KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH UNIVERSITY

Department of Computer Science

Syllabus for

Post Graduate Diploma in Computer Applications (PGDCA)

(Effective From June 2025)

duration.

CREDIT SYSTEM

One credit in theory course is equivalent to classroom teaching of 1 hour per week, Whereas one credit in practical requires 2 hours of performing practical per week.

ELIGIBILITY CRITERIA

1. A candidate who has passed graduation (viz. Bachelor of Commerce / Bachelor of Arts etc.) with minimum 40% marks.
2. A candidate who has passed an equivalent examination from any other university/examining body shall have to produce an Eligibility Certificate from K S K V Kachchh University, Bhuj (which can be obtained from the University Office) along with the application for admission in the first semester.

DOCUMENTS REQUIRED

Original as well as self-attested copies of

1. S.S.0 (10th) mark sheet, Passing and Trial Certificate.
2. H.S.C. (10+2) or Equivalent Mark sheet.
3. Graduation mark sheets.
4. Degree Certificate of qualifying degree.
5. Transfer / Leaving Certificate.
6. SC/ST/SEBC caste certificate wherever applicable.
7. Non-Creamy Layer Certificate in case of SEBC
8. Relevant reservation documents as notified by the government.

ADMISSION PROCEDURE

- Counselling will be given to the candidates on the day of admission before actual admission takes place in each college.

CRITERIA FOR EVALUATION

- Continuous and Comprehensive Evaluation (CCE) will be conducted by respective departments; CCE will have 30% weightage. A student shall have to score minimum 40% marks in internal evaluation to pass.
- End semester examination will have 70% weightage. A student shall have to score minimum 40% marks in internal evaluation to pass.
- CCE Marking Scheme for theory courses other than foundation:

For each paper, 30 % of CCE may be further distributed as under:

a)	Seminar/Assignment/Project/Presentation:	10 Marks
b)	Internal Test:	15 Mark
c)	Attendance	05 Marks

Internal Test comprises 30 Marks and 1.5 hours duration.

Krantiguru Shyamji Krishna Verma Kachchh University

Post Graduate Diploma in Computer Applications (PGDCA)

Semester I

Course Code	Name of Course	T / P	Credit	Exam Duration in Hours	Component of Marks		
					Internal	External	Total
CCCS-101	Introduction to computer science and programming	Theory	4	3	30	70	100
CCCS-102	Web development and programming	Theory	4	3	30	70	100
CCCS-103	Practical Based on CCCS-101 and CECS-101 OR CECS-102	Practical	4	3	30	70	100
CCCS-104	Practical Based on CCCS-102 and CECS-103 OR CECS-104	Practical	4	3	30	70	100
CECS-101	Fundamentals of IT	Theory	4	3	30	70	100
CECS-102	System Analysis and Design	Theory	4	3	30	70	100
CECS-103	Office Automation	Theory	4	3	30	70	100
CECS-104	The Intelligent Edge: An IoT Exploration	Theory	4	3	30	70	100
			24		180	420	600

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CCCS101	TotalCredit:4
Title of Paper: Building Blocks of Programming with C	TotalMarks:70 Time: 3 Hrs

- **CO1:** Students will be able to design algorithms and draw flowcharts for basic computational problems, and understand the evolution and classification of computer programming languages.
- **CO2:** Students will demonstrate proficiency in writing simple C programs using correct syntax, variables, data types, operators, and input/output functions.
- **CO3:** Students will apply control structures such as conditional statements and loops to solve decision-making and iterative problems in C.
- **CO4:** Students will implement programs involving arrays, strings, and user-defined functions to modularize and optimize code.
- **CO5:** Students will understand and utilize user-defined data types (structures and unions) and pointers for efficient memory handling and advanced C programming techniques.

Unit	Description
I	**Concept of Algorithm, Flowchart and Languages** Computer Science Introduction. Concept of an algorithm and a flow chart, need and definition Symbols used to draw a flow chart. Algorithm and flow charts construction for the problems like odd-even number, prime number. Generations of computer languages. High-level and low-level languages. Translators Introduction to editors and details about one of the editors.
II	**Basics of Programming** Introduction to C Programming: Over View of C; History and Features of C; Structure of a C program tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables. Operators, I/O statements (Printf, Scanf), Assignment statements. Escape sequences. getchar-putchar, functions

III	**Control Structures** Decision making Statements - Simple if, if else, nested if else, else if ladder, Switch-case, goto, break & continue statements; Looping Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.
IV	**Strings, Array and User-Defined Functions** Arrays: Declaration, Initialization and Memory representation. String handling functions - strlen, strcmp, strcpy and strcat. User Defined Functions: Need for user defined functions; Format of C user defined functions; Components of user defined functions return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type
V	**User Define Data Types and Pointer** User defined data types: Structure and Union, difference between Structures and Unions. Pointers in C: Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers

Basic Text & Reference Books: -	
1	Balaguruswami: Programming in ANSI C., Tata McGraw Hill Publication.
2	Kernighan B., Ritchie D.: The C Programming Language, Prentice Hall.
3	Brian W. Kernighan and Dennis M. Ritchie, The C 'Programming Language, Prentice Hall of India

