

GURU KASHI UNIVERSITY



Diploma in Computer Applications

Session 2026-2027
Faculty of Computing

Semester-I									
Course Code	Course Title	Type of Course							Total Marks
			L	T	P	Cr.	Int	Ext	
DCA101	Fundamentals of Computer	Core	4	0	0	4	30	70	100
DCA102	Operating Systems	Core	4	0	0	4	30	70	100
DCA108	Fundamentals of Web Technology	Core	4	0	0	4	30	70	100
DCA103	Effective Communication Skills	Compulsory Foundation	4	0	0	4	30	70	100
DCA109	Fundamentals of Web Technology Lab	Technical Skill	0	0	6	3	30	70	100
DCA106	Effective Communication Skills Lab	Technical Skill	0	0	4	2	30	70	100
DCA105	Office Automation Systems Lab	Compulsory Foundation	0	0	6	3	30	70	100
Total			16	0	16	24	210	490	700

Semester-II									
Course Code	Course Title	Type of Course							
			L	T	P	Cr.	INT	EXT	Total Marks
DCA202	Programming in C	Core	4	0	0	4	30	70	100
DCA203	Data Structures	Core	4	0	0	4	30	70	100
DCA207	Database Management Systems	Core	4	0	0	4	30	70	100
DCA211	Office Productivity and Documentation Training	Technical Skill	0	0	18	9	30	70	100
DCA210	Digital Electronics	VAC	2	0	0	2	30	70	100
Total			14	0	18	23	150	350	500
Grand Total			30	0	34	47	360	840	1200

SEMESTER-I

Course Title: Fundamentals of Computer	L	T	P	Cr.
Course Code: DCA101	4	0	0	4

Total Hours: 60

Course Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Describe basic computer structure, number systems, and binary arithmetic.
- CO2. Identify computer codes and input/output devices.
- CO3. Explain memory types, storage devices, and programming languages.
- CO4. Discuss software types, Internet basics, and virus protection.

Course Content**UNIT I****15 hours**

COMPUTER FUNDAMENTALS: Block diagram of a computer, characteristics of computers and generations of computers.

NUMBER SYSTEM: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, representation of characters, integers and fractions.

BINARY ARITHMETIC: Addition, subtraction and multiplication.

UNIT II**15 hours**

COMPUTER CODES: weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode. Input Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices – OMR, OBR, OCR

OUTPUT DEVICES: Monitors, Printer and its Types.

UNIT – III**15 hours**

MEMORIES: Units of Memory, Main Memories - RAM, ROM and Secondary Storage Devices - Hard Disk, Compact Disk, DVD.

COMPUTER LANGUAGES: Machine language, assembly language, higher level language, 4GL.

UNIT – IV**15 hours**

Introduction to Compiler, Interpreter and Assembler.

COMPUTER SOFTWARE: Need, Types – System software,

Application software Internet: Basic Internet terms: Web Page, Website, Home page, Browser, URL, Hypertext, Web Server, APPLICATIONS: WWW, e-mail, Instant Messaging, Videoconferencing. Computer Virus, Types of Viruses Virus detection and prevention.

Suggested Readings

1. P.K. Sinha and P. Sinha (2002), *Foundations of Computing*, First Edition, BPB.
2. D. H. Sanders (1988), *Computers Today*, Fourth Edition, McGraw Hill.
3. V. Rajaraman (1996), *Fundamentals of Computers*, Second Edition, Prentice Hall of India, New Delhi.
4. Satish Jain (1999), *Information Technology*, Paperback Edition, BPB.

Course Title: Operating Systems	L	T	P	Cr.
Course Code: DCA102	4	0	0	4

Total Hours: 60

Course Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Define operating system concepts, functions, and types.
- CO2. Explain process management, scheduling, and deadlock handling.
- CO3. Describe memory management techniques and virtual memory.
- CO4. Discuss secondary storage structure, disk scheduling, and management

Course Content

UNIT-I 15 hours

INTRODUCTION: Operating system Meaning, Supervisor & User mode, Operating system operations & Functions, Types of OS.

UNIT-II 15 hours

PROCESS MANAGEMENT: Process Concept, PCB, Process Scheduling, Cooperating Processes, Overview of Inter Process Communication, Context Switching, scheduling criteria, TYPE OF SCHEDULING: Long term, Short term & Medium term scheduling, scheduling algorithms, Deadlock concept & handling.

UNIT-III 15 hours

MEMORY MANAGEMENT: Logical & Physical Address space, Swapping, Contiguous memory allocation, paging, segmentation, Virtual memory, demand paging, Overview of Page replacement, Thrashing.

