Structure & Syllabus for Semester-I

BACHELOR OF COMPUTER APPLICATIONS (BCA) Programme

Gujarat University

2023 – 2024

As per NEP 2020 CURRICULUM AND CREDIT FRAMEWORK FOR UNDERGRADUATE PROGRAMMES, UGC

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of

Education Department, Govt. of Gujarat

STRUCTURE FOR SEMESTER - 1
GUJARAT UNIVERSITY
Bachelor of Computer Applications (B.C.A.)
(as per NEP 2020)

COURSE:	**Bachelor of Computer Applications (B.C.A.)**
MAJOR:	**COMPUTER APPLICATIONS**
MINOR:	**1. COGNITIVE MATHEMATICS**
	2. DATA SECURITY
	3. WEB TECHNOLOGIES

SEMESTER - 1

MAJOR

CODE	COURSE	CREDITS
DSC-C-BCA-111T	Elements of Programming and Computer Organization	4
DSC-C-BCA-112P	C Programming Practical	4

MINOR

CODE	COURSE	CREDITS
DSC-M-BCA-113T	Mathematical Foundation	2
DSC-M-BCA-113P	Office Automation - Practical	2
	OR	
DSC-M-BCA-113T	Data Encryption and Compression Techniques	2
DSC-M-BCA-113P	Data Encryption and Compression Techniques-Practical	2
	OR	
DSC-M-BCA-113T	Introduction to Web Technologies	2
DSC-M-BCA-113P	Web Designing - Practical	2

Semester - I

BACHELOR OF COMPUTER APPLICATIONS

MINORS

1. **COGNITIVE MATHEMATICS (CG)**
2. **DATA SECURITY (DS)**
3. **WEB TECHNOLOGIES (WTECH)**

Course Name: Mathematical Foundation

Course Code: DSC-M-BCA-113T

Credits: 2

Course Outcomes:

The aim of this course is to enable students to

- CO1: Provide with the knowledge and skills necessary to interpret and use basic mathematical data, symbols and terminology useful in computer science.
- CO2: Gain the knowledge of the subject that forms the base of computer science.

Prerequisites: Basic knowledge of Mathematics.

Contents:

No.	Particulars	Hours	Credits
Unit 1.	**Matrices, Determinant & Set Theory** **Matrices:** Definition of Matrix, Types of Matrix (Square, Row, Column, Zero, Diagonal, Scalar, Identity, Transpose, Symmetric, Skew-symmetric), Arithmetic operations of Matrices (Addition, Scalar Multiplication, Matrix Multiplication), **Determinant:** Introduction to Determinants with Basic properties, Invertible matrix, Computation of Inverse using Definition, Simultaneous Solution of set of Linear equations using Cramer's Rule, Matrix Inversion method, Rank of Matrix, **Set Theory**: Basic definition of Set Theory, Methods of representation of Set (Property method, Listing method), Set operations (Union, Intersection, Complement of a set, Difference of sets, Symmetric difference, Cartesian product of sets), Properties of set operations (Commutative, Associative, Distributive, De-Morgan's laws), Power set and Cardinality of sets.	**15 Hrs**	**1**
Unit 2.	**Function, Logic & Propositional Calculus, Relations and Ordering** **Function**: Introduction of Functions, Definition of function, Domain, Co-domain and Range of a function, **Logic & Propositional Calculus**: Definition, Statement (Proposition) & Notation, Truth Values, Connectives: Negation, Conjunction, Disjunction, Implication (condition), Bi-implication (Bi-conditional), Truth Tables for all Connectives, Statement Formulas (Well-formed Formulas), Truth Tables, Tautologies, Contradiction, **Relations and Ordering**: Basic concepts of binary relation, Total no. of distinct relations,	**15 Hrs**	**1**

Relation matrix and the graph of a relation, Basic properties of binary relations in a set, Equivalence relations and equivalence classes, Covering and partition of a set, Partial ordering and partially ordered set, Comparable elements, Chain, Cover of an element, Hasse diagram, Least, Greatest, Maximal, Minimal elements, Lower and upper bounds of posets.

