS product, such as ORACLE
CO7: To have a broad understanding of database concepts and database management system software
CO8: To have a high-level experience of major DBMS components and their function
CO9: To model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
CO10: To write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
CO11: To understand detailed architecture, define objects, load data, query data, and performance-tune SQL databases.
CO12: To be able to handle large volumes of structured, semi-structured, and unstructured data using database technologies.

Course Level Learning Outcomes:

After completion of this course, the student will be able to-

LO1: Appreciate the need for a DB approach and understand the components and roles of DBMS
LO2: Write SQL queries for the given problem statement
LO3: Apply DB system development life cycle to business problems
LO4. Develop ER diagram for representing the conceptual data model
LO5: Convert ER diagram into a set of relations representing the logical data model
LO6: Implement a collection of ties in the chosen DBMS product, such as ORACLE
LO7: Have a broad understanding of database concepts and database management system software
LO8: have a high-level experience of major DBMS components and their function
LO9: be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
LO10: be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
LO11: To understand detailed architecture, define objects, load data, query data, and performance tune SQL databases.
LO12: Able to handle large volumes of structured, semi-structured, and unstructured data using database technologies.

Unit I

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; **E-R Model**: Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Unit II

Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF, and BCNF. **Introduction to Relational model**, Constraints: Domain, Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; **Relational algebra**: select, project, union, intersection, minus, cross product, different types of join, division operations; aggregate functions and grouping**.**

Unit III

SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations, nested queries; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Cursors, Functions, Triggers.

Unit IV

Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, the concept of serializability, conflict-serializable schedules.

Unit V

Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; the concept of data warehousing.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks)..

Recommended Readings

1. Ramez A. Elmasri, Shamkant Navathe, Fundamentals of Database Systems, 5th Ed, Pearson Publications.
2. Korth, Silberschatz, Sudarshan, Database System Concepts, Mcgraw Hill.

Suggested Readings

3. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publication.
4. Ivan Bayross, SQL, PL/SQL Programming, BPB publications.
5. Ivan Bayross, Commercial Application Development Using Oracle Developer 2000, BPB publications.

Web Resources

1. http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx

Paper Code: DCA202
Paper Name: Data Communication and Networking
(See Scheme of Examination)

Course Objectives:

After completion of this course the student will be able to-

CO1. To gain the ability to create a new protocol and test its efficiency
CO2. To design a new network architecture using protocols and interfaces
CO3. To create a hybrid topology using the existing topologies, and check inefficiency
CO4. To apply different encoding and decoding mechanisms involved in various types of transmission media and measure the transmission impairments
CO5. To design a model internet with various categories of networks and test the transmission rate
CO6. To understand the basics of data communication, networking, the internet, and their importance
CO7. To analyze the services and features of various protocol layers in data networks
CO8. To differentiate wired and wireless computer networks
CO9. To analyze TCP/IP and their protocols
CO10. To recognize the different internet devices and their functions
CO11. To identify the primary security threats of a network

Course Level Learning Outcomes:

After completion of this course the student will be able to-

LO1. Create a new protocol and test its efficiency.
LO2. Design a new network architecture using protocols and interfaces.
LO3. Create a hybrid topology using the existing topologies, and check inefficiency.
LO4. Apply different encoding and decoding mechanisms involved in various types of transmission media and measure the transmission impairments.
LO5. Design a model internet with various categories of networks and test the transmission rate.
LO6. Understand the basics of data communication, networking, the internet, and their importance.
LO7. Analyze the services and features of various protocol layers in data networks.
LO8. Differentiate wired and wireless computer networks.
LO9. Analyze TCP/IP and their protocols.
LO10. Recognize the different internet devices and their functions.
LO11. Identify the primary security threats of a network.

Unit - I

Data Communication and Networking- Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack, Security.
Physical Layer- Introduction, Impairments, Performance, Digital Transmission, modes.

Unit II

Digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, Multiplexing, FDM, TDM, CDM, WDM. Switching techniques- Circuit Switching, Packet switching, Datagram, Virtual circuit, and Permanent Virtual Circuit, Connectionless and connection-oriented communication, Message switching,

Unit - III

Data Link Layer- Introduction, Error Detection, and Correction. Data Link Control- Line Discipline- Enq/Ack, Poll/Select, Flow Control- Stop And Wait, Sliding Window. Error Control- ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit IV

Network Layer- Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6.
Transport Layer- Introduction, Function, End to end communication, Transmission Control Protocol, User Datagram Protocol.
Application Layer- Introduction, Client-Server Model, Application Protocols, Network Services.