UNIT-IV 15 hours

SECONDARY STORAGE STRUCTURE: disk structure, Disk Scheduling, disk management, swap space management.

Suggested Readings

1. Tanenbaum, A. (2009). *Modern operating systems*. Pearson Education, Inc.,.
2. Coffman, E. G., & Denning, P. J. (1973). *Operating systems theory* (Vol. 973). Englewood Cliffs, NJ: prentice-Hall.
3. Madnick, S. E., & Donovan, J. J. (1974). *Operating systems* (Vol. 197, No. 4). New York: McGraw-Hill.
4. Deitel, H. M. (1990). *An introduction to operating systems*. Addison- Wesley Longman Publishing Co., Inc.

Course Title: Fundamentals of Web	L	T	P	Cr.
Course Code: DCA108	4	0	0	4

Total Hours: 60

Course Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Explain the basics of the Internet, browsers, and common HTML tags.
- CO2. Develop structured web pages using HTML and XHTML elements.
- CO3. Apply cascading style sheets for styling and layout of web pages.
- CO4. Use JavaScript and DOM to add interactivity and content to web pages.

Course Content

UNIT I

15 hours

Basics of Internet and Web The basics of Internet, World Wide Web, Web page, web browsers, URL, MIME, HTTP, Web Programmers Toolbox

HTML COMMON TAGS: List, Tables, images, forms, frames, basics of CSS and types of CSS.

UNIT II

15 hours

INTRODUCTION TO HTML TO XHTML: origin and evaluation of html, basics syntax, Standard Html document structure and basics Syntax, Basics of text documents, images hypertext, lists, tables, frames, forms, Multimedia in HTML.

UNIT - III

15 hours

CASCADING STYLE SHEET: Introduction and levels of cascading Style Sheet Style Specification Formats, Styles Classes, properties and properties value, color, and<div> tags.

UNIT - IV

15 hours

INTRODUCTION TO JAVA SCRIPT: Basic of Java Script and Document Object Model, Element Access in Java Script, event and event handling, Dom event and element Positioning, Moving Element and Element Positioning, Changing Color and Font. Dragging and Dropping Elements

Suggested Readings

1. P.K. Sinha and P. Sinha (2002), *Foundations of Computing*, First Edition, BPB.

2. D. H. Sanders (1988), *Computers Today*, Fourth Edition, McGraw Hill.
3. V. Rajaraman (1996), *Fundamentals of Computers*, Second Edition, Prentice Hall of India, New Delhi.
4. Satish Jain (1999), *Information Technology*, Paperback Edition, BPB.

Web Sources:

1. <https://www.geeksforgeeks.org/web-technology/>
2. <https://genuinenotes.com/wp-content/uploads/2020/02/Web-Technology-Notes-all.pdf>
3. https://www.rgm cet.edu.in/assets/img/departments/CSE/materials/R_15/3-2/Web%20Technologies.pdf
4. [https://studyglance.in/lecturenotes/display.php?tno=8&subject=Web%20Technologies&title=Web%20Technologies%20\(UNIT-2%20\)%20Lecture%20Notes](https://studyglance.in/lecturenotes/display.php?tno=8&subject=Web%20Technologies&title=Web%20Technologies%20(UNIT-2%20)%20Lecture%20Notes)

Course Title: Effective Communication	L	T	P	Cr.
Course Code: DCA103	4	0	0	4

Total Hours:60

Course Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Use correct English grammar and read with understanding.
- CO2. Communicate effectively in business settings.
- CO3. Apply nonverbal and presentation skills.
- CO4. Improve reading and writing for jobs and formal tasks.

Course Content

UNIT I

15 hours

ENGLISH LANGUAGE: Sentence, Parts of speech, Tenses, Active passive voice, Direct/Indirect speech, Creative writing & vocabulary, Comprehension passage, Reading of Biographies of at least 10 IT business personalities.

UNIT – II

15 hours

BUSINESS COMMUNICATION: Types, Medias, Objectives, Modals, Process, Importance Understanding Barriers to communication & ways to handle and improve barriers.

LISTENING SKILLS: Its importance as individual and as a leader or as a worker, Types of listening and Traits of a good listener, Note taking, barriers to listening & remedies to improve listening barriers

UNIT – III

15 hours

NONVERBAL COMMUNICATION- understanding what is called nonverbal communication, its importance as an individual, as a student, as a worker and as a leader, its types.

PRESENTATION SKILLS-Its Purpose in business world, how to find material for presentation, how to sequence the speech with proper introduction and conclusion, how to Prepare PPT & Complete set of required body language while delivering presentation.

