CENTRE FOR DEVELOPMENT OF IMAGING TECHNOLOGY
TECHNOLOGY EXTENSION DIVISION

SYLLABUS

DIPLOMA IN COMPUTER APPLICATION (DCA)	
Scheme: 2022 Scheme **Duration: 6 Months** **Eligibility: SSLC or Equivalent**	
THEORY SUBJECTS	
DCA 101	**Introduction to Information System**
DCA 102	**Networking and Internet**
DCA 103	**Office Automation Systems**
DCA 104	**Principles of Programming and Web Technologies**
LAB SUBJECTS	
DCA 105	**Lab I-Computer Basics and Office Automation**
DCA 106	**Lab II- Programming in C and Python & Web Application Development**
ANNEXURE	
Assignments for Theory & Questions for Lab	

Detailed Syllabus(Theory)

DCA 101 - INTRODUCTION TO INFORMATION SYSTEM
Theory Hours - 50 Hrs
Module I - Computer Fundamentals (10Hrs)

Learning outcome

- ➢ Understanding of the concept and architecture of computers.
- ➢ How a computer system works?
- ➢ Learning the basic terminologies.

Topics

Introduction :- Fundamentals - Definition, Hardware, Software, Operating System, data, information etc; Functions and Characteristics; Applications of Computers; Capabilities and Limitations

Familiarise different generations of computer

Computer classifications :- Analogue / Digital / Hybrid, PC, Microcomputer,

Minicomputer, Mainframe computer, Super Computer.

Components of a computer :- Input Unit ; Output Unit ; CPU ; Memory unit

Input devices :– Keyboard; Mouse; Scanner; Digital/ Web Camera; Touch screen; graphic tablet

Output Devices :– VDU; Printer; Audio Output devices; LCD Projector
Intelligent terminal and dump terminal

Memory Unit ; Volatile and Non-Volatile memory ; Primary Memory ; Secondary Memory ; BIOS Memory ; Cache Memory ; Virtual memory ; SIMM ; DIMM ; Storage devices; online / offline storage.

Familiarisation of other hardware components :- SMPS ; Motherboard ; Video Cards - PCI, PCI Express, and AGP ; Multimedia Cards - Sound Cards, TV Tuner Cards and Capture Cards ; I/O Cards - SCSI, Serial, USB, and Parallel ; Communications Cards - NICs and Modems

Ports :– Characteristics and different types - Serial, Parallel, USB, Ethernet port etc

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Configuring the Peripheral Devices ; methods for connecting peripherals to system - different types of cable connection, explain Bluetooth and Wi-Fi / IR, NFC connectivity

Data representation in computers :– Number System - Types, examples, Conversion rules ; Coding system - ASCII, BCD, EBCDIC, ISCII, Parity Bit, etc.

Units :– Time Units - Milliseconds, Microseconds, Nanoseconds, Pico seconds ; storage units - Bit, Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte, Peta Byte, Exa Byte, Nibble.

Module II - Basics of Information Technology (10Hrs)

Learning outcome

- ➢ Acknowledge the role of technologies in today's society
- ➢ To identify the basic hardware and software components of a computer and explore their functioning
- ➢ Learn about various operating systems

Topics

Introduction to IT – Role of IT in society - Advantages and Disadvantages, Characteristics and features of IT, Application areas - Science and Engineering, Education, Business and Commerce, Medicine and Entertainment – Advantages & Disadvantages of IT

Basics of Computer System – Generations & Peripheral devices – Hardware – Software - system software & application software-off the shelf and custom software-programming languages-compilers-interpreters– Operating systems: structure & functions – Types of Operating system: Batch processing OS, Mutitasking OS, Multiprocessing OS,Time sharing OS ,Real Time OS, Distributed OS, Network OS-Examples of OS: MS-DOS, MS-Windows, Linux Ubuntu, Apple Macintosh

Data and information Concepts -- Importance of data and information, Difference between data and information

Introduction to ITES (IT Enabled Services) – what are IT enabled services? Benefits and threats, ITES fields - BPO – GIS – Call Centers – Data Management Services – Medical Transcription – Data Digitization, Web services, Payroll management, Telemarketing

Topics
Information System :- Data, Information & System ; Information System; Dimensions of Information System - Organization, Management, IT ; Functions of Information System
Business Information Systems :- Role of Business Information Systems - Top, Middle, Bottom ;
Types of Business Information Systems - TPS, MIS, EIS, DSS, AI/Expert Systems
Management Information System(MIS) :- Objectives ; Components ; Functions ; Resources ; Characteristics; Terminologies and Applications
Enterprise System and Types :- ERP ; CRM ; SCM

Module V – Basics of Databases (10Hrs)

Learning outcome

> ➢ Knowledge about data processing, data management systems, relational data model, familiarize MS Access, SQL and importing of Excel files.

Topics

Database Management System – Introduction; Data Processing Vs. Data Management Systems ; Database Concepts; Characteristics of Database; Types of Database System; Advantages and Disadvantages of a DBMS ; Database Administrators and Database Users

Creating database using MS Access - Importing Excel files to MS Access; Using Forms- creating a form and editing data using form

Relational Model Concepts - Data Definition Language (DDL) ; Data Manipulation Language (DML); Introduction to SQL; SQL commands; Importing Excel files to SQL; Familiarise MySQL, NoSQL and Oracle

DCA 102 - NETWORKING AND INTERNET
Theory Hours - 50 Hrs

Module I - Computer Networks (10Hrs)

> Knowledge about networking technologies and types of networks, devices used, security devices, topologies, nodes, mobile communication and latest technologies

Topics

Introduction to Computer Networks - Evolution of Networking, Wired & Wireless Networking

Types of Networks - LAN (Local Area Network) , MAN (Metropolitan Area Network) , WAN (Wide Area Network) , PAN (Personal Area Network)

Network Devices - Hub, Switch, Router, Bridge, Gateway; Modem, Repeater, Access Point; Modem, Ethernet Card, RJ11, RJ45

Network Security Devices - Active Devices, Passive Devices, Preventative Devices, Unified Threat Management (UTM), Firewalls