References:

1. Business Mathematics (Latest Edition) Publisher : S.Chand and Sons Publications By: D.C. Sancheti & V.K Kapoor
2. J.P. Tremblay and R. Manohar McGraw- Hill Publication
3. Discrete Mathematics Publisher: Oxford University Press By Swapankumar Chakaborty, Bikas Kanti Sarkar
4. Discrete Mathematics Publisher: Cengage Learning By D.S. Malik, M.K.Sen
5. Elementary Engineering Mathematics Publisher : Khanna publisher By : BS. Grewel
6. J. P. Tremblay and W. K. Grassman. “Logic and Discrete Mathematics”, Pearson Education
7. Ralph P Grimaldi & B V Ramana, “Discreet and Combinatorial mathematics: An Applied Introduction”, Pearson Education, 5th Edition (2018)

Accomplishments of the student after completing the Course:

On the completion of the course students will:

1. Understand concepts of Set Theory, Coordinate Geometry, Matrix Algebra and Calculus.
2. Solve simple application problems related to Computer Science based on these.
3. To become reasonably good at problem solving and algorithm development.
4. Students also enhance their ability to think logically and mathematically

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Course Name: Office Automation- Practical

Course Code: DSC-M-BCA-113P

Credits: 2

Course Outcomes:

At the end of the course, the student will be able

- CO1: To get acquainted with the features and basic commands of CLI.
- CO2: To use basic as well as advance features of Open Office Automation tools.
- CO3: To appreciate the use of application software in professional field.

Prerequisites: No Prerequisites

Contents:

No.	Particulars	Hours	Credits
Unit 1.	**CLI versus GUI and Writer- The Word Processor:**	**30 Hrs**	**1**

Introduction to DOS and Windows: DOS: Introduction, Comparison with GUI, Wildcard characters, **Working with DOS commands**: dir, md, rd, cd, copy, type, del, ren, date, time, cls, ver, move, attrib, xcopy, batch file. **Windows:** Introduction, Booting Process, Components Of Windows Desktop, Icon, My computer, My documents, Network, Neighborhood, Recycle bin, Start menu, Taskbar, Windows explorer, **Control Panel:** Date & time, Display, Mouse, User accounts, Add & remove programs, Files and Folders Creating Folder, Folder Operations (copying , moving and deleting), Creating files & file operations, Creating Shortcut, **System Tools:** Disk Defragmentation

Introduction to Open Text Document: Creating text documents, **Working with text**: basic formatting like bold, italic, underline, change color, font, font effects, change case etc., basic editing like select-cut-copy-paste, paragraph formatting, number & bullet list, navigation find & replace etc., **View and page layout**: font work, print layout, page margin, add header, footer, footnotes, endnotes, using columns etc. **Advance Features**: Working with tables and graphics, Mail Merge, Other Features: Autocorrect, Autotext, Macros, Protecting documents.

Unit 2. Impress – The Presentation and Calc – The Spreadsheet: 30 Hrs 1

Introduction to Presentation: Creating, browsing & saving Presentation, Editing & formatting slides, Working with objects, **Enhancing presentation using multimedia:** Transitions, Add sound, image, video, Preset Animation, Rehearse Timings, Pack & go wizard, Pen, Custom Show.

Introduction to Spreadsheet: Concept of Workbook, Worksheet, Workspace, Types of data, Formatting Workbook, Conditional formatting, Sorting Data, **Advance Features**: Data validation, Data filter (Auto & Advance), Charts, What if analysis: Goal seek, Scenario, Protecting Worksheet, Types of error, **Functions and Formula**: **Mathematical**: round, ceiling, floor, fact, subtotal, sum , sumif, **Logical**: AND, OR, NOT, if, **Statistical**: min, max, avg, count, **Text**: concatenate, exact, find, left, right, len, lower, upper, trim, **Lookup**: Hlookup, Vlookup, **Date and Time:** date, day, days360, hour, minute, now, second, time, today, year

References:

1. Working with Personal Computer Software (Second Edition 2010) Publisher: Wiley India, New Delhi By R.P.Soni, Harshal Arolkar , Sonal Jain
2. Openoffice.org for dummies Publisher: Wiley Publishing, Inc. By Gurdy Leete, Ellen Finkelstein, and Mary Leete

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- To gain basic knowledge of CLI.
- To develop skills for effective use of the Open Office tools by preparing and applying various features in documentation, spreadsheet and presentation.

