



Structure for First Year M.Sc. (CA&IT) Semester-II
[Five Years' (Full-time) M.Sc. (CA&IT) Integrated Degree Course]

Offered in

**K. S. School of Business Management and
Information Technology**

Gujarat University

2023–2024

As per

**NEP2020 CURRICULUM AND CREDIT FRAME WORK FOR
UNDER GRADUATE PROGRAMMES, UGC**

&

Resolution No. KCG/admin/2023-24/0607/kh.1

of

Education Department, Govt. of Gujarat

MAJOR	COMPUTER SCIENCE				
MINOR	1. ARTIFICIAL INTELLIGENCE & MACHINE LEARNING				
	2. WEB TECHNOLOGY				
	3. INFORMATION SECURITY				
		Exam Marks			
Code	Course	Credits	Internal Marks	External Marks	Total Marks
DSC-C-IMSCIT-121T	DATA STRUCTURE & ALGORITHMAM	4	50	50	100
DSC-C- IMSCIT-122P	DATA STRUCTURE & ALGORITHMAM- PRACTICALS	4	50	50	100
MINOR					
DSC-M- IMSCIT-123T	FUNDAMENTAL OF DATABASE MANAGEMENT SYSTEM	2	25	25	50
DSC-M- IMSCIT-123P	FUNDAMENTAL OF DATABASE MANAGEMENT SYSTEM-PRACTICALS	2	25	25	50
OR					
DSC-M- IMSCIT-123T	ENTERPRISE RESOURCE PLANNING	2	25	25	50
DSC-M- IMSCIT-123P	ENTERPRISE RESOURCE PLANNING - PRACTICALS	2	25	25	50
INTER DISCIPLINARY / MULTI DISCIPLINARY					
(1 Theory and 1 Practical Course has to be chosen. Courses can also be chosen from Basket)					
MDC-IMSCIT-124T	COMPUTER ORIENTED STATISTICAL METHODS	2	25	25	50
MDC-IMSCIT-124P	COMPUTER ORIENTED STATISTICAL METHODS – PRACTICALS	2	25	25	50
ABILITY ENHANCEMENT COURSE (Any ONE Course to be selected from the Basket)					
AEC- IMSCIT-125	COMMERCIAL COMMUNICATION	2	25	25	50
SKILL ENHANCEMENT COURSE (Any ONE Course to be selected from the Basket)					
SEC-WDD-126	WEB DESIGN & DEVELOPMENT	2	25	25	50
SEC-GRA-126	GRAPHICS DESIGN	2	25	25	50
COMMON VALUE ADDED COURSES (Any ONE Course to be selected from the Basket)					
VAC- 127-E	INTERPERSONAL SKILLS	2	25	25	50
TOTAL CREDITS		22	275	275	550



**Syllabus for First Year M.Sc. (CA&IT)
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Semester-II

(B.Sc.(CA&IT)Programme)

Skill Enhancement Course

Gujarat University
K. S. School of Business Management and Information Technology
[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Web Design and Development

Course Code: SEC-WDD-126

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Grasp the core concepts and usage of HTML and CSS in web development.
- Understand the principles of responsive design and accessibility.
- Apply best practices in structuring and styling web pages.
- Develop basic programming skills with JavaScript to add interactivity to web pages.
- Apply principles of web accessibility and SEO in web development projects.
- Utilize development tools to enhance productivity and collaboration.

Contents:

Unit No.	Course Content	Hours	Credits
1	Introduction to Web Development: Overview of web technologies, history of the web, understanding web standards. HTML Fundamentals: Basic to advanced HTML practices, including text formatting, lists, tables, forms, and embedding media, with a focus on semantic HTML and accessibility. CSS for Styling and Layouts: Introduction to CSS, including selectors, the box model, introduction to Flex box, and CSS Grid. Responsive design principles using media queries are emphasized to ensure students can create designs that adapt to various screen sizes.	30	1
2	Introduction to JavaScript: Covering JavaScript basics (variables, data types, operators, control structures), functions, and event handling. Introduction to the Document Object Model (DOM) and how to manipulate web page content dynamically. Web Accessibility and Best Practices: Deepening understanding of web accessibility, including ARIA roles and properties. Introduction to SEO basics and performance optimization techniques for web pages. Introduction to Web Development Tools: Overview of essential tools, including version control with Git, browser developer tools, and basic usage of package managers like NPM.	30	1

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Reference Books:

1. HTML and CSS: Design and Build Websites"
By Jon Duckett
2. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics"
By Jennifer Niederst Robbins
3. Eloquent JavaScript: A Modern Introduction to Programming"
By Marijn Haverbeke
4. JavaScript & jQuery: Interactive Front-End Web Development"
By Jon Duckett
5. Pro Git
By Scott Chacon and Ben Straub

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Students will have a solid understanding of HTML and CSS, able to structure web pages efficiently and style them to be visually appealing.
- By learning the basics of JavaScript, students will be able to add dynamic content and interactivity to web pages.
- The course's emphasis on hands-on learning and practical application will have sharpened students' problem-solving abilities.