Integrated Services Digital Network (ISDN)

Networking Topologies - Bus Topology, Star Topology, Ring Topology, Mesh Topology, Tree or Hybrid Topology

Nodes in a Networked Communication - Types of Nodes, MAC Address, IP Address, IPv4, IPv6

Connecting to Internet - Connecting the computer to the Internet

Types of connectivity – Dial-up; Wired broadband connectivity - ISDN, Cable Internet, DSL, Leased Line, FTTH; Wireless broadband connectivity - Mobile broadband, Wi-MAX, Satellite broadband

Internet Access sharing methods - LAN, Wi-Fi, Li-Fi

Services on Internet - World Wide Web (WWW), Browser, Web browsing, Search Engines, E-mail, Social media; Various stages of Data Transfer from Server to Client; Domain Name; Resolution; Mobile communication;

Generations in mobile communication - First Generation, Second Generation - GSM, GPRS, EDGE, CDMA, Third Generation – WCDMA, Fourth Generation, Fifth Generation; Mobile communication services- SMS, MMS, GPS, Smart Cards

Mobile Operating System

Latest Technologies - Data Analysis; Cloud Computing; Internet of Things & Edge Computing; Block Chain; Artificial Intelligence & Machine Learning; Augmented Reality & Virtual Reality; Robotic Process Automation (RPA); 5G Spectrum

Module II - Introduction to Internet (10Hrs)

Learning outcome

- ➢ Understanding about internet
- ➢ Explore different kinds of information available on the Internet, surfing safely and Searching information on the Internet
- ➢ Importance of online conference tools in daily life and its usage
- ➢ Understand e-learning concept of e-learning and its importance in the modern world.

Topics

Concepts of Internet – Basics of internet connectivity -Applications of Internet –tools and troubleshooting– Intranet and extranet -Internet Services-communication services-Information retrieval services-Web services-World Wide Web-email– Web Browsing softwares – Search Engines – URL – Web Protocols- Domain name – IP Address – Surfing the web

Basics of electronic mail –concept, technology behind email, different email providers, Getting an email account – Sending and receiving emails – mail operations –email folders-applications of Emails-web mail-client mail-email security- email client(eg-outlook)

Online/Web/Mobile Conferences & Tools – introduction towards Audio and Video conferencing – Advantages & Disadvantages -Popular Video conferencing tools

eLearning – What is eLearning, Features and uses, Different eLearning platforms in India, LMS

Learning outcome

- ➢ Understand the concept of e-government and the associated benefits and drawbacks
- ➢ Gather knowledge on various National and State e-governance initiatives.
- ➢ Recognize the benefits and limitations of e-commerce
- ➢ Understand major e-commerce business models and their impact in the society

Topics

What is E-Governance, objective, Scope, Benefits and outcomes of e-Governance - **Pillars of e-Governance:** People - Process - Technology - Resources, **Types of interactions in e-Governance:** Government to Citizen (G2C)- Government to Businesses (G2B)-Government to Government (G2G)-Government to Employees (G2E), **Phases of e-Governance Maturity Model** (Phase I: Information, Phase II: Interaction, Phase III- Transaction - Phase IV : Transformation)

e-Governance Infrastructures: Common Service Centre (CSC) - State Wide Area Network (SWAN) – National e-Governance Service Delivery Gateway (NSDG) - State Data Center (SDC)

Challenges to e-Governance, Security approaches to e-Governance

National level e-Governance initiative – Digital India initiative, Major services and projects implemented by union govt and state govt.

e-Commerce (Internet Commerce or electronic commerce) - What is e-Commerce - Features and Scope of e-Commerce – Traditional Commerce vs e-Commerce - e-Commerce Models (B2C, B2B, C2C, C2B, B2G - Benefits and limitations of e-Commerce – Major e-Commerce websites and its usage

Module IV- Mobile Computing and Digital Payment System (10Hrs)

Learning outcome

- ➢ Understand mobile computing, its principles and theories.
- ➢ List applications in different domains that mobile computing offers to the public, employees, and businesses.
- ➢ Understand the various options of payments - online & mobile payment, smart cards etc

Topics

Mobile Computing - Introduction and Concepts- mobile communication, mobile hardware and software, Mobile Device Operating Systems – Android, iOS, - Generations of Mobile Communication Technologies

e-Commerce & m-Commerce System Security

Familiarisation of mobile applications - Introduction to mobile applications-types of mobile applications-native web and hybrid, Different categories of mobile applications - cooking application - Education applications - Communication applications - Shopping application etc

Digital economy - Identify the methods of payments on the internet – e-Cash , e-cheques , credit cards on the Internet

Electronic Payment Systems - Need and uses of Electronic Payment System- Electronic Fund Transfer-one time password (OTP)-PIN and its importance-internet banking – Credit card - Debit card - UPI, Point of Sale(POS), Security Issues

Mobile Payment System - Different payment types: Mobile Wallets, QR code payments, Payment links, SMS payments, Benefits of Mobile Payment

Security issues in digital payment system ,Online banking frauds

Do's and Don'ts in electronic/mobile payment system

Module V – Social Media & Cyber Security   (10Hrs)

Learning outcome

  ➢ Understand various social media technologies and their importance in the day to day life.