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CCCS102	Total Credit:4
Title of Paper: Web Development and Programming I	Total Marks:70 Time:3 Hrs

- **CO1:** Understand the fundamental concepts of how the internet and World Wide Web (WWW) work, including the roles of web browsers, URLs, domain names, and the difference between client-side and server-side operations.
- **CO2:** Develop structured and semantically meaningful webpages using HTML elements, tags, attributes, lists, links, images, tables, forms, and text formatting elements.
- **CO3:** Apply CSS for styling HTML content using various selectors, the box model, typography controls, and layout techniques through inline, internal, and external stylesheets.
- **CO4:** Design and implement responsive web layouts using Bootstrap, incorporating its grid system, forms, buttons, and icon integration for multi-device compatibility.
- **CO5:** Integrate HTML, CSS, and Bootstrap into real-world project structures, demonstrating file organization, responsive design, and best practices in modern web development.

Unit	Description
I	**Introduction to Web Development** How the internet works (brief overview), What is the World Wide Web (WWW), Websites and Webpages, URLs and Domain Names, Web Browsers and their role,Client-side vs. Server-side, Overview of HTML, CSS, and JavaScript,understanding file structure for web projects, what is HTML? Its history and versions (HTML5), Basic structure of an HTML document (<!DOCTYPE html>, <html>, <head>, <title>, <body>).
II	**HTML Fundamentals I** HTML elements and tags , Attributes and their usage ,Self-closing tags, Comments in HTML , HTML elements and tags , Attributes and their usage , Self-closing tags , Comments in HTML, Headings (<h1> to <h6>) , Paragraphs (<p>) , Line Breaks ( ), Horizontal Rules (<hr>), Text Formatting (<strong>, <em>, <b>,

	<i>, <mark>, <small>, <del>, <ins>, <sub>, <sup>) , Lists (Unordered lists (,) , Ordered lists (,), Definition lists (<dl>, <dt>, <dd>)) Links <a> (anchor tag) and its attributes (href, target, title)., Absolute and relative URLs , Linking to different sections within the same page.
III	**HTML Fundamentals II** Image embedding (<img> tag and src, alt attributes), Tables (<table>, <tr>, <th>, <td>), Table attributes (colspan, rowspan) , Forms (<form>),Form input elements (<input>, <textarea>, <select>, <button>),Input types (text, password, radio, checkbox, submit),Form attributes (action, method) , Semantic tags (<article>, <section>, <nav>, <aside>, <header>, <footer>, <main>) , Divs and spans. (<div>,<span>)
IV	**CSS Basics** What is CSS? , CSS syntax (selectors, properties, values) , Ways to include CSS (inline, internal, external) , CSS comments , Element selectors , ID selectors (#) , Class selectors (.) , Attribute selectors , Combinators (descendant, child, adjacent sibling, general sibling) , Understanding the CSS box model (content, padding, border, margin) , Font properties (font-family, font-size, font-weight, font-style) , Text properties (color, text-align, text-decoration, line-height)
V	**Responsive Web Design with Bootstrap** Introduction to Responsive Design, Mobile first design concepts, Common device dimensions, View-port tag, UsingCSS media queries, Menu conversion script, Basic Custom Layout, Introduction toBootstrap, Installation of Bootstrap, Grid System, Forms, Buttons, Icons Integration

Basic Text & Reference Books :-	
1.	Ivan Bayross, —Web Enabled Commercial Applications Development using HTML,DHTML, JavaScript, Perl CGI‖, BPB, 2004
2.	Xavier C: World Wide Web Design With HTML, Tata McGraw Hill Publication
3.	Bootstrap 4 Quick Start: A Beginner's Guide to Building Responsive Layouts with Bootstrap 4 Jacob Lett, 2018

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code : CCCS103	**TotalCredit:**4
Title of Paper: Practical Based on CCCS-101 and CECS- 101 OR CECS-102	**TotalMarks:**70 **Time:**3 Hrs.

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code:CCCS104	Total Credit:4
Title of Paper: Practical Based on CCCS-102 and CECS- 103 OR CECS-104	**Total Marks:**70 **Time:**3 Hrs.

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CECS101	TotalCredit:4 TotalMarks:70
Title of Paper: Fundamentals of Information Technology	Time:3 Hrs

- **CO1:** Students will demonstrate a foundational understanding of essential IT concepts, including computer hardware, software, data representation, and networking principles.
- **CO2:** Students will gain practical skills in using operating systems, with a focus on basic file operations, command-line functions in Linux, and file management.
- **CO3:** Students will develop the ability to utilize various software applications, likely including productivity tools, although the syllabus specifies "PC Software" which implies a focus on desktop applications.
- **CO4:** Students will acquire knowledge of the internet, web browsers, and search engines, enabling them to navigate the web, access information, and utilize online tools effectively.
- **CO5:** Students will be able to apply their knowledge to solve basic technical problems related to computer systems and software.