Gujarat University
Semester- II
Course on Interpersonal Skills
Course Code: 127 - E
For all Undergraduate Programs
(Value Added Course)
(w.e.f 2023-2024)

Objective of the Course

In order to have a successful professional life, you have to be able to communicate with the people you work with. You have to be able to communicate with co-workers in a way that establishes respect and influence.

This course is designed to teach you how to communicate with the people you work with in ways that shows confidence and gives them a sense of trust. By taking this course you will learn how to assert your influence and how you can use these skills to do things like resolve issues between people at work. At every job, there is bound to be a conflict that will arise, and by taking this course you will gain the communication skills you need to resolve them. By learning the interpersonal skills that this course will equip you with, you will gain some foundational skills that will pave the way for your success. This course will provide you with the essential skills you need to be able to be able to successfully communicate and establish yourself with people in your professional life.

Outcome of the Course (CO)

Learner will be able to....

- Identify and analyze different communication styles and understand their strengths and weaknesses.
- Demonstrate active listening skills and questioning styles to explore issues and enhance understanding.
- Identify conflict response styles; approach and effectively mediate workplace conflicts.
- Determine ways to build and maintain trust and increase your influence and eminence in the workplace.

Prerequisite: 12th Pass

Corequisite: Learner can join other online certificate and diploma courses for knowledge enhancement.

Evaluation Pattern

Internal	Total Marks
	25
External	25

Semester: 2

Course Credit: 2

Course Duration: 40 Hrs.

Unit	Topics
1	<ul style="list-style-type: none">➤ Effective Communication1. Art Of Listening<ul style="list-style-type: none">• Introduction• What is listening?• Benefits of active listening• Factors that hamper listening• Common poor listening habits.2. Art Of Speaking<ul style="list-style-type: none">• Art of public speaking• Importance of public speaking• Public speaking tips• Over coming fear of public speaking3. Art Of Writing E -mail<ul style="list-style-type: none">• Introduction• The mail magic• Use appropriate salutations• Make the subject matter significant• Reread before pressing the “send” button – Be polite, and reciprocate good deeds

2	<p>➤ Team building and Conflict Management</p> <ul style="list-style-type: none"> • Body Language • Body language in building interpersonal relations – Body language in building industrial relations • Interpreting body language Developing confidence with correct body language. • Skill needed for teamwork • A model of team building • Role of a team leader • Inter-group collaboration • Active listening • Problem-solving • Compromising • Avoiding

Reference

- SOFT SKILLS KNOW YOURSELF AND KNOW THE WORLD, Author : Dr. K.ALEX, Publication : S.CHAND, First Edition : 2009, Reprint : 2023
- Barnlund, Dean C. “A Transactional Model of Communication,” in Foundations of Communication Theory, eds. Kenneth K. Sereno and C. David Mortensen (New York, NY: Harper and Row, 1970), 83–92.
- Burleson, Brant R. Sandra Metts, and Michael W. Kirch, “Communication in Close Relationships,” in Close Relationships: A Sourcebook, eds. Clyde Hendrick and Susan S. Hendrick (Thousand Oaks, CA: Sage, 2000).
- Dance, F. E. X. (1972). Speech Communication; Concepts and Behavior. New York: Holt, Rinehart and Winston.
- Frank E. X. Dance and Carl E. Larson, The Functions of Human Communication: A Theoretical Approach (New York, NY: Holt, Reinhart, and Winston, 1976)
- De Salvo, V. S. (1980). [A Summary of Current Research Identifying Communication Skills in Various Organizational Contexts](#). *Communication Education*, 29(3), 283.

- Ellis, Richard and Ann McClintock, *You Take My Meaning: Theory into Practice in Human Communication* (London: Edward Arnold, 1990).
- Robert H. Gass and John S. Seiter, *Persuasion, Social Influence and Compliance Gaining* (Boston, MA: Allyn and Bacon, 1999)
- Erving Goffman, *The Presentation of Self in Everyday Life* (New York, NY: Anchor Books, 1959)
- Greene, Kathryn, Valerian J. Derlega, and Alicia Mathews, "Self-Disclosure in Personal Relationships," in *The Cambridge Handbook of Personal Relationships*, eds. Anita L. Vangelisti and Daniel Perlman (Cambridge: Cambridge University Press, 2006).
- Hargie, Owen . *Skilled Interpersonal Interaction: Research, Theory, and Practice* (London: Routledge, 2011).
- National Association of Colleges and Employers, *Job Outlook 2011* (2010): 25.
- Schramm, Wilbur . *The Beginnings of Communication Study in America* (Thousand Oaks, CA: Sage, 1997).
- Gunter Senft, "Phatic Communion," in *Culture and Language Use*, eds. Gunter Senft, Jan-Ola Ostman, and Jef Verschueren (Amsterdam: John Benjamins Publishing Company, 2009), 226–33.
- Shannon, Claude and Warren Weaver, *The Mathematical Theory of Communication* (Urbana, IL: University of Illinois Press, 1949).
- Williams, Kipling D. and Lisa Zadro, "Ostracism: On Being Ignored, Excluded, and Rejected," in *Interpersonal Rejection*, ed. Mark R. Leary (New York, NY: Oxford University Press, 2001).
- Zabava, Wendy S. and Andrew D. Wolvin, "The Differential Impact of a Basic Communication Course on Perceived Communication Competencies in Class, Work, and Social Contexts," *Communication Education* 42 (1993)



