Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj
Master of Science (Computer Applications & Information Technology)
Semester: II

Paper Code: CCCS205		**Total Credit :** 4
Title of Paper: Introduction to Data Structure and Algorithm		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Introduction** Variables, Data Types, Data Structures, Abstract Data Types (ADTs) What is an Algorithm? Why the Analysis of Algorithms? Goal of the Analysis of Algorithms, What is Running Time Analysis? How to Compare Algorithms, What is Rate of Growth? Commonly Used Rates of Growth, Types of Analysis, Asymptotic Notation, Big-O Notation, Omega-Ω Notation, Theta-Θ Notation, Why is it called Asymptotic Analysis? Guidelines for Asymptotic Analysis, Properties of Notations, Commonly used Logarithms and Summations, Master Theorem for Divide and Conquer, Divide and Conquer Master Theorem: Problems & Solutions, Master Theorem for Subtract and Conquer Recurrences, Variant of Subtraction and Conquer Master Theorem, Method of Guessing and Confirming, Amortized Analysis Algorithms Analysis: Problems & Solutions	**20%**
II	**Recursion and Backtracking** Introduction, What is Recursion? Why Recursion? Format of a Recursive Function, Recursion and Memory (Visualization), Recursion versus Iteration, Notes on Recursion, Example Algorithms of Recursion, Recursion: Problems & Solutions, What is Backtracking? Example Algorithms of Backtracking, Backtracking: Problems & Solutions **Linked Lists** What is a Linked List? Linked Lists ADT, Why Linked Lists? Arrays Overview, Comparison of Linked Lists with Arrays and Dynamic Arrays, Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists, A Memory-efficient Doubly Linked List, Unrolled Linked Lists Skip Lists, Linked Lists: Problems & Solutions	**20%**
III	**Stacks** What is a Stack? How Stacks are Used, Stack ADT, Applications Implementation, Comparison of Implementations, Stacks: Problems & Solutions **Queues** What is a Queue?, How are Queues Used, Queue ADT, Exceptions Applications, Implementation, Queues: Problems & Solutions	**20%**
IV	**Trees** What is a Tree? Glossary, Binary Trees, Types of Binary Trees, Properties of Binary Trees, Binary Tree Traversals, Generic Trees (N-ary Trees), Threaded Binary Tree Traversals (Stack or Queue-less Traversals), Expression Trees, XOR Trees, Binary Search Trees (BSTs), Balanced Binary Search Trees, AVL (Adelson-Velskii and Landis) Trees, Other Variations on Trees	**20%**
V	**Algorithms Design Techniques** Introduction, Classification, Classification by Implementation Method Classification by Design Method , Other Classifications **Greedy Algorithms** Introduction, Greedy Strategy, Elements of Greedy Algorithms, Does Greedy Always Work? Advantages and Disadvantages of Greedy Method, Greedy Applications, Understanding Greedy Technique Greedy Algorithms: Problems & Solutions **Divide and Conquer Algorithms**	**20%**
Basic Text & Reference Books :-		
1.	Data Structures And Algorithmic Thinking With Python, Narasimha Karumanchi, CareerMonk Publications	
2.	Introduction to Algorithms, Thomas H. Cormen, Prentice-Hall of India	

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Title of Paper: Introduction to Data Structure and Algorithm			
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, Full Forms, True/False, Match the Following)	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 / Long Questions. (With Internal Option)	08	

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Master of Science (Computer Applications & Information Technology)
Semester: II

Paper Code: CCCS206 **Title of Paper:** Introduction to Internet and Web Programming		**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**The Internet and Web Browsers** Introduction to the Internet, History of the Internet Services provided by the Internet, Some basic terminology and concepts (WWW, URL, webpage, web site, web servers, web browsers, HTML, search engines, etc.) Components of a browser window, Use of menus and toolbar buttons History and navigation, Setting basic options, security and privacy precautions, Managing bookmarks/favorites, Tabbed browsing, downloading files, saving web pages for offline reading	**20%**
II	**Web Page Designing-I** An introduction to HTML HTML tags Structure of an HTML document Text and paragraph formatting Ordered and unordered lists, nested lists	**20%**
III	**Web Page Designing-II** HTML tables Hyperlinks Images Frames, framesets, nested framesets	**20%**
IV	**Web Page Designing-III** Designing HTML forms, Webpage layout, Introduction to a selected website development tool, Key features of the website development tool, Developing websites using the tool, Defining Style with HTML Tags, Features of Style Sheet.	**20%**
V	**Introduction to Java Script:** Introduction, Using operators, control statements, user defined functions, working with built-in objects: window object, document object, string object, array object and date object. Handling events in JavaScript A brief Introduction to Dreamweaver, Planning and creation of web Site, Site Management	**20%**
Basic Text & Reference Books :-		
1.	Ivan Bayross, "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", BPB, 2004	
2.	Douglas E Comer: The Internet, PHI, Second Edition, May 2000	
3.	Xavier C : World Wide Web Design With HTML, Tata McGraw Hill Publication, 2000	