Unit	Description
I	What is Computer? Representation of data / information. What is Data Processing? Characteristics of a Computer System, Evolution of Computer, Generation of computers, Block Diagram of Digital Computer, Classification of Digital Computers Classification of Computers,Functional Components of a computer- Central Processing Unit, Memory-Primary Memory RAM, ROM, Types of ROM, Booting, Secondary Memory. Primary Memory VS. Secondary Memory.

II	Secondary Storages Devices: Floppy and Hard Disks, Optical Disks CD-ROM, DVD, Mass Storage Devices: USB thumb drive. Input and Output Devices- Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light Pen, Touch Screen, Monitors, Printers & types – Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers. Introduction of Computer Hardware and Software.
III	Bits, Nibbles, Bytes and Words, Data Representation, Coding system, Binary Arithmetic, Binary Addition, Binary Subtraction, Definition, Types of Number System (Decimal, Binary, Octal, Hexadecimal), Number Conversion: Decimal to Binary Conversion, Decimal to Octal Conversion, Decimal to Hexadecimal Conversion), Binary to Octal Conversion, Binary to Hexadecimal, Hexadecimal to Binary, Hexadecimal to Octal, octal to Binary, Octal to hexadecimal,
IV	What is Software? Need and Types of Software (System Software and Application Software). Basic file operating using windows (cut, copy, paste, rename). File compression and archiving (tar, rar, zip). Definition and characteristics of cloud computing. Service models: IaaS, PaaS, SaaS. Cloud deployment models: Public, Private, Hybrid. Benefits and challenges of cloud adoption. Examples: Google Drive, Dropbox, AWS, Microsoft Azure.
V	WWW, A brief Introduction to the Internet, Intranet, Extranet. LAN, WAN, MAN Internet services, Web browsers and their functions. Overview of common web browsers. Browser extensions and add-Ons. Bookmarks/favorites and history management. Tabs and windows management. Downloading and uploading files. Overview of web-based email. Cloud storage and online collaboration tools

Basic Text& ReferenceBooks:	
1.	TanenbaumA.S.:StructuredComputerOrganization, Prentice-HallofIndiaPvt.Ltd.
2.	RajaramanV.:ComputerFundamentals,Prentice-HallofIndia Pvt.Ltd.
3.	TaxaliR.K:PCSoftware forwindowsmadesimple,TataMcGraw-HillPublishingCo.Ltd.

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CECS102	Total Credit:4
Title of Paper: System analysis and design	Total Marks:70 Time: 3 Hrs

- **CO1**: Understand and explain the fundamental concepts of systems, SDLC models, and the role of a system analyst.
- **CO2**: Apply various techniques for requirements gathering, perform feasibility analysis, and prepare a Software Requirements Specification (SRS) document.
- **CO3**: Create system models using tools like DFD, ERD, and UML diagrams, and use CASE tools for automated modeling.
- **CO4**: Design efficient system components including interfaces, databases, and user controls with attention to security and usability.
- **CO5**: Demonstrate knowledge of implementation strategies, system maintenance, and emerging technologies like DevOps, low-code platforms, and AI in SAD.

Unit	Description
I	**Introduction to Systems and SDLC** Overview of Systems, Types of Systems, System Elements, Introduction to System Analysis and Designs: Waterfall, Spiral, Agile, Iterative, V-model, Role of System Analyst: Skills, Responsibilities. SDLC life cycle.
II	**Requirements Engineering and Feasibility Study** Requirements Gathering Techniques: Interviews, Questionnaires, Observation. Types of Requirements: Functional and Non-Functional. Feasibility Study: Technical, Economic, Legal, Operational, Schedule. Cost-Benefit Analysis. Documentation Standards (SRS).
III	**System Modeling and Tools** Modelling object classes, attributes & relationships. Automated tools - front end, back end, integrated tools. Data Flow Diagrams (DFDs): Levels, Symbols, Rules. Entity Relationship Diagrams (ERD). Use Case Diagrams and Scenarios (UML). Class and Activity Diagrams (Basic UML).

IV	**System Design** Objectives in system design. Components to be designed - output, files, database, input, controls, procedures, codes, program specifications. Logical and Physical Design. Input and Output Design. User Interface Design Principles. Data Dictionary and Data Storage Design. Security, Control, and Backup Strategies. **Case Study:** Design a mini-inventory or library management system
V	**Implementation, Maintenance, and Emerging Trends** Implementation Methods: Direct, Parallel, Pilot, Phased. System Testing: Unit, Integration, System, Acceptance. Maintenance: Corrective, Adaptive, Perfective. Change Management & Training. Introduction to DevOps, Low-Code/No-Code platforms, and AI in SAD. Ethics and Sustainability in System Development

	Basic Text & Reference Books: -
1.	System Analysis and Design by Elias M. Awad, Galgotia Publications.
2.	Modern Systems Analysis and Design by Jeffrey A. Hoffer, Joey George & Joseph S. Valacich, Pearson Education.
3.	Object-Oriented Systems Analysis and Design Using UML by Simon Bennett, Steve McRobb& Ray Farmer, McGraw Hill Education.