Course Name: Data Encryption and Compression Techniques

Course Code: DSC-M-BCA-113T

Credits: 2

Course Outcomes:

The aim of this course is to enable students to

- CO1: Cover the concept of security, types of attack experienced
- CO2: Use encryption and authentication to deal with attacks,
- CO2: Understand what is data compression, need and techniques of data compression.

Prerequisites:

Linear Algebra

Contents:

No.	Particulars	Hours	Credits
Unit 1.	**Introduction to Security and Encryption Techniques**	**15 Hrs**	**1**
	Introduction to Security: Need for security, Security approaches, Principles of security, Types of attacks, **Encryption Techniques**: Plaintext, Cipher text, Substitution & Transposition techniques, Encryption & Decryption, Types of attacks, Key range & Size, **Symmetric & Asymmetric Key Cryptography**: Algorithm types & Modes, DES, IDEA, Differential & Linear Cryptanalysis, RSA, Symmetric & Asymmetric key together, Digital signature, Knapsack algorithm.		
Unit 2.	**Introduction to Data Compression:**	**15 Hrs**	**1**
	Introduction: Need for data compression, Fundamental concept of data compression & coding, Communication model, Compression ratio, Requirements of data compression, Classification. **Methods of Data Compression**: Data compression-- Loss less &Lossy, Recent trends in encryption and data compression techniques		

References:

1. Cryptography and Network Security, Mohammad Amjad, John Wiley & Sons.
2. Cryptography & Network Security by Atul Kahate, TMH.
3. Information Theory and Coding, Muralidhar Kulkarni, K S Shivaprakasha, John Wiley & Sons.
4. Cryptography and Network Security by B. Forouzan, McGraw-Hill.
5. The Data Compression Book by Nelson, BPB.

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- At the end of this course the student will have the knowledge of how data encryption and data compression techniques work in cryptography and cyber security.

Course Name: Data Encryption and Compression Techniques- Practical

Course Code: DSC-M-BCA-113P

Credits: 2

Course Outcomes:

The aim of this course is to enable students to

- CO1: Practically implement the concept of security,
- CO2: Apply encryption and authentication to deal with attacks
- CO3: Apply techniques of data compression.

Prerequisites:

- Cryptography
- Basic Knowledge of Programming

Contents:

No.	Particulars	Hours	Credits
Unit 1.	**Encryption Techniques:** 1. Write a C program to encrypt string using Caesar cipher encryption. 2. Write a C program to decrypt string using Caesar cipher decryption. 3. Write a C program to encrypt string using RSA encryption. 4. Write a C program to decrypt string using RSA decryption. 5. Write a C program Encrypt & Decrypt Message using Substitution Cipher. 6. Write a C program Encrypt & Decrypt Message using PlayFair (Monarchy) Cipher. 7. Write a C program Encrypt & Decrypt Message using Transposition Cipher. 8. Write a C Program to Encrypt & Decrypt Files. 9. Write a C program Encrypt & Decrypt Message using Vernam Cipher. 10. Write a C Program to implement Huffman algorithm.	**30 Hrs**	**1**

Unit 2. Data Compression techniques: **30 Hrs** **1**

1. Write a C Program to compress file.
2. Write a C Program to decompress file.
3. Write a C Program to compress text using Huffman algorithm.
4. Write a C Program to decompress text using Huffman algorithm

References:

1. Cryptography and Network Security, Mohammad Amjad, John Wiley & Sons.
2. Cryptography & Network Security by Atul Kahate, TMH.
3. Information Theory and Coding, Muralidhar Kulkarni, K S Shivaprakasha, John Wiley & Sons.
4. Cryptography and Network Security by B. Forouzan, McGraw-Hill.
5. The Data Compression Book by Nelson, BPB.