  ➢ Benefits of social media in digital marketing and Education,

  ➢ Awareness on various cybercrimes and cyber security,

  ➢ Understand copyright and intellectual property rights

Topics

Social Media – Why & what Social Media – Present and Past - Social media Platforms and applications – Usage in business & Education- social media etiquette

Social media and digital marketing

Information Security – Concepts of Security - two factor authentication(2FA) - Biometric authentication methods - Data Encryption and Decryption- Cryptography

Awareness about cyber crime and Cyber security

Cyber crime - What is cyber crime, Understand the term computer Virus and Malware, Email spamming, Email spoofing, Email bombing, Forgery, Hacking, Cyber Stalking or Bullying, Web jacking, Phishing, Pornography, Cookies and threats

Cyber security - Basic concepts - Elements of security - Data security and protection from cyber attack - Antivirus - password, Concept of Firewall, Digital signature - uses and working

Cyber Laws - An Overview & Scope of Cyber Law - Copyright, Trademarks and Software Patenting - Data Privacy & Confidentiality - Cyber laws in India -   IT ACT-objectives, features, offences

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Cyber Laws - An Overview & Scope of Cyber Law - Copyright, Trademarks and Software Patenting - Data Privacy & Confidentiality - Cyber laws in India -   IT ACT-objectives, features, offences

Sharing A Presentation - Convert presentation to PDF ; Convert presentation to Video ; Create an Image from presentation ; Print a PowerPoint Presentation; Broadcast PowerPoint presentation

Open Office Impress - Impress characteristics; Start Impress, Presentation Wizard; Drawing,Zoom, Lines, Rectangle, Freeform line filled, Polygon, Convert objects, Curves; Select objects, Copy objects, Delete objects, Flip objects, Arrange objects, Group objects; Export drawing, Area Fills, Color, Gradient, Hatching, Bitmaps, Transfer settings, Images,Insert images, Filters, Graphics mode, Color, Transparency, Crop, Gallery, Glue points, Size and position,Rotate, Alignment, Text, Text to polygon, Text boxes, Slides, Insert, Clone, Rename, Delete slides; Format, Character, Paragraph, Textbox format, Slide effects, Slide transitions, Sounds ; Automatic transition, Manual transition, Hyperlinks, From text,From images, Bitmaps

Module IV- Basics of Accounting & Billing Systems (10Hrs)

Learning outcome

➢ After going this module one should get an idea about basic accounting components and can familiarize billing system

Topics

Basics of Accounting – Accounting; Business Transaction; Purchase; Sales; Purchase return (Outward invoice); Sales return (Inward invoice); Assets; Liabilities; Capital; Debtors; Creditor; Debit; Credit; Drawings; Receipts; Account; Ledger; Journal entries; Trial balance; Profit; Profit & loss account; Balance Sheet

Billing System – Introduction; Need of Billing System; Features of Billing System; GST Billing; Billing using MS-Excel

Module V - Printing Technologies & Multimedia (10Hrs)

Learning outcome

➢ Knowledge about modern printing technologies, DTP, familiarize with image tools and Multimedia techniques

Topics

Printing Technologies - Introduction to various modern Printing processes; Printing

Technology using DTP; Advantages of DTP; Introduction to DTP software; Use of various

tools in MS Paint, GIMP; Importing Graphics; Image Compression; Electronic Image file formats- BMP, JPEG, TIFF, GIF & PNG ; Topographic design; Vector drawing techniques; Portable Document Format (PDF)

Multimedia - Definition; Multimedia systems, elements & applications; Multimedia system architecture; Digital media and Hyper media; Multimedia file formats & standards; Types and methods of compression and decompression; Multimedia I/O Technologies; Adding text, integrating audio with Video; Image enhancing designing techniques; Image authoring and editing tools

DCA 104 - PRINCIPLES OF PROGRAMMING AND WEB TECHNOLOGIES

Theory Hours - 50 Hrs

Module I - Basics of Programming (10Hrs)

Learning outcome

- ➢ Understand the methodology to solve the problem, algorithm, flowchart & coding
- ➢ To identify programming language classifications.
- ➢ To Learn Object oriented programming concepts.
- ➢ Understand the features & architecture of Microprocessor generations and types.

Topics

Algorithms - Properties of a good algorithm - Flowchart - Problem-solving using Computer - Introduction to Programming Languages - Machine Language - Assembly Language - High Level Programming Languages - Procedure Orientation and Object Orientation - Object Orientation concepts - Compiler and interpreter - Introduction to Microprocessor & Microcontroller Programming Operation Cycle (Fetch, Decode, Execute, Store)

Module II- Introduction to C Programming (10Hrs)

Learning outcome

- ➢ To provide an overview of working principles of C language.
- ➢ Construct, compile, link & execute the C programs
- ➢ To learn and implement C language programming techniques.

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Learning outcome

- ➢ Understanding of the concept and architecture of computers.
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Learning outcome

- ➢ Acknowledge the role of technologies in today's society
- ➢ To identify the basic hardware and software components of a computer and explore their functioning
- ➢ Learn about various operating systems

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Data and information Concepts -- Importance of data and information, Difference between data and information

Introduction to ITES (IT Enabled Services) – what are IT enabled services? Benefits and threats, ITES fields -   BPO – GIS – Call Centers – Data Management Services – Medical Transcription – Data Digitization, Web services, Payroll management, Telemarketing

Module III - Basics of Software (10Hrs)

Learning outcome

- ➢ Distinguish System software and Application software.
- ➢ Commonly used operating systems.
- ➢ Identify the primary functions of Operating Systems.
- ➢ Installation and configuration of software.

Topics

Types of Software :– Software - System software , Application software, Utility Software ; Demo ware ; Shareware ; Freeware ; Firmware ; Free and Open Source Software.

Operating Systems :– Functions, Types – Batch Processing , Single User, Multi User, Multiprogramming, Multi-Tasking (Multiprocessing); Familiarise Multithreading

Booting and Shutdown of Computers ; BIOS ; POST ; Master Boot Record(MBR)

Introduction to old versions of Windows OS

Detailed study of Windows :– Overview ; GUI basics (Desktop, taskbar, icons, desktop background management) ; Navigation (Start menu, File explorer) ; Accessories ; Control Panel ; User Account management ; storage management ; file and folder management ; keyboard shortcuts ; data backup

Familiarise Ubuntu Linux :– Introduction ; History ; Versions ; basics

Familiarising Command mode :- Windows (DOS) ; Linux (Terminal)

Familiarize other operating systems :– UNIX ; Apple Macintosh

Linux commands

Computer Virus :– Introduction ; Mechanism of Virus ; How a virus spreads ; How is virus named ; A few prominent viruses ; Types of Computer Virus ; Related Concepts - Antivirus programs - Norton antivirus program

Module IV - Basics of Information System (10Hrs)

Learning outcome

- ➢ Knowledge about information system, its capabilities and uses with IT infrastructure in a business enterprise to achieve desired goals.