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CECS103	TotalCredit:4
Title of Paper: Office Automation	TotalMarks:70 Time:3 Hrs

- **CO1**: Understand the basic concepts and interface of office automation software and their applications in daily tasks.
- **CO2**: Develop proficiency in Microsoft Word for document creation, formatting, and collaboration.
- **CO3**: Create and manage spreadsheets in Microsoft Excel for data analysis using formulas, functions, and charts.
- **CO4**: Design professional presentations using Microsoft PowerPoint with animations and multimedia integration.
- **CO5**: Manage databases in Microsoft Access, including creating tables, forms, queries, and reports.

Unit	Description
I	**Introduction to Office Automation & Microsoft Word** Introduction to office automation and its significance. Introduction to word document. Working with Documents -Opening & Saving files, editing text documents, Formatting page & setting Margins, converting files to different formats, Importing & Exporting documents, sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents. Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets &Numbering. Setting Page style - Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer. Page Numbering, date & Time, Author. Tables-Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing - Inserting ClipArt, Pictures/Files etc., Tools– Word Completion, Spell Checks, Mail merge, Templates, Printing Documents

II	**BasicsofExcel** **Introduction to the Excel interface** Workbook, worksheet, rows, columns, cells, Ribbon, Quick Access Toolbar, Formula Bar, Navigation and basic shortcuts **Data entry and formatting** Entering text, numbers, dates, and times, Basic cell formatting (font, size, color, alignment), Number formatting (currency, percentage, decimal places), rebating and managing tables. **Basic formulas and functions:** Using simple arithmetic operators (+, -, *, /), Introduction to basic functions: SUM, AVERAGE, COUNT, MIN, MAX, Understanding cell references (relative, absolute, mixed).
III	**Intermediate Excel Skills** **Basic data manipulation:** Sorting and filtering data, Creating simple charts (column, bar, pie), Printing and page setup. **Excel file management:** Saving, opening and closing excel files, understanding different excel file types (.xlsx, .xls, .csv) **Advanced functions:** Logical functions: IF, AND, OR, NOT.Lookup functions: VLOOKUP, HLOOKUP, INDEX, MATCH.Text functions: LEFT, RIGHT, MID, CONCATENATE, TRIM.Date and Time functions: DATE, TODAY, NOW, DAY, MONTH, YEAR. **Data validation and data cleaning:** Creating data validation rules. Removing duplicates and handling errors, Text to columns, Flash fill.
IV	**Conditional formatting:** Using conditional formatting rules to highlight data. Creating custom conditional formatting rules. Using data bars, color scales, and icon sets. **PivotTables and Pivot Charts:** Creating and customizing PivotTables.Summarizing and analyzing data with PivotTables.Creating Pivot Charts to visualize PivotTable data. **Advanced functions and formulas:** SUMIFS, COUNTIFS, AVERAGEIFS.Array formulas. Advanced Lookup functions (XLOOKUP). Financial functions (PMT, FV, PV). **Data analysis tools:** Scenario Manager and Goal Seek. Solver add-in. Data analysis Toolpak (descriptive statistics, regression). Power Query for data transformation and loading.
V	**Power Point** Introduction to presentation, creating a presentation - Setting Presentation style, Adding text to the Presentation. Formatting a Presentation - Adding style, Color, gradient fills, arranging objects, Adding Header & Footer, Slide Background, Slide layout.

	Adding.Graphics to the Presentation- Inserting pictures, movies, tables etc. into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

Basic Text & Reference Books:	
1.	Peter Weverka: Microsoft Office 365 All-in-One for Dummies, Wiley Publication.
2.	S.K. Basandra : Office Automation, BPB Publications.
3.	Joan Lambert & Curtis Frye: Microsoft Word, Excel, PowerPoint & Access 2021 Step by Step, Microsoft Press.

KSKV Kachchh University
Program: PGDCA
Semester: I

Paper Code: CECS104	Total Credit: 4
Title of Paper: The Intelligent Edge: An IoT Exploration	Total Marks: 70 Time: 3 Hrs.

- **CO1**: Understand the fundamental concepts of the Internet of Things, including key components such as sensors, actuators, connectivity, and data processing.
- **CO2**: Analyze real-world IoT applications across domains like healthcare, smart cities, and Industry 4.0, and explore emerging trends such as AIoT and edge computing.
- **CO3**: Demonstrate knowledge of IoT hardware platforms such as Arduino, Raspberry Pi, and ESP32, and explain the role of embedded systems in IoT.
- **CO4**: Apply core Arduino programming concepts including control structures, I/O functions, and serial communication to build simple IoT applications.
- **CO5**: Interface various sensors and actuators with microcontrollers and implement practical IoT solutions through hardware prototyping.