Other web references:

https://scanftree.com/programs/c/
http://www.trytoprogram.com/c-examples/c-program-to-encrypt-and-decrypt-string/
https://codescracker.com/c/program/c-program-encrypt-file.htm

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- At the end of this course the student will have the knowledge of how data encryption and data compression techniques work in cryptography and cyber security.

Course Name: Introduction to Web Technologies

Course Code: DSC-M-BCA-113T

Credits: 2

Course Outcomes:

At the end of the course, the student will be able

- CO1: To develop the skills in the basic and important terminology of HTML.
- CO2: To learn the basic differences between HTML and HTML5.
- CO3: To gain knowledge of basic and advanced HTML tags with features like frames, multimedia, images, and forms.
- CO4: To become familiar with web site creation and design fundamentals using HTML scripting and CSS.

Prerequisites:

Nil

Contents:

No.	Particulars	Hours	Credits
Unit 1.	**Getting Started with HTML 5, Working with Text, Hyperlink, List, Tables, Frames and Images** Introduction to HTML5: New structure, New form elements and attributes, Browser support, Basic structure of HTML document, Modifying the background of an HTML webpage: Adding background color, Adding background Image, Specifying metadata about an HTML Web Page, Introduction to New Elements in HTML5: The Markup elements, Working with Text: Adding a plain text to an HTML webpage, Adding text in new line, Creating headings on webpage, Creating a paragraph, Creating a horizontal rule, Creating a subscript and superscript, Aligning the text, Formatting the text, Grouping the text, Indenting quotations, Working with character entities, Commenting the text, Working with Hyperlink: Creating hyperlinks, Setting hyperlink color, Linking Different sections of page, Working with Lists: Creating an Unordered list, Creating an Ordered list, Creating an Definition list, Nested lists, Working with Tables: Creating a Table, Specifying a caption to a table, Adding a table heading, Setting the table border, Aligning a table and cell content, Changing the background color of a table, Setting a cell padding and cell spacing, Nesting tables, Working with Frames: Creating a frame, Defining new element-specific attributes, Specifying	15 Hrs	1

width and height of a frame, Applying hyperlink target to a frame, Working with Images: Inserting an image on web page, Display alternate text for an image, Adding border to an image, Align an image, Using image as links, Creating image maps.

Unit 2.	**Working with Multimedia, Forms and Controls, CSS (Cascading Style Sheet)** Working with Multimedia: Embedding multimedia on web page, Creating a link to a multimedia file, Using the <object> tag insert objects, Working with Forms: Creating an HTML Form, Specifying the action URL and the method to send form, Adding Controls to an HTML Form : Using the<input> tag with all attributes, Adding Text Area using <textarea>, Adding selection control, Understanding new form elements: The <datalist> element, The <keygen> element, The <output> element, Grouping the controls of HTML Forms, Specifying a Label for control, CSS Introduction: Understanding the concepts of CSS, Advantages and disadvantages, CSS syntax : Grouping selectors and rulers, Using the class selectors, Using the ID selectors, Comparing ID and classes selectors, Using CSS comments, Types of Style sheets: External, Internal, Inline, CSS properties and text attributes: Color, Alignment, Decoration, Transformation, Indent, Letter spacing and word spacing, White space, Line-height, Direction, Unicode-bidi, CSS Padding: Using padding properties, Setting padding for all sides, Setting padding for each side, List properties: Setting list-style-image, list-style-position, list-style-type, list-style, CSS positioning: relative, absolute, fixed and Z-index, CSS properties and table attributes.	**15 Hrs**	**1**

References:

1. Kogent Learning Solutions Inc., "*HTML 5 in SIMPLE STEPS*", DREAMTECH PRESS
2. Deven N. Shah, Kogent Learning Solutions Inc., "*A Complete Guide to Internet and Web Programming*", DREAMTECH PRESS
3. C Xavier, "*World wide web Design with HTML*", 1st Edition, Tata McGraw Hill
4. Julie C. Meloni, Jennifer Kyrnin, "*Sams Teach Yourself HTML, CSS, and JavaScript All in One*", 3rd Edition, Pearson Education
5. Thomas A Powell, "*The Complete Reference HTML and CSS*", 5th Edition, Thomas A Powell
6. Jason Cranford Teaue, "*DHTML and CSS Advanced*", 1st Edition, Pearson Education