Topics
Information System :- Data, Information & System ; Information System; Dimensions of Information System - Organization, Management, IT ; Functions of Information System
Business Information Systems :- Role of Business Information Systems - Top, Middle, Bottom ;
Types of Business Information Systems - TPS, MIS, EIS, DSS, AI/Expert Systems
Management Information System(MIS) :- Objectives ; Components ; Functions ; Resources ; Characteristics; Terminologies and Applications
Enterprise System and Types :- ERP ; CRM ; SCM

Module V – Basics of Databases (10Hrs)

Learning outcome

> ➢ Knowledge about data processing, data management systems, relational data model, familiarize MS Access, SQL and importing of Excel files.

Topics

Database Management System – Introduction; Data Processing Vs. Data Management Systems ; Database Concepts; Characteristics of Database; Types of Database System; Advantages and Disadvantages of a DBMS ; Database Administrators and Database Users

Creating database using MS Access - Importing Excel files to MS Access; Using Forms-creating a form and editing data using form

Relational Model Concepts - Data Definition Language (DDL) ; Data Manipulation Language (DML); Introduction to SQL; SQL commands; Importing Excel files to SQL; Familiarise MySQL, NoSQL and Oracle

DCA 102 - NETWORKING AND INTERNET
Theory Hours - 50 Hrs

Module I - Computer Networks (10Hrs)

Learning outcome

➢ Knowledge about networking technologies and types of networks, devices used, security devices, topologies, nodes, mobile communication and latest technologies

Topics

Introduction to Computer Networks - Evolution of Networking, Wired & Wireless Networking

Types of Networks - LAN (Local Area Network) , MAN (Metropolitan Area Network) , WAN (Wide Area Network) , PAN (Personal Area Network)

Network Devices - Hub, Switch, Router, Bridge, Gateway; Modem, Repeater, Access Point; Modem, Ethernet Card, RJ11, RJ45

Network Security Devices - Active Devices, Passive Devices, Preventative Devices, Unified Threat Management (UTM), Firewalls

Integrated Services Digital Network (ISDN)

Networking Topologies - Bus Topology, Star Topology, Ring Topology, Mesh Topology, Tree or Hybrid Topology

Nodes in a Networked Communication - Types of Nodes, MAC Address, IP Address, IPv4, IPv6

Connecting to Internet - Connecting the computer to the Internet

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Internet Access sharing methods - LAN, Wi-Fi, Li-Fi

Services on Internet - World Wide Web (WWW), Browser, Web browsing, Search Engines, E-mail, Social media; Various stages of Data Transfer from Server to Client; Domain Name; Resolution; Mobile communication;

Generations in mobile communication - First Generation, Second Generation - GSM, GPRS, EDGE, CDMA, Third Generation – WCDMA, Fourth Generation, Fifth Generation; Mobile communication services- SMS, MMS, GPS, Smart Cards

Mobile Operating System

Latest Technologies - Data Analysis; Cloud Computing; Internet of Things & Edge Computing; Block Chain; Artificial Intelligence & Machine Learning; Augmented Reality & Virtual Reality; Robotic Process Automation (RPA); 5G Spectrum

Module II - Introduction to Internet (10Hrs)

Learning outcome

> Understanding about internet
> Explore different kinds of information available on the Internet, surfing safely and Searching information on the Internet
> Importance of online conference tools in daily life and its usage
> Understand e-learning concept of e-learning and its importance in the modern world.

Topics

Concepts of Internet – Basics of internet connectivity -Applications of Internet –tools and troubleshooting– Intranet and extranet -Internet Services-communication services-Information retrieval services-Web services-World Wide Web-email– Web Browsing softwares – Search Engines – URL – Web Protocols- Domain name – IP Address – Surfing the web

Basics of electronic mail –concept, technology behind email, different email providers, Getting an email account – Sending and receiving emails – mail operations –email folders-applications of Emails-web mail-client mail-email security- email client(eg-outlook)

Online/Web/Mobile Conferences & Tools – introduction towards Audio and Video conferencing – Advantages & Disadvantages -Popular Video conferencing tools

eLearning – What is eLearning, Features and uses, Different eLearning platforms in India, LMS

- ➢ Understand the concept of e-government and the associated benefits and drawbacks
- ➢ Gather knowledge on various National and State e-governance initiatives.
- ➢ Recognize the benefits and limitations of e-commerce
- ➢ Understand major e-commerce business models and their impact in the society

Topics

What is E-Governance, objective, Scope, Benefits and outcomes of e-Governance - **Pillars of e-Governance:** People - Process - Technology - Resources, **Types of interactions in e-Governance:** Government to Citizen (G2C)- Government to Businesses (G2B)-Government to Government (G2G)-Government to Employees (G2E), **Phases of e-Governance Maturity Model** (Phase I: Information, Phase II: Interaction, Phase III- Transaction - Phase IV : Transformation)

e-Governance Infrastructures: Common Service Centre (CSC) - State Wide Area Network (SWAN) – National e-Governance Service Delivery Gateway (NSDG) - State Data Center (SDC)

Challenges to e-Governance, Security approaches to e-Governance

National level e-Governance initiative – Digital India initiative, Major services and projects implemented by union govt and state govt.

e-Commerce (Internet Commerce or electronic commerce) - What is e-Commerce - Features and Scope of e-Commerce – Traditional Commerce vs e-Commerce - e-Commerce Models (B2C, B2B, C2C, C2B, B2G - Benefits and limitations of e-Commerce – Major e-Commerce websites and its usage

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Learning outcome

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- ➢ Understand the various options of payments - online & mobile payment, smart cards etc

Topics

Mobile Computing - Introduction and Concepts- mobile communication, mobile hardware and software, Mobile Device Operating Systems – Android, iOS, - Generations of Mobile Communication Technologies

e-Commerce & m-Commerce System Security

Familiarisation of mobile applications - Introduction to mobile applications-types of mobile applications-native web and hybrid, Different categories of mobile applications - cooking application - Education applications - Communication applications - Shopping application etc