Unit	Description
I	**Introduction to IoT** Defining the Internet of Things (IoT), Explore various definitions from different sources (industry, academia), Emphasize the concept of interconnected physical devices, Discuss the key elements: sensors, actuators, connectivity, data processing, Distinguish between IoT and traditional embedded systems.
II	**IoT Applications and Future Trends** Industrial IoT (IIoT) and Industry 4.0, Smart cities and infrastructure, IoT in healthcare and agriculture, Emerging trends in IoT (AIoT, edge AI), Future challenges and opportunities in IoT, IoT network architectures.

III	**IoT Hardware and Devices** Microcontrollers (Arduino, Raspberry Pi, ESP32), Sensors and actuators (temperature, humidity, light, motion, etc.), Embedded systems and their role in IoT, Device connectivity and power management, Hardware prototyping and development boards.	
IV	**Arduino Core Concepts** Structure, Variables and Data Types, Operators, Control Structures (if...else, for, while, switch...case), Functions, Arduino I/O Functions (digital Read (), digital Write (), Pin Mode (), analog Read (), analog Write ().Time Functions (delay(), Millis(), micros (), Serial Communication,Serial. Begin (), Serial. Print () etc.	
V	**Working With Sensors and actuators** RGB Led, Relay, Sound Detector, Push Button, Buzzer, Temp & Humidity Sensor, IR Sensor, Ultrasonic Sensor, Smoke Detector	

Basic Text & Reference Books:	
1.	"Internet of Things: A Hands-On Approach" by Arshdeep Bahga and Vijay Madisetti
2.	"Building Internet of Things with Raspberry Pi and Arduino" by Sayed Hashmatullah Sharif
3.	"Arduino Cookbook" by Michael Margolis

Krantiguru Shyamji Krishna Verma Kachchh University

Post Graduate Diploma in Computer Applications (PGDCA)

Semester II

Course Code	Name of Course	T / P	Credit	Exam Duration in Hours	Component of Marks		
					Internal	External	Total
CCCS-201	Python programming	Theory	4	3	30	70	100
CCCS-202	Database Management System	Theory	4	3	30	70	100
CCCS-203	Practical Based on CCCS-201 and CECS- 201 OR CECS-202	Practical	4	3	30	70	100
CCCS-204	Practical Based on CCCS-202 and CECS- 203 OR CECS-204	Practical	4	3	30	70	100
CECS-201	Web Development and Programming-II	Theory	4	3	30	70	100
CECS-202	Operating System	Theory	4	3	30	70	100
CECS-203	Cyber Security	Theory	4	3	30	70	100
CECS-204	Computer Network	Theory	4	3	30	70	100
			24		180	420	600

KSKV Kachchh University
Course: PGDCA
Semester II

Paper Code: CCCS201	**Total Credit:** 4
Title of Paper: Python Programming	**Total Marks:** 70 **Time:** 3 Hrs.

- **CO1**: Understand the fundamentals of Python programming, including syntax, keywords, data types, variables, and control flow structures.
- **CO2**: Develop and apply functions, utilize Python's built-in functions, and implement object-oriented programming concepts using classes and objects.
- **CO3**: Demonstrate the ability to work with Python's core data structures such as lists, tuples, and dictionaries, and perform data manipulation using various methods and operations.
- **CO4**: Handle errors and exceptions effectively using Python's exception-handling constructs, including creating custom exceptions.
- **CO5**: Analyze and visualize data using Pandas and Matplotlib, including data cleaning, transformation, and graphical representation techniques.

Unit	Description
I	Introductory Python, A Brief History of Python, How Python is different from other languages, Python Version, Installing Python, How To execute Python program, writing your first program, Python keywords and Identifiers, Comments in python, Getting user input, Variables, Data types.
II	Control flow and syntax, the if statement, Python operators, the while Loop, Break and continue, The for Loop, pass statement, Introduction to Lists, List Slicing, Finding Items in Lists with the in Operator, Introduction to Lists, Introduction to Tuples, Introduction to Dictionary, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists
III	Introduction of Function, calling a function, Function arguments, built in function, Scope of variables, Classes & Objects, Introduction of classes and objects, creating classes, __init__ (), Importing modules (import), Introduction to standard library modules (e.g., math, random, datetime).

IV	Error Handling and Exceptions (Types of errors and exceptions, try, except, finally blocks, raising exceptions, Custom Exceptions), Pandas Introduction, Data frame, reading files (json csv), Pandas - Analyzing Data-Frames, cleaning Empty Cells, cleaning Wrong Format, Cleaning Wrong Data, Removing Duplicates, Data Correlations, Merging more than one data frame together
V	What is Matplotlib? Installation and setup, Introduction to matplotlib, pyplot, Basic plot structure (figures, axes), Creating line plots with plt. Plot (), Customizing line styles, colors, and markers, Creating scatter plots with plt. Scatter (), Adding labels, titles, and legends, Bar Plots and Histograms with plt.bar (), plt.barh() and plt.hist (), Pie Charts

Basic Text & Reference Books:	
1	Think Python: How to Think Like a Computer Scientist" by Allen B. Downey
2	Python: The Complete Reference by by Martin C. Brown (Author)
3	Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter, Third Edition (Grayscale Indian Edition) Paperback – 6 September 2022 by Wes McKinney (Author)

KSKV Kachchh University

Program: PGDCA

Semester:II

Paper Code: CCCS202	Total Credit: 4
Title of Paper: Database Management System	Total Marks: 70 Time: 3 Hrs.