Unit - V

Cyber Security- definition, cybercrime and information security, cybercriminals, classification of cybercrime. Cyber offenses- categories of cybercrime.
Tools and methods used in cybercrime- phishing, types of phishing, types, and techniques of ID theft, password cracking, keyloggers and spyware, backdoors, steganography, DoS, SQL Injection.
Cybercrime on mobile and wireless devices- attacks on wireless networks, Authentication security service, attacks on mobile phones. Cyber Law, Digital Signatures, Anti-Cybercrime Strategies, Cyberterrorism, Indian ITA 2000.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. Nina Godbole & Sunit Belapur, Cyber Security.
2. Forozan, Data Communication and Networking, Tata McGraw Hill.

Suggested Readings

3. Dr. Madhulika Jain, Satish Jain, Data Communication And Computer Networks, BPB publications.
4. William Stallings, Data and Computer Communications, Pearson Education.
5. A. S. Tanenbaum, Computer Networks, Fourth Edition, Pearson Education.

Paper Code: DCA203

Paper Name: Operating System

(See Scheme of Examination)

Course Objectives:

CO1. To be able to design and understand the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory, and Paging systems.

CO2. To be able to evaluate, and compare OS components through instrumentation for performance analysis.

CO3. To analyze the various device and resource management techniques for time-sharing and distributed systems

CO4. To develop and analyze simple concurrent programs using transactional memory and message passing, and understand the trade-offs and implementation decisions

Course Level Learning Outcome:

After completion of this course, the student will be able to-

LO1. Allocate Main Memory based on various memory management techniques

LO2. Compare Memory allocation using Best fit, Worst fit, and first hold policies

LO3. Apply page replacement policies for dynamic memory management

LO4. Schedule CPU time using scheduling algorithm for processors

LO5. Compare various device scheduling algorithms. serve

Unit I

Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads, System calls; Process Scheduling: types of schedulers, context switch, CPU Scheduling, Preemptive Scheduling, Scheduling Criteria- CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time.

Unit II

Scheduling Algorithms- FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling.Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores, simple solution to Readers-Writers Problem.

Unit III

Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock. Memory Management: Physical and virtual address space, Paging, Overview of Segmentation; Virtual Memory Management: Concept, Page Replacement techniques- FIFO, LRU, Optimal.

Unit IV

Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure, Users and groups, file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc.; Installing packages.

Unit V

Shell scripts: writing and executing a shell script, shell variables, read and expr, decision making (if-else, case), for and while loops.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Recommended Readings

1. Abraham Silberschatz, Peter Baer Galvin, Operating System Principles, John Wiley And Sons Inc.
2. Milan Milen Kovic, Operating System Concepts And Design, Tata Mcgraw Hill.

Suggested Readings

3. Andrew S. Tanenbaum, Herbert Bos, Modern Operating System.
4. Mike McGrath, Linux in easy steps.
5. Sumitabha Das, Unix concepts and applications, TMH.

MK UNIVERSITY

Campus: Deesa -Highway, Opp. Hngu, Matarvadi Part, Gujrat-384265
Established by the Gujarat Govt. Recognized by UGC under Section 2(f) of UGC Act, 1956

Paper Code: DCA204

Paper Name: PHP

(See Scheme of Examination)

Course Objectives:

CO1. To introduce the importance of PHP in web page design.
CO2. To understand the features like functions, forms in PHP.
CO3. To understand Files, OOPs concepts , Cookies, Sessions and Data base
CO4. Explain the difference between a programming language and a scripting language
CO5. Create an error-free simple PHP program
CO6. Fundamental concepts of PHP scripting language
CO7. The basic structure of a web application
CO8. Basics of MySQL database
CO9. The relationship between the client-side and server-side scripts

Learning Outcome:

After completion of this course, the student will be able to-
LO1. Understand the basic structure of a web application
LO2. Understand the use of PHP with HTML
LO3. Develop and deploy enterprise web applications
LO4. Develop database connectivity using MySQL
LO5. Demonstrate how to debug PHP scripts
LO6. Creating functional websites and web apps in PHP

Unit – I

PHP: Installation of PHP. Building Blocks of PHP: Variables, data types, Operators & Expressions, Constants, Switching, Flow, Loops. Functions: Meaning, Calling, Defining a function. Return value from user defined function.