E-Resources:

1. https://www.w3schools.com/html/html5_intro.asp
2. https://www.w3schools.com/css/
3. https://www.tutorialspoint.com/css/index.htm

Accomplishments of the student after completing the Course:

After completion of this course, students will be able to

- Design web pages using simple and advanced tags in HTML5.
- Change the overall look and style of a website by making some changes in the CSS code.
- Once students have knowledge of the basics of CSS and HTML, other associated technologies like Angular, PHP, and JavaScript become easier to understand.

Course Name: Web Designing - Practical

Course Code: DSC-M-BCA-113P

Credit : 2

Course Outcomes:

The aim of this course is to enable students to

- CO1: To develop the skill about the basic and important terminology of HTML.
- CO2:Students will also able to gain knowledge of basic and advanced HTML tags with HTML features like frame, multimedia, Images and forms.
- CO3:To make the students able for web site design fundamentals using HTML scripting.
- CO4: Learn the basic differences between HTML and HTML5.
- CO5: To make familiar with web page creation tool like CSS.

Prerequisites:

Nil

No.	Particulars	Hours	Credits
Unit 1.	**Working with Basic elements of HTML 5, Texts, Hyperlink, Tables, Lists, Frames and Images**	**30 Hrs**	**1**

1. Develop an HTML document by using all markup elements.
2. Develop an HTML document for a web page of your favourite place.
3. Design the page with an attractive background Music, text colour and background image.
4. Develop an HTML document for a web page of any subject introduction.
5. Design The page with an attractive colour combination, with suitable headings and horizontal rules.
6. Demonstrate use of all text formatting tags (Eg.font,sup,sub,I,b,u etc..)
7. Make 3 attractive webpages and provide link between them, Demonstrate use of link in different sections of page.(use of internal link)
8. Show Use of special character in html.
9. Create Following tables (Use all properties of table)

ID	Name	Subject	Marks
1	David	Maths	80
		Physics	90
		Computers	70
2	Alex	Maths	80
		Physics	70
		Computers	90

Khanewal Self Store			
Item/Desc	QTY	Price/Unit	Total
Sugger	5kg	50	250
Cooking Oil	2kg	200	400
Soap	4 Pices	40	160
Sub Total			810
Tax		5%	41
Total Bill			851