- **CO1**: Understand the fundamental concepts of databases, including types of databases, DBMS architecture, and the advantages over traditional file systems.
- **CO2**: Analyze different data models and design ER diagrams to represent real-world entities and their relationships effectively.
- **CO3**: Apply relational database concepts such as keys, relational algebra operations, and normalization techniques to ensure data integrity and efficiency.
- **CO4**: Develop SQL queries using DDL, DML commands, clauses, and aggregate functions to manage and retrieve data from relational databases.
- **CO5**: Demonstrate transaction control using COMMIT, ROLLBACK, and SAVEPOINT, and apply normalization techniques to eliminate data anomalies.

Unit	Description
I	**Introduction to Databases** What is a database? Why use a database? File processing system Vs DBMS, Limitation of file processing system, Comparison of File processing system and DBMS, Advantages and Disadvantages of DBMS, Users of DBMS, Capabilities of good DBMS, Types of databases (relational, NoSQL, etc.), Database management systems (DBMS), Basic database terminology (tables, records, fields, keys).
II	**Data Models** Introduction, Object Based Logical Model, Record Based Logical Model (Relational Model, Network Model, Hierarchical Model), Entity Relationship Diagram (ERD), Extended features of ERD
III	**Relational Databases** Introduction,Terms (Relation, Tuple, Attribute, Cardinality, Degree, Domain), Keys (Super Key, Candidate Key, Primary

	Key, Foreign Key), Relational Algebra Operations (Select, Project, Union, Difference, Intersection, Cartesian Product, Natural Join)
IV	**SQL (Structured Query Language)** Introduction, History Of SQL, Basic Structure, DDL Commands (CREATE, ALTER, DROP, TRUNCATE), DML Commands (SELECT, INSERT, UPDATE, DELETE), Clauses (FROM, GROUP BY, HAVING, ORDER BY, IN), Aggregate Functions (AVG, COUNT, FIRST, LAST, MIN, MAX,SUM)
V	**Basic Transaction Management:** Use COMMIT and ROLLBACK statements to control transactions.Demonstrate the effects of COMMIT and ROLLBACK on data changes. Practice using SAVEPOINTs to mark specific points within a transaction.**Normalization:**What is an unnormalized database?Anomalies of unnormalized database,Introduction to Normalization, Normal Forms (1 NF, 2 NF, 3 NF, BCNF, DKNF), Join Query

	Basic Text & Reference Books:
1	Database System Concepts By Henry Korth and A. Silberschatz
2	An Introduction to Database System by Bipin Desai
3	SQL, PL/SQL. the Programming Language of Oracle, Ivan Bayross, BPB Publications

KSKV Kachchh University
Course: PGDCA
Semester: II

Paper Code: CCCS203	TotalCredit:4
Title of Paper: Practical Based on CCCS-201 and CECS- 201 OR CECS-202	**TotalMarks:**70 **Time:**3 Hrs.

KSKV Kachchh University
Course: PGDCA
Semester: II

Paper Code:CCCS204	Total Credit:4
	Total Marks:70
Title of Paper: Practical Based on CCCS-202 and CECS- 203 OR CECS-204	Time: 3 Hrs.

KSKV Kachchh University
Program: PGDCA
Semester II

Paper Code: CECS201	Total Credit: 4
Title of Paper: Web Development and Programming II	Total Marks: 70 Time: 3 Hrs.

- **CO1:** Understand the WordPress ecosystem, including its history, core philosophy, installation (local and remote), and dashboard components.
- **CO2:** Develop and customize a basic WordPress theme from scratch using core template files, template tags, and custom CSS.
- **CO3:** Integrate JavaScript into WordPress themes by enqueuing scripts and enhancing interactivity with dynamic content.
- **CO4:** Apply JavaScript fundamentals—such as conditionals, loops, functions, and event handling—to build interactive web experiences.
- **CO5:** Utilize AJAX and the WordPress REST API to retrieve and manipulate data asynchronously within themes and plugins.

Unit	Description
I	**WordPress Core Concepts** Introduction to WordPress: History, philosophy, and ecosystem, WordPress installation and setup (local and remote),WordPress dashboard overview: Posts, pages, media, users, settings,WordPress database structure: Understanding core tables,Themes and plugins: Basic concepts and differences
II	**Theme Development Fundamentals** Understanding WordPress theme structure: index.php, header.php, footer.php, style.CSS,creating a basic custom theme from scratch,Using WordPress template tags: get header(), getfooter(), the title (), thecontent(),Basic theme customization: Adding custom CSS and modifying template files
III	**Introduction to JavaScript** What is JavaScript? Writing your first script, Internal vs. external scripts, Using comments in scripts, Using the NoScript tag in HTML, **JavaScript Language Essentials I: Creating** alert dialogs, understanding conditional statements,getting confirmations from users, Creating prompts for users

IV	**JavaScript Language Essentials II**
	Understanding functions, making links smarter, using switch/case statements, creating loops, Handling errors, functions, arrays **Handling Events:**Responding to mouse movements, responding to mouse clicks, responding to onFocus form events, Responding to keyboard events
V	**JavaScript and WordPress Integration**
	Enqueuing JavaScript files in WordPress: wp_enqueue_script ().Using JavaScript to enhance WordPress themes: Dynamic content, interactive elements. AJAX and WordPress: Making asynchronous requests using wp_ajax.Working with the WordPress REST API: Retrieving and manipulating data., Basic plugin development that utilizes JavaScript.