Digital economy - Identify the methods of payments on the internet – e-Cash , e-cheques , credit cards on the Internet

Electronic Payment Systems - Need and uses of Electronic Payment System- Electronic Fund Transfer-one time password (OTP)-PIN and its importance-internet banking – Credit card - Debit card - UPI, Point of Sale(POS), Security Issues

Mobile Payment System - Different payment types: Mobile Wallets, QR code payments, Payment links, SMS payments, Benefits of Mobile Payment

Security issues in digital payment system ,Online banking frauds

Do's and Don'ts in electronic/mobile payment system

Module V – Social Media & Cyber Security   (10Hrs)

Learning outcome

- ➢ Understand various social media technologies and their importance in the day to day life.
- ➢ Benefits of social media in digital marketing and Education,
- ➢ Awareness on various cybercrimes and cyber security,
- ➢ Understand copyright and intellectual property rights

Topics

Social Media – Why & what Social Media – Present and Past - Social media Platforms and applications – Usage in business & Education- social media etiquette

Social media and digital marketing

Information Security – Concepts of Security - two factor authentication(2FA) - Biometric authentication methods - Data Encryption and Decryption- Cryptography

Awareness about cyber crime and Cyber security

Cyber crime - What is cyber crime, Understand the term computer Virus and Malware, Email spamming, Email spoofing, Email bombing, Forgery, Hacking, Cyber Stalking or Bullying, Web jacking, Phishing, Pornography, Cookies and threats

Cyber security - Basic concepts - Elements of security - Data security and protection from cyber attack - Antivirus - password, Concept of Firewall, Digital signature - uses and working

Cyber Laws - An Overview & Scope of Cyber Law - Copyright, Trademarks and Software Patenting - Data Privacy & Confidentiality - Cyber laws in India -   IT ACT-objectives, features, offences

DCA 103 - OFFICE AUTOMATION SYSTEMS

Theory Hours - 50 Hrs

Module I - Word Processing and Indian Language Computing (10Hrs)

Learning outcome

➢ Work with MS Word and Open Office Writer.

➢ Understand the features affecting the page layout.

➢ Understand to use Indian languages in preparation of documents.

Topics

Introduction to Word Processing - Word Processor Basics, typing text, selecting, copying and deleting text

Creating and formatting documents using MS – Word :- MS Word Interface, Toolbars, Ribbon and Menus; Creating a new word document; Clipboard, Cut, Copy, Paste text; Find, Replace and select Text; Insert and delete comment; Use of Undo and Redo operations; Saving a document; Opening and closing a document

Text Formatting - Familiarise various Fonts, font size, font style; Format text, Bold, Italic, Underline, Strikethrough, Superscript and subscript; Text effects, text highlighting, applying font color; Change the Text Case; Alignment of text; Formatting a paragraph, Drop Cap, spacing, Tabs and Indents ; Copy Formatting with format painter; Using Borders and Shading; Create a numbered list or bulleted list

Working with objects - Insert pictures, shapes, symbols, Date and Time; Insert Text box, charts, Word Art, symbols; Insert Header and Footer, Footnote and End note; Page numbering; Insert a manual page break

Document Formatting - Formatting using themes; Using watermark; Applying Page Borders

Page Layout Settings - Page setup options – Setting Margins, Page orientation, Paper size; Creating documents with columns

Document Review - Checking spelling and grammar in a document; Using of Thesaurus; Auto correct; Tracking changes

Viewing a document - Different views of a document; Zooming; Arranging windows; Creating macros

Styles – Apply a style; Apply a document theme; View all available styles; Change style set; Create a style

Navigation - Open the Navigation pane; Search for a word or phrase; Search for Graphics, Tables, Equations or Comments; View search results; View documents headings; View a document's pages; Adding Hyperlink; Inserting Bookmark

Drawing and Graphics - Insert a picture, screen shot, shapes; Adjust text wrapping; Format, Resize and delete an object

Working with Tables - Insert a table; Manipulating Rows & Columns; Merging & splitting cells ; Adjust Column width or row height; Text Direction

Mail Merging - Creating a Mail Merge Document; Creating address list; Merging Main Document with data, Saving

Printing a document - Previewing, settings – Print All / Current Page / Custom Print; Printing a document; Advanced Printing Options

Converting documents to other file formats(eg- pdf)

MS Word Keyboard shortcuts

Word Processing using Open Office Writer - Working with documents; Formatting documents; Working with Tables; Inserting Pictures/Files etc; Tools - Spell check, macros, mail merge etc; AutoCorrect; Manually running the Spell checker; Finding Synonyms with the Thesaurus; Finding items in a Document; Create and modify Headers and Footers; Create and modify Page numbers; Adding Graphics, Formatting a Picture; Resize a picture, Wrapping a picture around text; Adding borders and colors; Creating a Form Letters; Creating a Data Source; Reviewing the Mail Merge document; Addressing Mailing Labels

Language Computing - Complexities of Indian languages; Pre -Unicode Era; Advantages of Font Encoding; Disadvantages of Font Encoding; What is Unicode? History, Format, varying length encoding; Packages and tools available under Windows for Indian languages; Difference between Unicode and non-Unicode Fonts; Familiarisation of Malayalam typing keyboard

Module II - Spreadsheets (10Hrs)

Learning outcome

➤ Examine spreadsheet concepts and explore the Microsoft Office Excel environment, import and export data

Topics

Introduction to Spreadsheets - Spreadsheet Basics; Use of spreadsheets

MS-EXCEL- Basics; Familiarise MS- Excel Interface; Components of an Excel Workbook; Worksheet, Cell and Cell Address; Create New Workbook; Typing data; Saving and opening and closing a workbook; Preview and print workbook; Undo and Redo operations in workbook; Selecting a cell, cell range, entire worksheet; Different views; Zooming

Spreadsheet manipulations - Editing cell contents; Cut or Copy Data ; Previewing an Item Before Pasting; Paste Special options; Move or Copy Cells Using Drag and Drop; Copy Using Auto Fill; Complete a Series Using AutoFill; Insert a Column or Row; Delete a Column or Row; Insert a Comment; Copying and moving Spreadsheet; Naming, inserting and deleting Spreadsheet