UNIT IV

15 hours

READING SKILLS- to enhance independent reading, Comprehension Passages, News / Magazine articles on stereotype topics, Poems – Abu Ben Adhem, The Tiger

WRITING SKILLS- Importance of reading and writing, improving writing skills through Basic cohesive paragraph writing, Resume writing, Job application writing/acceptance letter

Suggested Readings

1. Kumar, S., &Lata, P. (2011). Communication skills. Oxford University Press.
2. Training, M. T. D. (2012). Effective communication skills. Bookboon.
3. Hargie, O. (Ed.). (1986). The handbook of communication skills (p. 37). London: Croom Helm.

Course Title: Fundamentals of Web Technology Lab	L	T	P	Cr.
Course Code: DCA109	0	0	6	3

Total Hours: 90

Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Design basic HTML web pages with color, images, and headings.
- CO2. Create lists, tables, and nested lists using HTML tags.
- CO3. Develop web pages with frames, links, and style sheets.
- CO4. Build simple forms for user input and data collection.

List of Experiments

1. Design the page with an attractive background color, text color and background image.
2. Design the page with an attractive color combination, with suitable headings and horizontal rules.
3. Write an HTML document with an example of Ordered List and Unordered List.
4. Write an HTML document with an example of Table format to print your Bio-Data.
5. Write an HTML document with an example of Table format to print your Telephone Bill.
6. Develop a complete web page using Frames and Frameset.
7. Write an HTML code for designing the subscription form of mail account in the e-mail website with appropriate fields.
8. Write an example of a Style Sheet.
9. Design a webpage with colors in bgcolor, text and link, try out different sizes.
10. Design a single page web site for a university containing a description of the courses offered, it should also contain some general information about the university such as its history.
11. Write a HTML code for specifying the heading BS or cities in the HTML document.
12. Write a HTML Code for Nested list.
13. Write HTML code to develop a web page having background in blue and title "Welcome to my home page" in red other color.
14. Create an HTML document giving details of your name, age, telephone no, address and enrolment no, aligned in proper order.
15. Design a web page that provides links to five different web pages or to entirely different websites.

Course Title: Effective Communication Skills Lab	L	T	P	Cr.
Course Code: DCA106	0	0	4	2

Total Hours: 60

Learning Outcomes: After the completion of the course the learner will be able to

CO1. Apply effective listening skills in academic and technical contexts.

CO2. Communicate confidently through speaking and role play.

CO3. Read and interpret various texts, identifying key vocabulary.

CO4. Write clear, error-free content in different formats.

Course Content

UNIT I

15 hours

Listening Practices: Listen and takes notes of Lecture, Listen and Write appropriate word, Talks on Engineering and Technology, Developing effective listening skills, barriers to effective listening

UNIT II

15 hours

Speaking: Self-Introduction, Role play of Celebrities, Sharing memorable incidents

Reading: Reading Online Blogs, Reading Advertisement in Online, Newspaper archives reading

UNIT III

15 hours

Writing Process Description, narrating experiences, Creating Email blogs, Review Writing – Books, Movies, and Journals

Summarized Activities:

Reading – cloze exercises, identifying redundant words, Jargon words, foreign words, Technical terms

UNIT IV

15 hours

Writing – Error free sentences, Sequential paragraphs, Essay writing on various levels – basic, middle, and advanced

Speaking – Face to face conversation on specific topics, interviewing celebrities, getting acquainted with new people, sharing information with persons from abroad.

Course Title: Office Automation System Lab	L	T	P	Cr.
Course Code: DCA105	0	0	6	3

Total Hours: 90

Learning Outcomes: After the completion of the course the learner will be able to

- CO1. Create and edit documents in MS Word.
- CO2. Design presentations in MS PowerPoint.
- CO3. Use data tools and functions in MS Excel.
- CO4. Apply mail merge, macros, and links in MS Office.

List of Experiments

1. Study the MS Office environment and perform basic operations such as creating, opening, saving, editing, and closing documents.
2. Create and format a professional document using fonts, paragraphs, margins, page layout, bullets, numbering, and styles in MS Word.
3. Insert tables, pictures, shapes, SmartArt, WordArt, headers, footers, page numbers, and watermarks in an MS Word document
4. Create a professional PowerPoint presentation using themes, templates, Slide Master, and slide layouts.
5. Insert tables, charts, SmartArt, images, audio, video, hyperlinks, transitions, and animation effects in a PowerPoint presentation.
6. Design an interactive PowerPoint presentation with action buttons, custom slide shows, and presenter view.
7. Create and format worksheets in MS Excel using cell formatting, formulas, and basic functions.
8. Perform data management in MS Excel using sorting, filtering, conditional formatting, and data validation.
9. Create charts, PivotTables, and Pivot Charts for data visualization and analysis in MS Excel.
10. Import and export data between MS Word, MS Excel, and MS PowerPoint; generate reports using charts and tables.