Basic Text & Reference Books:	
1.	"Professional WordPress Plugin Development" by Brad Williams, Justin Tadlock, and John James Jacoby
2.	"WordPress for Beginners 2023: A Visual Step-by-Step Guide to Mastering WordPress" by Dr. Andy Williams
3.	"JavaScript: The Definitive Guide" by David Flanagan

KSKV Kachchh University
Program: PGDCA
Semester: II

PaperCode:CECS202	TotalCredit:4
Title of Paper: Operating Systems	TotalMarks:70 Time:3 Hrs.

- **CO1:** Understand the basic concepts, objectives, types, and functionalities of Operating Systems.
- **CO2:** Analyze and apply CPU scheduling algorithms like FCFS, SJF, Priority, and Round Robin.
- **CO3:** Explain process management, including PCB, process states, scheduling, and inter-process communication.
- **CO4:** Identify deadlock conditions and apply techniques like prevention, avoidance, detection, and recovery.
- **CO5:** Apply memory management techniques such as paging, segmentation, and page replacement algorithms.

Unit	Description
I	Introduction, Uses of OS, Functions of OS, Objective of OS, Types of OS, To choose best OS, Example of OS. Batch Processing Operating System (BPOS), Features of BPOS, Working, Advantages and Disadvantages of BPOS, Multiprogramming OS, Features of Multiprogramming, Advantages and disadvantages of multiprogramming, Working of Multiprogramming OS, Time Sharing System, Advantages and disadvantages of Time-SharingSystems, Network Operating Systems, Real Time Operating Systems.
II	Process Management: Introduction, Process Table and Process Control Block (PCB), Operations on Process, Process Schedulers in Operating Systems, Intern Process Communication, Context Switching in Operating System, Preemptive and Non-Preemptive Scheduling, CPU Scheduling and its Criteria, CPU Scheduling Algorithms: FCFS, SJF, LJF, Priority, RR

III	**Deadlock and Deadlock Handling Methods:** Introduction and Example, Conditions of Deadlock, Bankers' Algorithm, Deadlock detection in distributed systems, Handling Deadlocks, Deadlock Prevention and Avoidance, Deadlock detection and recovery, Deadlock ignorance, Recovery from deadlock.
IV	**Memory Management in OS:** Main Memory, Logical and Physical Address Space, Static and Dynamic Loading, Static and Dynamic Linking, Swapping, Logical Vs Physical Address Space, Contiguous Memory Space, Memory Allocation – First Fit, Best Fit and Worst Fit, Fragmentation – Internal and External, Paging and Page replacement algorithm.
V	Introduction to Linux System & History Features of Linux Introduction to File System & Memory Management Basic Commands: login, logout, date, man, pwd, who, whoami, dir, ls, cd, mkdir, rmdir Use of Wild card characters and introduction to vi editor Introduction to environment variable like HOME, PATH, PS1 Types of FAP, use of chmod command Basic commands like cp, mv, rm, rev, file redirection, grep, cut, paste, find sort commands with example Introduction to shell script: execution of it, shell script variable, expr, test commands

Basic Text&Reference Books:	
1	Andrew S. Tanenbaum: Operating System design& Implementation, Prentice Hall International
2	James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley

KSKV Kachchh University
Program: PGDCA
Semester: II

Paper Code: CECS203	**Total Credit: 4**
Title of Paper: Cyber Security	**Total Marks:70** **Time: 3 Hrs.**

- CO1: Understand the fundamentals of cybercrime, cyberspace, and cybersecurity concepts.
- CO2: Identify and analyze various categories of cybercrime including attacks and social engineering methods.
- CO3: Evaluate security threats on social media and mobile platforms, and apply appropriate safety practices.
- CO4: Apply cybersecurity principles to safeguard digital payment systems and related technologies in India.
- CO5: Understand legal frameworks and technical tools for preventing cybercrime, including hacking countermeasures and IT laws.