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Semester: II

Paper Code: CCCS206			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Fundamental of Internet and Web Programming			
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, Full Forms, True/False, Match the Following)	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 based on Table Designing. (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) Java Script Program. (With Internal Option)	08	

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Semester: II

Paper Code: CCCS207	**Total Credit :** 4
Title of Paper: Practical Based on CCCS205	**Total Marks :** 70 **Time :** 3 Hrs

Unit	**Description**	**Weighting**

Recursion and Backtracking

1. Solving Tower of Hanoi Problem.
2. Given an array, check whether the array is sorted or not using recursion.
3. Generate all the binary strings with *n* bits. Assume *A*[0…n-1] is an array of size *n*.

Linked List

4. Implement Stack using Linked List.
5. Check whether the given Linked List is either null terminated or not, if there is a cycle, find the start node of the loop.
6. Insert a node in sorted Linked List.
7. How to display a Linked List from end?

Stacks and Queues

8. Evaluate postfix expressions with Stack.
9. Given a Stack, how to reverse the Stack using only Stack operations push and pop.
10. How to implement three Stacks in one array? Every node in array should be used.
11. Given an array of elements, replace every element with nearest greater element on the right of that element.
12. Implement a Queue using just two Stacks, How can we efficiently implement one Stack using two Queues.
13. Given a string, check whether it is palindrome or not using a double ended queue.

Trees

14. Searching an element in a binary tree (with and without recursion).
15. Inserting an element into a binary tree.
16. Finding deepest node of the binary tree.
17. For a given binary tree (not threaded) how do we find a pre-order successor?

NOTE: This list is not exhaustive; the instructor should formulate appropriate problems wherever required.

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Total Marks : 70
Time : 3 Hrs</td></tr>
<tr><td colspan="3">Title of Paper: Practical Based on CCCS205</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Unit</td><td colspan="2">Description</td><td>Total Marks</td></tr>
<tr><td rowspan="2">I</td><td>Q.1 (A) Viva – Voce</td><td>20</td><td rowspan="2">70</td></tr>
<tr><td>Q.1 (B) Practical</td><td>50</td></tr>
</table>

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Semester: II

Paper Code: CCCS208	**Total Credit :** 4
Title of Paper: Practical Based on CCCS206 and Elective Courses	**Total Marks :** 70 **Time :** 3 Hrs

Description

1. Develop a simple web page having attractive background color, text color.
2. Develop a HTML document for a web page of your course detail. Design a page with attractive font, suitable heading and horizontal rules (use paragraph and line tag).
3. Develop a HTML document with an example of Ordered Lists and Unordered List.
4. Develop a HTML document for a web page of your favorite teacher. Design a page with attractive color combination, suitable headings and appropriate text styles.
5. Develop a HTML document for a web page having the Image and also indicate the another image as background.
6. Develop a HTML document for a web page with an example of Table Format having the information of Hardware and Software used in your lab.
7. Develop a HTML document for a web page of your Bio-Data with use of Table tag.
8. Develop a HTML document for a web page with use of frame and frameset tag.
9. Develop a HTML document for a web page which linking with another pages.
10. Develop a HTML document having the Student Information Form.(Use all necessary tags)
11. Develop an HTML document which will use style sheets. Use inline style sheet and external style sheet.
12. Develop an HTML document for a web page of your favorite National Leader. Design the page with an attractive color combination, with suitable headings and horizontal rules.
13. Write an HTML document with an example of Table format to print your Telephone Bill.

    Write an HTML code for designing the subscription form of mail account in the e-mail website with appropriate fields.
14. Looping and Branching practices of Java Script
15. User defined practices of Java Script
16. Java Script implementation of objects

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<tr><td colspan="3">Title of Paper: Practical Based on CCCS206 and Elective Courses</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Unit</td><td colspan="2">Description</td><td>Total Marks</td></tr>
<tr><td rowspan="2">I</td><td>Q.1 (A) Viva – Voce</td><td>20</td><td rowspan="2">70</td></tr>
<tr><td>Q.1 (B) Practical</td><td>50</td></tr>
</table>