Formatting - Formatting Text – setting Font, font size, style; Setting font color, Bold, Italic, Underline cell contents; Text Wrap, Merge & Center; Format Cell values; Copy Formatting with the Format Painter; Cell Alignments; Applying borders; Apply a Cell Style; Format a Cell Range as a Table; Apply a Document Theme; Conditional Formatting ; Page setup options; Setting header and footer in a worksheet; Inserting page number and page breaks in a worksheet; Setting background in a worksheet; Applying Borders and shading; Fill Series; Sorting & Filtering of data ; Using Auto Sum

Calculations in a spreadsheet - Introduction to formulas and Functions; Creating a formula; Using Functions –various functions in MS Excel and its use; Use of Vlookup function; Reference a Cell in a Formula; Create an Absolute Cell Reference

Sorting and Filtering data in a spreadsheet - Data Sorting; Data Filtering and Advanced filtering; Data Validation; Introduction to Pivot Table and create a Pivot table

Working with Charts - Introduction to Chart and its types; Inserting Column and Pie chart; Manipulating charts

Mail merging using worksheet data - Importing address list from Excel file for mail merging

Workbook Views - Various views of a workbook; Freezing Panes; Using macros in a workbook

Protecting the workbook - Protecting a workbook with a password

Printing the worksheet - Page Setup; Setting Print Area and Print Titles; Print Preview and Print options

MS Excel Keyboard shortcuts

Module III - Presentations (10 Hrs)

Learning outcome
- ➢ Knowledge about PowerPoint interface.
- ➢ Creating multimedia presentations.
- ➢ Using design layouts and templates for presentations.

Topics

Create and Manage Presentations using MS-POWERPOINT - The Basics; Introduction to Presentations and slides; Familiarizing PowerPoint Window; Create a New Presentation; Creating a presentation using templates; Open a Presentation; Saving a Presentation

Working with Slides - Inserting a new slide; Selecting a slide layout; Copying slides; Setting slide background; Applying themes to slide layout; Making duplicate slides

Manipulation of Slide contents - Inserting Text Boxes; Formatting text; Creating list with bullets and numbering; Changing Text directions; Inserting pictures, Shapes, Word Art; Inserting Chart inside a slide; Grouping objects in a slide; Inserting slide header and Footer; Different views

Transitions and Animations - Applying various Slide; Transitions; Animate slide contents, custom animation; Set timing for Transitions and Animations; Creating multimedia presentation - add video and audio

Slide Show - Running a slide show; Creating custom slide show

Topics
Introductions to C programming - Structure of a C program - Input and output Statements - Keywords-Data types - Constants - Variables - Declaring Variable Names - Operators and Expressions - Operator Precedence in Expressions - Increment and Decrement Operators - Conditional Statements - simple if - if-else - switch - Implementing Loops in Programs - The While Loop - The do while Loop - The for Loop - Break and Continue Statement

Module III - C Programming: Arrays and Functions (10Hrs)

Learning outcome
- To understand and apply the functions and arrays.   - To implement the features of C language in real world applications

Topics
Arrays - Defining and Manipulating Arrays - Array Variable - Syntax Rules for Arrays - Reading and Writing Multidimensional Arrays. Functions - Functions Definition- Function Calling - Recursive functions - Character Strings -The Character Data Type - Manipulating Strings of Characters- Arrays in Functions.

Module IV - Web Programming: HTML, CSS and JavaScript (10Hrs)

Learning outcome
- To understand the working of a web application.   - Understanding the use of HTML, CSS and JavaScript in websites   - To develop websites.

Topics
Introduction to web technology - Web application- Web server and Application server - Client and Server - Scripting languages HTML and HTML5 - HTML Editors - Elements - Attributes - Headings - Paragraphs - Formatting - HTML Comments - Colors - Fonts - Hyperlink- Images - Tables – Lists -- Iframes - Marquee - Forms - Embedding Audio and video

CSS3 Introduction – Syntax - Selectors - External, Internal & Inline Style sheets - Backgrounds - Colors - Text - Fonts - Links - Border - Outline – Margin - Padding - Align - Positioning – Gradients

JavaScript introduction - Syntax - External & Internal usage - Variables - Operators -- Functions - Events - Comparison - Condition -- Loops - Dialog box - Form Validation.

Module V - Introduction to PHP and Python Programming (10Hrs)

Learning outcome

- ➢ Understand the features and uses of PHP
- ➢ To be able to create web pages using PHP.
- ➢ To get a basic understanding on web servers.
- ➢ To be able to write programs in the Python programming language.

Topics

Introduction to PHP - Advantages of PHP - Where to use PHP - Installing PHP - PHP Syntax - Variables - Echo and Print - Data Types – Constant - Operators - IF Statement - Switch statement - Loops.

Introduction to Python - Data Types - Variables - Basic Input-Output Operations- Keywords- Identifiers - Literals - Punctuations - Operators - Basic loops and conditions - String - List-Set – Tuple - Dictionary.

Detailed Syllabus
(Lab)

DCA 103 - OFFICE AUTOMATION SYSTEMS

Theory Hours - 50 Hrs

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Module V – Social Media & Cyber Security   (10Hrs)

Learning outcome

➢ Understand various social media technologies and their importance in the day to day life.