Unit	Description
I	Introduction: Cyber Security, Classification of Cybercrime, Cyberspace: architecture of cyberspace, Concept of Cyber Security, Issues and Challenges of Cybercriminal, Internet, Information Security, Computer Ethics and Security Policies. Cybercrime, Origin of Cybercrime.
II	Categories of Cybercrime, Cyberstalking, Cybercrime and Cloud Computing, Common Cybercrimes: targeting computer and mobile phones, Cybercrime Against Women and Children, Financial fraud, social engineering attack, malware and ransomware attack, zero day and zero click attack.
III	Introduction to social Network, Types of social media, social media fraud and Issues, Guideline four social media security, security Attacks: Spam, Phishing, Ponzi scheme. best practices for safer social usage. Basic Security: Android, IOS, Windows (apps, permissions, fake calls).
IV	Importance of passwords and updates, Cyber Security Initiatives in India: introduction to digital payment, components of digital payment, Security of Debit and Credit Card, UPI Security, Security of Micro ATMs, e-wallet Security Guidelines.

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V	Introduction to hacking and prevention: common hacking methods, Basic Tools: antivirus, firewall, Proxy Servers and VPNs. Wi-Fi Security Protocols (WEP, WPA, WPA2, WPA3), Legal perspective of Cybercrime. Indian IT act 2000 and subsequent amendments.

Basic Text & Reference Books:	
1	"Cyber Security for Beginners" – Raef Meeuwisse
2	"Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011

KSKV Kachchh University
Program: PGDCA

Semester: II

PaperCode: CECS204	**Total Credit: 4**
TitleofPaper: Introduction to Computer Networks	**Total Marks:70** **Time: 3 Hrs.**

- **CO1:** Explain fundamental concepts of data communication, network types (LAN, WAN, MAN), and basic networking terms (e.g., Node, Link, IP, MAC, Protocols, Devices).
- **CO2:** Describe and compare network topologies (Point-to-Point, Star, Bus, Ring, Mesh, Tree, Hybrid), network architectures, and switching techniques.
- **CO3:** Identify and differentiate network devices (e.g., Repeater, Hub, Switch, Router, NIC) and explain transmission media (wired/wireless) and modes (Simplex, Half/Full Duplex).
- **CO4:** Describe OSI and TCP/IP models, compare their layers, and explain key network protocols (e.g., TCP, IP, HTTP, FTP, DNS).
- **CO5:** Understand IPv4 and IPv6 addressing, subnetting, subnet masks, and network classes.

Unit	Description
I	Introduction: Data Communications, Networks, Network Types: LAN, WAN, MAN, Cloud network, Basic terminologies of computer network: Node, Link, Bandwidth, Latency, IP Address, MAC Address, Packet, Protocol, Client, Server, Switch, Router, Throughput, Goals and Applications of Computer Networks.
II	Network Topologies: Point to Point, Star, Bus, Ring, Mesh, Tree, Hybrid. Advantages, Disadvantages and comparison of network topologies. Network Architecture. Switching techniques.
III	Network Devices: Repeater, Hub, Switch, Bridge, Router, Gateway, router, Network Interface Card (NIC). Transmission Media: Wired (Twisted Pair, Coaxial, Fiber Optic), Wireless (Radio, Microwave, Infrared). Types of transmission [Simplex, Half Duplex, Full Duplex].
IV	OSI Model: Layers and their functionalities/IP Model: Layers and their functionalities. Comparison: OSI vs TCP/IP. Connection-Oriented vs Connectionless Communication. Network Protocols: TCP, IP, UDP, HTTP, HTTPS, FTP, SMTP, POP3, IMAP, DNS
V	IP Addressing:IPv4: 32-bit, dotted decimal, limited addresses, IPv6: 128-bit, hexadecimal, large address space, improved features. Subnet Mask:network & host parts. Network Classes.

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	Subnetting:Subnet Mask, Subnet ID, Broadcast Address, Host Range.

BasicText&ReferenceBooks: -	
1.	Computer Networks 4th Edition - Andrew Tanenbaum
2.	Computer Networking: A Top-Down Approach Featuring the Internet by JamesF.Kurose , Keith W.Ross
3.	Data Communication & Networking 4th Edition by Behrouz A. Forouzan

KSKV Kachchh University

Program: PGDCA

Semester: I and II

External Exam Pattern (Theory)

Unit	Description		Total Marks
I	Q.1 (A) Answer the Following. (Definitions, Blanks, Full Forms, True/False, Match the Following)	06	14
	Q.1 (B) Medium/Long Questions. (With Internal Option)	08	
II	Q.2 (A) Answer the Following. (Definitions, Blanks, FullForms, True/False, MatchtheFollowing)	06	14
	Q.2 (B) Medium/Long Questions. (With Internal Option)	08	
III	Q.3 (A) Short/Medium Questions (With Internal Option)	06	14
	Q.3 (B) Medium/Long Questions. (With Internal Option)	08	
IV	Q.4 (A) Short/Medium Questions (With Internal Option)	06	14
	Q.4 (B) Medium/Long Questions. (With Internal Option)	08	
V	Q.5(A) Short/Medium Questions (With Internal Option)	06	14
	Q.5(B) Medium/LongQuestions. (With Internal Option)	08	

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Course: PGDCA

Semester: I and II

External Exam Pattern (Practical)

Unit	Description		Total Marks
Unit I to V	Q.1 Viva Voce	20	70
	Q.2 Practical	50	