Unit - II

Arrays: Creating arrays, Array related functions. Working with String, Date & Time: Formatting String with PHP, Using Date and time Functions with PHP. Working with file and Directories.

Unit III

OOPs in PHP. Forms: Creating simple input Form. Accessing Form input with user defined arrays-GET/POST, HTML and PHP Code on a single page. Working with File Upload. Uploading & Downloading.

Unit IV

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session. Exception Handling: Understanding Exception and error, Try, catch, throw

Unit - V

Connecting to the MYSQL: Selecting a database, Adding data to a table, Displaying returned data on Web pages, Inserting data, Deleting data, Entering and updating data, Executing multiple queries, executing stored procedures.

Instructions for Examination (Theory)

Maximum Marks: 100 (70 External + 30 Internal)
Duration: 3 Hrs
Minimum Passing Marks: 40%

Note: **Non-scientific calculators may be allowed in the end-semester examination**

External

Theory exams(70 Marks)

Internal

Internal exam shall comprise Sessional Theory Exam (20 marks), Seminar Presentation (5 marks) and Class Performance (5 marks).

Suggested Readings:

6. Teach Yourself PHP, MYSQL &Apache ByMeloni, Pearson Education.
7. Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl & PHP By James Lee, Pearson Education.
8. PHP: A Beginner's Guide ByVaswani, Vikram Tata Mc-Graw Hill.

Paper Code: DCA205
Paper Name: Practical of PHP
(See Scheme of Examination)

Course Objectives:

CO1. Identify and define the problem statement
CO2. Define and justify the scope of the proposed problem
CO3. Gather and analyze system requirements
CO4. Propose an optimized solution among the existing solutions
CO5. Practice software analysis and design techniques
CO6. Develop technical report writing and oral presentation skills
CO7. Develop a functional application based on the software design
CO8. Apply to code, debugging, and testing tools to enhance the quality of the software
CO9. Prepare the proper documentation of software projects following the standard guidelines
CO10. Become a master in specialized technology
CO11. Become updated with all the latest changes in the technological world.
CO12. Ability to communicate eficiently.
CO13. Ability to be a multi-skilled engineer with sound technical knowledge, management, leadership, and entrepreneurship skills.
CO14. Capability and enthusiasm for self-improvement through continuous professional development and life-long learning
CO15. Awareness of the social, cultural, global, and environmental responsibility of an engineer.

Course Level Learning Outcomes

After completing this course, students will be able to:
LO1. Identify and define the problem statement
LO2. Define and justify the scope of the proposed problem
LO3. Gather and analyze system requirements
LO4. Propose an optimized solution among the existing solutions
LO5. Practice software analysis and design techniques
LO6. Develop technical report writing and oral presentation skills
LO7. Develop a functional application based on the software design
LO8. Apply to code, debugging, and testing tools to enhance the quality of the software
LO9. Prepare the proper documentation of software projects following the standard guidelines
L10. Become a master in specialized technology
LO11. Become updated with all the latest changes in the technological world.
LO12. Ability to communicate efficiently.
LO13. Ability to be a multi-skilled engineer with sound technical knowledge, management, leadership, and entrepreneurship skills.
LO14. Capability and enthusiasm for self-improvement through continuous professional development and life-long learning
LO15. Awareness of the social, cultural, global, and environmental responsibility of an engineer.

Practical Training

Sr. No.	Title of the Practical
01	a. Install and configure PHP, web server, MYSQL b. Write a program to print "Welcome to PHP" c. Write a simple PHP program using expressions and operators.
02	Write a PHP program to demonstrate the use of Decision making control structures using- a. If statement b. If-else statement c. Switch statement
03	Write a PHP program to demonstrate the use of Looping structures using- a) While statement b) Do-while statement c) For statement d) Foreach statement
04	Write a PHP program for creating and manipulating- a) Indexed array b) Associative array c) Multidimensional array
05	A. Write a PHP program to- • Calculate length of string. • Count the number of words in string without using string functions. B. Write a simple PHP program to demonstrate use of various built-in string functions.
06	Write a simple PHP program to demonstrate use of simple function and parameterized function.
07	Write a simple PHP program to create PDF document buy using graphics concepts.
08	Write a PHP program to a) Inherit members of super class in subclass. b) Create constructor to initialize object of class by using object oriented concepts.
09	Write a simple PHP program on Introspection and Serialization.
10	Design a web page using following form controls: a. Text box, b. Radio button, c. Check box, d. Buttons
11	Design a web page using following form controls: a. List box, b. Combo box, c.Hidden field box
12	Develop web page with data validation.
	Write simple PHP program to -

13	a. Set cookies and read it. b. Demonstrate session management
14	Write a PHP program for sending and receiving plain text message (e-mail).
15	Develop a simple application to - a) Enter data into database b) Retrieve and present data from database
16	Develop a simple application to Update, Delete table data from database.