10. Demonstrate use of <ol> tag.

Example of Ordered List

i. FYBCA
ii. SYBCA
iii. TYBCA
C. FYBBA
D. SYBBA
E. TYBBA

11. Demonstrate use of <ul> tag

Example of Unordered List

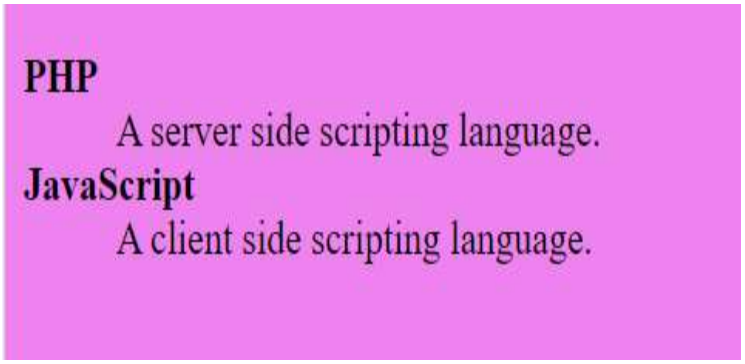
- Item 1
- Item 2
- Item 3

- Item 1
- Item 2
- Item 3

- Item 1
- Item 2
- Item 3

12. Demonstrate use of nested list.

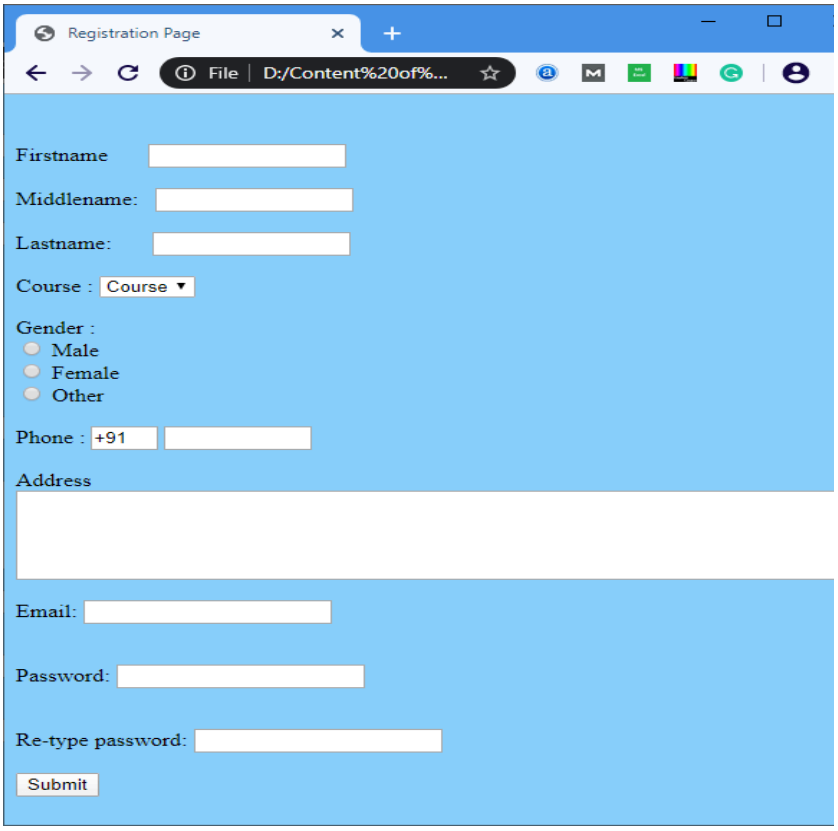
13. Demonstrate use of Definition list.



14. Show use of iframe including hyperlink and target (there should be minimum 4 pages)
15. insert image in an HTML Document
    (provide alternatetext for an image,
    border to an image, Align an image and link on page)
16. Develop an HTML document to display image and also show image maps.
17. Develop an HTML document for creating a link to a multimediafile.

Unit 2 Working with Multimedia, Forms& Controls and CSS. 30 Hrs 1

1. Demonstrate use of <object> tag and insert video audio and image in html document.
2. Develop an HTML document for Registration form with validation.



3. Develop an HTML document for Login page and provide link to next page
4. Example of <input> with its all values and attributes, Example of <output> element
5. Example of <datalist>Element.

6. Example of <keygen> element
7. Example of Specifying Label for a control.
8. Example of Internal Style Sheet. (using id selector)
9. ExampleofInline Style Sheet
10. Example of External Style Sheet.(using class selector)
11. Develop your academic time table in HTML using <table>

Tag and use class to change the Background of different allows of your time table

12. Demonstrate use of text attributes(Color, Alignment, Decoration, Transformation, Indent, Letter spacing and word spacing, White space, Line- height, Direction)
13. Demonstrate use of Border & List attributes. (Setting list, style, image, list style, position, list, style, type, list, style)
14. Create HOME page of your college using CSS
15. Create Feedback form using table and provide CSS to webpage as well as on table
16. Insert image in webpage and provide CSS on image.

References:

1. Book : HTML and CSS: Design and Build Websites : Jon Duckett.
2. HTML & CSS: The Complete Reference, Fifth Edition (Complete Reference Series) : Thomas A. Powell
3. https://www.w3schools.com
4. https://www.javatpoint.com/html-tutorial

Accomplishments of the student after completing the Course:

After completion of this course, students will be able to

- Students can design proper Layout and Structure
- Students can be Proficient in HTMl
- Students have Understanding of Web Standards