➢ Benefits of social media in digital marketing and Education,

➢ Awareness on various cybercrimes and cyber security,

➢ Understand copyright and intellectual property rights

Topics

Social Media – Why & what Social Media – Present and Past - Social media Platforms and applications – Usage in business & Education- social media etiquette

Social media and digital marketing

Information Security – Concepts of Security - two factor authentication(2FA) - Biometric authentication methods - Data Encryption and Decryption- Cryptography

Awareness about cyber crime and Cyber security

Cyber crime - What is cyber crime, Understand the term computer Virus and Malware, Email spamming, Email spoofing, Email bombing, Forgery, Hacking, Cyber Stalking or Bullying, Web jacking, Phishing, Pornography, Cookies and threats

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Cyber Laws - An Overview & Scope of Cyber Law - Copyright, Trademarks and Software Patenting - Data Privacy & Confidentiality - Cyber laws in India -   IT ACT-objectives, features, offences

Sharing A Presentation - Convert presentation to PDF ; Convert presentation to Video ; Create an Image from presentation ; Print a PowerPoint Presentation; Broadcast PowerPoint presentation

Open Office Impress - Impress characteristics; Start Impress, Presentation Wizard; Drawing, Zoom, Lines, Rectangle, Freeform line filled, Polygon, Convert objects, Curves; Select objects, Copy objects, Delete objects, Flip objects, Arrange objects, Group objects; Export drawing, Area Fills, Color, Gradient, Hatching, Bitmaps, Transfer settings, Images, Insert images, Filters, Graphics mode, Color, Transparency, Crop, Gallery, Glue points, Size and position, Rotate, Alignment, Text, Text to polygon, Text boxes, Slides, Insert, Clone, Rename, Delete slides; Format, Character, Paragraph, Textbox format, Slide effects, Slide transitions, Sounds ; Automatic transition, Manual transition, Hyperlinks, From text, From images, Bitmaps

Module IV- Basics of Accounting & Billing Systems (10Hrs)

Learning outcome

➢ After going this module one should get an idea about basic accounting components and can familiarize billing system

Topics

Basics of Accounting – Accounting; Business Transaction; Purchase; Sales; Purchase return (Outward invoice); Sales return (Inward invoice); Assets; Liabilities; Capital; Debtors; Creditor; Debit; Credit; Drawings; Receipts; Account; Ledger; Journal entries; Trial balance; Profit; Profit & loss account; Balance Sheet

Billing System – Introduction; Need of Billing System; Features of Billing System; GST Billing; Billing using MS-Excel

Module V - Printing Technologies & Multimedia (10Hrs)

Learning outcome

➢ Knowledge about modern printing technologies, DTP, familiarize with image tools and Multimedia techniques

Topics

Printing Technologies - Introduction to various modern Printing processes; Printing Technology using DTP; Advantages of DTP; Introduction to DTP software; Use of various

tools in MS Paint, GIMP; Importing Graphics; Image Compression; Electronic Image file formats- BMP, JPEG, TIFF, GIF & PNG ; Topographic design; Vector drawing techniques; Portable Document Format (PDF)

Multimedia - Definition; Multimedia systems, elements & applications; Multimedia system architecture; Digital media and Hyper media; Multimedia file formats & standards; Types and methods of compression and decompression; Multimedia I/O Technologies; Adding text, integrating audio with Video; Image enhancing designing techniques; Image authoring and editing tools

DCA 104 - PRINCIPLES OF PROGRAMMING AND WEB TECHNOLOGIES

Theory Hours - 50 Hrs

Module I - Basics of Programming (10Hrs)

Learning outcome

- ➢ Understand the methodology to solve the problem, algorithm, flowchart & coding
- ➢ To identify programming language classifications.
- ➢ To Learn Object oriented programming concepts.
- ➢ Understand the features & architecture of Microprocessor generations and types.

Topics

Algorithms - Properties of a good algorithm - Flowchart - Problem-solving using Computer - Introduction to Programming Languages - Machine Language - Assembly Language - High Level Programming Languages - Procedure Orientation and Object Orientation - Object Orientation concepts - Compiler and interpreter - Introduction to Microprocessor & Microcontroller Programming Operation Cycle (Fetch, Decode, Execute, Store)

Module II- Introduction to C Programming (10Hrs)

Learning outcome

- ➢ To provide an overview of working principles of C language.
- ➢ Construct, compile, link & execute the C programs
- ➢ To learn and implement C language programming techniques.

CENTRE FOR DEVELOPMENT OF IMAGING TECHNOLOGY
TECHNOLOGY EXTENSION DIVISION

SYLLABUS

DIPLOMA IN COMPUTER APPLICATION (DCA)	
Scheme: 2022 Scheme **Duration: 6 Months** **Eligibility: SSLC or Equivalent**	
THEORY SUBJECTS	
DCA 101	**Introduction to Information System**
DCA 102	**Networking and Internet**
DCA 103	**Office Automation Systems**
DCA 104	**Principles of Programming and Web Technologies**
LAB SUBJECTS	
DCA 105	**Lab I-Computer Basics and Office Automation**
DCA 106	**Lab II- Programming in C and Python & Web Application Development**
ANNEXURE	
Assignments for Theory & Questions for Lab	

Detailed Syllabus(Theory)

DCA 101 - INTRODUCTION TO INFORMATION SYSTEM **Theory Hours - 50 Hrs**
Module I - Computer Fundamentals (10Hrs)

Learning outcome

- ➢ Understanding of the concept and architecture of computers.
- ➢ How a computer system works?
- ➢ Learning the basic terminologies.

Topics

Introduction :- Fundamentals - Definition, Hardware, Software, Operating System, data, information etc; Functions and Characteristics; Applications of Computers; Capabilities and Limitations

Familiarise different generations of computer

Computer classifications :- Analogue / Digital / Hybrid, PC, Microcomputer,

Minicomputer, Mainframe computer, Super Computer.

Components of a computer :- Input Unit ; Output Unit ; CPU ; Memory unit

Input devices :– Keyboard; Mouse; Scanner; Digital/ Web Camera; Touch screen; graphic tablet

Output Devices :– VDU; Printer; Audio Output devices; LCD Projector
Intelligent terminal and dump terminal

Memory Unit ; Volatile and Non-Volatile memory ; Primary Memory ; Secondary Memory ; BIOS Memory ; Cache Memory ; Virtual memory ; SIMM ; DIMM ; Storage devices; online / offline storage.

Familiarisation of other hardware components :- SMPS ; Motherboard ; Video Cards - PCI, PCI Express, and AGP ; Multimedia Cards - Sound Cards, TV Tuner Cards and Capture Cards ; I/O Cards - SCSI, Serial, USB, and Parallel ; Communications Cards - NICs and Modems

Ports :– Characteristics and different types - Serial, Parallel, USB, Ethernet port etc

Configuring the Peripheral Devices ; methods for connecting peripherals to system - different types of cable connection, explain Bluetooth and Wi-Fi / IR, NFC connectivity

Data representation in computers :– Number System - Types, examples, Conversion rules ; Coding system - ASCII, BCD, EBCDIC, ISCII, Parity Bit, etc.