Semester-II

Course Title: Programming in C	L	T	P	Cr.
Course Code: DCA202	4	0	0	4

Total Hours: 60

Learning Outcomes: On the completion of the course the students will be able to

- CO1. Develop confidence for self-education and ability for life-long learning needed for Computer language.
- CO2. Handle possible errors during program execution.
- CO3. Build logic used in Programming.
- CO4. Design and develop Computer programs, analyses, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.

Course Content**UNIT I****15 hours**

INTRODUCTION: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program, Programming rules, Execution BASIC STRUCTURE OF C PROGRAM: Character set, Identifiers and keywords, constants, variable, Data types, input and output, type conversion, Operators and expressions: Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators, type conversion. Library functions.

UNIT II**15 hours**

INPUT/ OUTPUT IN C: Formatting input; output functions. Decision making statements – if, else if
CONTROL STATEMENTS: branching, looping using for, While and Do-While statements, nested control structures, switch, break and continue statements.

UNIT III**15 hours**

ARRAYS: Definition, declaration, assignment, one dimensional and two dimensional arrays.
STRINGS: input/output of strings, string handling functions, table of strings. Pointers: pointer data type, pointer declaration, initialization, accessing values using pointers.
FUNCTIONS: prototype, definition and call, formal and actual arguments, methods of parameter passing to functions, recursion versus iteration.

UNIT IV**15 hours**

STRUCTURES AND UNIONS: using structures and unions, comparison of structure with arrays and union.
FILES: opening and closing files, Basic I/O operation on files. Storage

Classes: automatic, external, static and register variables.

Suggested Readings

1. Balagurusamy, *Programming in C*, Tata McGraw Hill.
2. Kanetkar, Y. (2018). *Let us C*. BPB publications.
3. Hanly, J. R., & Koffman, E. B. (2007), *Problem solving and program design in C*, Pearson Education India.

Course Title: Data Structures	L	T	P	Cr.
Course Code: DCA203	4	0	0	4

Total Hours: 60

Learning Outcomes: On the completion of the course the students will be able to

CO1. Explain types of data structures and analyze algorithm complexity.

CO2. Implement and operate on arrays, stacks, and queues.

CO3. Apply linked lists and trees for efficient data management.

CO4. Perform sorting, searching, and graph traversal algorithms.

Course Content

UNIT I

15 hours

INTRODUCTION: definition, various types of data structures, data structure operations, algorithms complexity and Time Space Trade-off.

ARRAYS AND RECORDS: Linear arrays, Representation of linear arrays in memory, Operations on Array, Multidimensional arrays and its implementation, Pointers, pointer arrays, Records.

UNIT II

15 hours

STACKS: Stacks, array representation of stacks, operation on stacks, Polish Notation, Notation conversion, evaluation of postfix expression, Applications of Stack.

QUEUES: Queues, implementation, operations on queue, Dequeues, Priority queues.

UNIT III

15 hours

LINKED LISTS: Linked lists, Representation in memory, traversing link lists, operations on link list, overflow and underflow, Memory allocation, Header link list, two way lists.

TREES: Basic terminology, Binary trees and its representation, Complete binary tree, Extended binary tree, linked representation of binary tree, traversing binary tree, searching binary tree, Binary search trees.

UNIT IV

15 hours

SORTING AND SEARCHING: Definitions, bubble sort, insertion sort, selection sort, quick sort, merge sort, radix sort, heap sort, Quick Sort, Linear Search, Binary Search.

GRAPHS: representation of graph, types of Graph, adjacency matrices, path matrix, Graph traversal: Breadth first search. Depth first search, shortest path problem: Warshall's algorithm, Dijkstra algorithm.

Suggested Readings

1. Hubbard, J. R. (2007), *[Introduction to] Schaum's Outline of Data Structures with Java*, McGraw-Hill.
2. Horowitz, E., & Sahni, S. (1976), *Fundamentals of data structures* (Vol. 1982), Potomac, MD: Computer science press.
3. Wirth, N. (1985), *Algorithms & data structures*, Prentice-Hall, Inc..
4. Tarjan, R. E. (1983), *Data structures and network algorithms*, Society for industrial and Applied Mathematics.