Paper Code: DCA206
Paper Name: Project
(See Scheme of Examination)

Course Objectives:

CO1. Identify and define the problem statement
CO2. Define and justify the scope of the proposed problem
CO3. Gather and analyze system requirements
CO4. Propose an optimized solution among the existing solutions
CO5. Practice software analysis and design techniques
CO6. Develop technical report writing and oral presentation skills
CO7. Develop a functional application based on the software design
CO8. Apply to code, debugging, and testing tools to enhance the quality of the software
CO9. Prepare the proper documentation of software projects following the standard guidelines
CO10. Become a master in specialized technology
CO11. Become updated with all the latest changes in the technological world.
CO12. Ability to communicate eficiently.
CO13. Ability to be a multi-skilled engineer with sound technical knowledge, management, leadership, and entrepreneurship skills.
CO14. Capability and enthusiasm for self-improvement through continuous professional development and life-long learning
CO15. Awareness of the social, cultural, global, and environmental responsibility of an engineer.

Course Level Learning Outcomes

After completing this course, students will be able to:
LO1. Identify and define the problem statement
LO2. Define and justify the scope of the proposed problem
LO3. Gather and analyze system requirements
LO4. Propose an optimized solution among the existing solutions
LO5. Practice software analysis and design techniques
LO6. Develop technical report writing and oral presentation skills
LO7. Develop a functional application based on the software design
LO8. Apply to code, debugging, and testing tools to enhance the quality of the software
LO9. Prepare the proper documentation of software projects following the standard guidelines
L10. Become a master in specialized technology
LO11. Become updated with all the latest changes in the technological world.
LO12. Ability to communicate efficiently.
LO13. Ability to be a multi-skilled engineer with sound technical knowledge, management, leadership, and entrepreneurship skills.
LO14. Capability and enthusiasm for self-improvement through continuous professional development and life-long learning
LO15. Awareness of the social, cultural, global, and environmental responsibility of an engineer.

Practical Training and Project Work:

1. Project Work may be done individually or in groups in case of bigger projects. However, if the project is done in groups, each student must be given responsibility for a distinct module and care should be taken to monitor the individual student.
2. Project Work can be carried out in the college or outside with prior permission of the college.
3. The Student must submit a synopsis of the project report to the college for approval. The Project Guide can accept the project or suggest modification for resubmission. Only on acceptance of the draft project report, the student should make the final copies.

Submission Copy:

The Student should submit a spiral-bound copy of the project report.

Format of the Project:

1. **Paper:**
   The Report shall be typed on White Paper of A4 size.
2. **Final Submission:**
   The Report to be submitted must be original.
3. **Typing:**
   Font:- Times New Roman
   Heading:- 16 pt., Bold
   Subheading:- 14 pt, Bold
   Content:- 12 pt.
   Line Spacing:- 1.5 lines.
   Typing Side :-One Side
   Font Color:- Black.
4. **Margins:**
   The typing must be done in the following margin:
   Left : 0.75”
   Right: 0.75”
   Top: 1”
   Bottom: 1”
   Left Gutter: 0.5”
5. **Binding:**
   The report shall be Spiral Bound.
6. **Title Cover:**
   The Title cover should contain the following details:
   Top: Project Title in block capitals of 16pt.
   Centre: Name of project developer’s and Guide name.
   Bottom: Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.
7. **Blank sheets:**
   At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.
8. **Content:**
   - **I).** Acknowledgment
   - **II).** Institute/College/Organization certificate where the project is being developed.
   - **III).** Table of contents
   - **IV).** A brief overview of the project
   - **V).** Profiles of problems assigned
   - **VI).** Study of Existing System

VII). System Requirement

VIII). Project plan

- Team Structure
- Development Schedule
- Programming language and Development Tools

IX). Requirement Specification

X). Design

- Detailed DFD and Structure Diagram
- Data structure, Database and File Specification

XI). Project Legacy

- Current Status of project
- Remaining Areas of concern
- Technical and Managerial Lessons Learnt
- Future Recommendations

- Nomenclature and Abbreviations.
- Bibliography
- Source Code