Units :– Time Units - Milliseconds, Microseconds, Nanoseconds, Pico seconds ; storage units - Bit, Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte, Peta Byte, Exa Byte, Nibble.

Module II - Basics of Information Technology (10Hrs)

Learning outcome

> Acknowledge the role of technologies in today's society
> To identify the basic hardware and software components of a computer and explore their functioning
> Learn about various operating systems

Topics

Introduction to IT – Role of IT in society - Advantages and Disadvantages, Characteristics and features of IT, Application areas - Science and Engineering, Education, Business and Commerce, Medicine and Entertainment – Advantages & Disadvantages of IT

Basics of Computer System – Generations & Peripheral devices – Hardware – Software - system software & application software-off the shelf and custom software-programming languages-compilers-interpreters– Operating systems: structure & functions – Types of Operating system: Batch processing OS, Mutitasking OS, Multiprocessing OS,Time sharing OS ,Real Time OS, Distributed OS, Network OS-Examples of OS: MS-DOS, MS-Windows, Linux Ubuntu, Apple Macintosh

Data and information Concepts -- Importance of data and information, Difference between data and information

Introduction to ITES (IT Enabled Services) – what are IT enabled services? Benefits and threats, ITES fields - BPO – GIS – Call Centers – Data Management Services – Medical Transcription – Data Digitization, Web services, Payroll management, Telemarketing

Module III - Basics of Software (10Hrs)

Learning outcome

- ➢ Distinguish System software and Application software.
- ➢ Commonly used operating systems.
- ➢ Identify the primary functions of Operating Systems.
- ➢ Installation and configuration of software.

Topics

Types of Software :– Software - System software , Application software, Utility Software ; Demo ware ; Shareware ; Freeware ; Firmware ; Free and Open Source Software.

Operating Systems :– Functions, Types – Batch Processing , Single User, Multi User, Multiprogramming, Multi-Tasking (Multiprocessing); Familiarise Multithreading

Booting and Shutdown of Computers ; BIOS ; POST ; Master Boot Record(MBR) Introduction to old versions of Windows OS

Detailed study of Windows :– Overview ; GUI basics (Desktop, taskbar, icons, desktop background management) ; Navigation (Start menu, File explorer) ; Accessories ; Control Panel ; User Account management ; storage management ; file and folder management ; keyboard shortcuts ; data backup

Familiarise Ubuntu Linux :– Introduction ; History ; Versions ; basics

Familiarising Command mode :- Windows (DOS) ; Linux (Terminal)

Familiarize other operating systems :– UNIX ; Apple Macintosh

Linux commands

Computer Virus :– Introduction ; Mechanism of Virus ; How a virus spreads ; How is virus named ; A few prominent viruses ; Types of Computer Virus ; Related Concepts - Antivirus programs - Norton antivirus program

Module IV - Basics of Information System (10Hrs)

Learning outcome

- ➢ Knowledge about information system, its capabilities and uses with IT infrastructure in a business enterprise to achieve desired goals.

Information System :- Data, Information & System ; Information System; Dimensions of Information System - Organization, Management, IT ; Functions of Information System

Business Information Systems :- Role of Business Information Systems - Top, Middle, Bottom ;

Types of Business Information Systems - TPS, MIS, EIS, DSS, AI/Expert Systems

Management Information System(MIS) :- Objectives ; Components ; Functions ; Resources ; Characteristics; Terminologies and Applications

Enterprise System and Types :- ERP ; CRM ; SCM

Module V – Basics of Databases (10Hrs)

Learning outcome

> ➢ Knowledge about data processing, data management systems, relational data model, familiarize MS Access, SQL and importing of Excel files.

Topics

Database Management System – Introduction; Data Processing Vs. Data Management Systems ; Database Concepts; Characteristics of Database; Types of Database System; Advantages and Disadvantages of a DBMS ; Database Administrators and Database Users

Creating database using MS Access - Importing Excel files to MS Access; Using Forms-creating a form and editing data using form

Relational Model Concepts - Data Definition Language (DDL) ; Data Manipulation Language (DML); Introduction to SQL; SQL commands; Importing Excel files to SQL; Familiarise MySQL, NoSQL and Oracle

DCA 102 - NETWORKING AND INTERNET
Theory Hours - 50 Hrs

Module I - Computer Networks (10Hrs)

Learning outcome

➢ Knowledge about networking technologies and types of networks, devices used, security devices, topologies, nodes, mobile communication and latest technologies

Topics

Introduction to Computer Networks - Evolution of Networking, Wired & Wireless Networking

Types of Networks - LAN (Local Area Network) , MAN (Metropolitan Area Network) , WAN (Wide Area Network) , PAN (Personal Area Network)

Network Devices - Hub, Switch, Router, Bridge, Gateway; Modem, Repeater, Access Point; Modem, Ethernet Card, RJ11, RJ45

Network Security Devices - Active Devices, Passive Devices, Preventative Devices, Unified Threat Management (UTM), Firewalls

Integrated Services Digital Network (ISDN)

Networking Topologies - Bus Topology, Star Topology, Ring Topology, Mesh Topology, Tree or Hybrid Topology

Nodes in a Networked Communication - Types of Nodes, MAC Address, IP Address, IPv4, IPv6

Connecting to Internet - Connecting the computer to the Internet

Types of connectivity – Dial-up; Wired broadband connectivity - ISDN, Cable Internet, DSL, Leased Line, FTTH; Wireless broadband connectivity - Mobile broadband, Wi-MAX, Satellite broadband

Internet Access sharing methods - LAN, Wi-Fi, Li-Fi

Services on Internet - World Wide Web (WWW), Browser, Web browsing, Search Engines, E-mail, Social media; Various stages of Data Transfer from Server to Client; Domain Name; Resolution; Mobile communication;