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Semester: II

Paper Code: FCCS203		**Total Credit :** 4
Title of Paper: Mathematical Foundation of Computer Science-I		**Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Set Theory** Introduction of Set Types of Sets Operations on Sets Venn Diagram Laws related to set theory Numerical based on operations on sets and Venn diagram Application and Importance of Set Theory in Computing Science	**20%**
II	**Matrices** Introduction of Matrix Types of Matrices Operations on Matrices Cramer's Rule Adjoin, Minor and Inverse of a Matrix Solving equation using matrices Determinant of Matrix Application and Importance of Matrices in Computing Science	**20%**
III	**Graph Theory** Introduction of Graph Multi-graph, Degree of vertex Paths , connectivity, sub-graph Connected components, cut points, bridges Special Graphs: complete, regular and bipartite graphs Matrices and Graphs Application and Importance of Graph Theory in Computing Science	**20%**
IV	**Functions** Introduction to Functions Domain and Range Types of Functions Numerical based on functions	**20%**
V	**Elementary Data Analysis** Discrete and continuous frequency distribution, Cumulative Frequency, Distribution, Graphical Representation, Measures of central tendency: Mean, Median, Mode.	**20%**
Basic Text & Reference Books :-		
1.	S.Lipschutz and Marc Lars Lipson : Discrete Mathematics, Schaum's series (Interational edition,1992).	
2.	Vinay Kumar: Discrete Mathematics (BPB Publication, First edition-2002)	
3.	S. C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, 2004.	

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Paper Code: FCCS203			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Mathematical Foundation of Computer Science-I			
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, Full Forms, True/False, Match the Following)	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 based on Table Designing. (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 / Long Questions. (With Internal Option)	08	

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Semester: II

Paper Code: CECS204 **Title of Paper:** Elements of C Programming		**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	**Concept of Algorithm, Flowchart and Languages** Concept of an algorithm and a flow chart, need and definition Symbols used to draw a flow chart Typical (primitive) examples of flow charts and algorithms Generations of computer languages High-level and low-level languages Translators, Introduction to editors and details about one of the editors	**20%**
II	**Basics of Programming** Problem analysis, Variables, expressions & manipulation Data types in a high-level language, operators, I/O statements, Assignment statements, Control strategies, Conditions	**20%**
III	**Structured Programming and Arrays, Strings** Loop statements Common standard library functions Arrays, Strings and string handling functions	**20%**
IV	**Functions and Pointers** Functions and Working with functions, Pointer, Pointer Arithmetic and Pointer Manipulations, Calling functions, passing arguments	**20%**
V	**Structure, Union and File Management** Structure and Union, File Management, Command Line Arguments	**20%**
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.	Cooper H. & Mullish H : The Sprit of C, Jaico Publication House, New Delhi.	

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Paper Code: CECS204			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Elements of C Programming			
Unit	**Description**		**Total Marks**
All	Q.1(A) Multiple Choice Questions (MCQ)	06	14
	Q.1 (B) Short Questions (Definitions, Blanks, Full Forms, True/False, Match the Following)	08	
I, II	Q.2(A) Medium Questions (Any Two)	06	14
	Q.2(B) Medium Questions / Long Questions (Any Three)	08	
II, III	Q.3(A) Medium Questions / Long Questions (Any Two)	06	14
	Q.3(B) Medium Questions / Long Questions (Any Two)	08	
III,IV	Q.4 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.4 (B) C Program. (With Internal Option)	08	
IV,V	Q.5 (A) Short / Medium Questions (With Internal Option)	06	14
	Q.5 (B) C Program. (With Internal Option)	08	

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Paper Code: CECS205 **Title of Paper:** Digital Computer Electronics		**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Unit	**Description**	**Weighting**
I	Number Systems- Binary , Octal , Decimal, Hexadecimal, Floating Point representation of numbers, Number base conversion, Binary Addition, Subtraction, Multiplication, Division, 2'complement arithmetic, BCD Numbers, The ASCII code ,The EXCESS-3 code ,The Gray code, Error correcting and correcting method	**20%**
II	**Gates and Boolean Algebra** Gates, Boolean algebra, Truth tables Circuit equivalence, De Morgan's theorem	**20%**
III	**Basic Digital Logic Circuits-I** Usage of Karnaugh maps Encoders, decoders, comparators	**20%**
IV	**Basic Digital Logic Circuits-II** Half adder, full adder, binary adder-subtractor Multiplexers	**20%**
V	**Memory Elements & Counters** D Flip flops, Shift-left, shift-right and controlled buffer registers Ring counters	**20%**
Basic Text & Reference Books :-		
1.	Malvino A. P.: Digital Computer Electronics,2nd Edition, Tata McGraw, Hill Pub. Co. Ltd.,New Delhi, 1990.	
2.	Gothmann, William H. : Digital Electronics - An Introduction to Theory and Practice, 2nd Edition,PHI,1982.	
3.	Tanenbaum A. S. : Structured Computer Organization, 3rd Edition, Prentice-Hall of India Pvt. Ltd., 1993.	
4.	Hall Douglas V. : Microprocessors and Interfacing - Programming and Hardware., McGraw Hill Book Company, 1986.	
5.	M.M. Mano : Computer System Architecture, 3rd Edition, Pearson Education, 2000.	

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Paper Code: CECS205			**Total Credit :** 4 **Total Marks :** 70 **Time :** 3 Hrs
Title of Paper: Digital Computer Electronics			
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, Full Forms, True/False, Match the Following)	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 / Long Questions. (With Internal Option)	08	