Course Title: Database Management System	L	T	P	Cr.
Course Code: DCA207	4	1	0	5

Total Hours: 75

Learning Outcomes: On the completion of the course the students will be able to

- CO1. Describe database concepts, architecture, and data models.
- CO2. Design ER/EER diagrams and apply relational model concepts.
- CO3. Develop SQL queries for data definition and manipulation.
- CO4. Apply normalization, transactions, and indexing techniques in database design.

Course Content

UNIT I 15 hours

INTRODUCTION TO DATABASES: Characteristics of database approach, data models, database system architecture, data independence and data abstraction.

UNIT II 20 hours

DATA MODELING: Entity relationship (ER) modeling: Entity types, relationships, constraints, ER diagrams, EER model.
RELATION DATA MODEL: Relational model concepts, relational constraints, relational algebra.

UNIT III 20 hours

SQL QUERIES: SQL data definition, data types, specifying constraints, Queries for retrieval, insertion, deletion, updation, introduction to views

UNIT IV 20 hours

DATABASE DESIGN: Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

TRANSACTION AND DATA STORAGE: Introduction to transaction processing: ACID properties, concurrency control; Introduction to indexing structures for files.

Suggested Readings

- Ramakrishnan, R., Gehrke, J., & Gehrke, J. (2003). *Database management systems (Vol. 3)*. New York: McGraw-Hill.
- Korth F. Henry. *Database System Concepts*, McGraw Hill.
- Lu, G. (1999). *Multimedia database management systems*.

Boston: Artech House.

- *Date, C. J. (1975). An introduction to database systems. Pearson Education India.*

Web Sources

1. <https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/><https://www.javatpoint.com/dbms-tutorial>
2. <https://www.techopedia.com/definition/24361/database-management-systems-dbms>

Course Title: Digital Electronics	L	T	P	Cr.
Course Code: DCA210	2	0	0	2

Total Hours: 30

Learning Outcomes: On the completion of the course the students will be able to

- CO1. Explain analog and digital systems and use basic logic gates.
- CO2. Design combinational logic circuits using SOP, POS, K-Map, multiplexers, and demultiplexers.
- CO3. Describe and implement basic flip-flops and latches.
- CO4. Explain and apply analog-to-digital conversion techniques.

Course Content

UNIT I 10 hours

FUNDAMENTAL CONCEPTS: Introduction to Analog and Digital Systems, Digital Signals, Basic Digital Circuits: AND, OR, NOT, NAND, NOR, XOR and XNOR gates.

UNIT II 10 hours

COMBINATIONAL LOGIC DESIGN: SOP and POS Representation of Logic functions, K-Map Representation Multiplexers: 4X1, 8X1 and 16X1. DE- MULTIPLEXERS: 1 to 4, 1 to 8 and 1 to 16.

UNIT III 5 hours

FLIP-FLOPS: Introduction, Latch, Clocked S-R Flip Flop, Preset and Clear signals, D-Flip Flop, J-K Flip Flop

UNIT IV 5 hours

ANALOG TO DIGITAL CONVERTERS: Quantization and encoding, Parallel- comparator A/D converter, Counting A/D converter.

Transactional Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning.

Suggested Readings

- Jain, R. P. (2003). *Modern digital electronics*. Tata McGraw-Hill Education.
- Maini, A. K. (2007). *Digital electronics: principles, devices and applications*. John Wiley & Sons.

- *Pedroni, V. A. (2008). Digital electronics and design with VHDL. Morgan Kaufmann.*
- *Balch, M. (2003). Complete digital design: a comprehensive guide to digital electronics and computer system architecture. McGraw-Hill Education.*

Course Title: Office Productivity and Documentation Training	L	T	P	Cr.
Course Code: DCA2011	0	0	18	9

Learning Outcomes: On the completion of the course the students will be able to

CO1.Create, edit, format, and manage professional documents using Microsoft Word with appropriate formatting, styles, tables, images, and templates.

CO2.Develop and deliver effective presentations using Microsoft PowerPoint by incorporating themes, Slide Master, multimedia, charts, animations, and transitions.

CO3.Perform data organization, analysis, and reporting using Microsoft Excel through formulas, functions, charts, sorting, filtering, and What-If Analysis tools.

CO4.Apply office automation features such as Mail Merge, document protection, macros, and collaboration tools to improve productivity and streamline routine office tasks.

CO5.Integrate data and content across Microsoft Office applications to prepare professional reports, presentations, and business documents while following standard documentation practices.

Course Content

Develop a mini project demonstrating the integrated use of Microsoft Office.