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Semester-II

(B.Sc.(CA&IT)Programme)

Ability Enhancement Course

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First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Commercial Communication

Course Code: AEC- IMSCIT-125

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Demonstrate mastery in written communication principles, allowing for clear, concise, and professional correspondence in business contexts.
- Apply the essential components of a business letter, including proper formatting, tone, and structure, adhering to professional standards.
- Recognize and construct various types of business letters, adapting communication strategies to suit diverse professional scenarios.
- Navigate the process of generating and interpreting quotations, demonstrating competence in pricing discussions and negotiations.
- Manage the complete life cycle of business orders, from placement to execution and potential cancellation, ensuring efficient supply chain and procurement processes.

Contents:

Unit No.	Course Content	Hours	Credits
1	Business Letters(theory) <ul style="list-style-type: none">• Written Communication• Essentials of a business letter• Parts and forms of business letter• Types of business letter Business Letters (Practical) <ul style="list-style-type: none">• Enquiry and reply letter• Quotation• Order – placing, execution and cancellation• Complain and adjustment letter	15	1
2	Grammar & Reading <ul style="list-style-type: none">• Informal communication letters (Condolence, greeting, email)• Vocabulary, Synonyms, Antonyms & part of speech• Phonetics• Confusing words (Minimum 30 words)• One word substitute (Minimum 20 words)• Idioms & phrasal verbs (Minimum 30 words)• Short / Brief Novel (Subject to change every year as announced in the class)	15	1

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Reference Books:

1. Business Communication
By V. K. Jain and Omprakash Biyani.
2. Business Communication
by Rajendra pal and korlahally.
3. Business Communication
By Urmila Rai and S. M. Rai.
4. Modern Commercial Correspondence
By R. S. N. Pillai and Bagavathi.
5. Murphy's English Grammar
By Raymond Murphy
6. A Textbook of English phonetics for Indian students
By T. Balasubramanian

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Demonstrate the ability to craft clear, concise, and professionally formatted business letters across diverse scenarios.
- Apply versatile communication strategies, having gained expertise in constructing various types of business letters tailored to specific contexts.
- Showcase practical proficiency in composing inquiry and reply letters, exhibiting the capacity to seek information efficiently and respond effectively.
- Master informal communication skills, including crafting condolence and greeting letters, as well as employing proper email etiquette for fostering positive professional relationships.
- Compile a portfolio showcasing a variety of business letters, providing tangible evidence of their practical skills and accomplishments.



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Semester-II

(B.Sc.(CA&IT) Programme)

Multi Disciplinary Courses

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K. S. School of Business Management and Information Technology
[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Computer Oriented Statistical Methods-Theory

Course Code: MDC-IMSCIT-124T

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Acquire a deep understanding of ancient Indian mathematicians, their methodologies, and contributions, enriching mathematical knowledge with insights from Indian Knowledge Systems.
- Apply ancient Indian methods of factorization, triangular numbers, and geometric progression to solve mathematical problems, demonstrating practical skills rooted in historical mathematical traditions.
- Gain cultural insights by analyzing the game of dice and its connections to game theory in the Mahabharata, providing a unique perspective on strategic decision-making in historical contexts.
- Recognize the historical roots of data analytics in ancient Indian mathematical practices, connecting traditional wisdom to contemporary applications in data analysis.
- Develop statistical proficiency with a focus on descriptive statistics and numerical methods, enabling the analysis and interpretation of data through measures of variability, association, and distribution, along with practical applications in regression modeling

Contents:

Unit No.	Course Content	Hours	Credits
1	Computation in Indian Knowledge Systems (IKS) Notable ancient Indian Mathematicians, Methods of Factorization, Basics of Determinations, Triangular numbers and calculation of Spheres, Quick Exponential calculations, Invention of Chess & Geometric Progression, Summation of Infinite Geometric Series, Permutation & Combinatorics in IKS, Concepts of Probability in IKS, Game of Dice, Game theory in Mahabharata, Data analytics and its roots in ancient India	15	1
2	Descriptive Statistics: Numerical Methods Measures of variability: range, inter quartile range, variance, standard deviation, coefficient of variation, Measures of association between two variables: covariance interpretation of the covariance correlation coefficient interpretation of the correlation coefficient, Measures of distribution: shape, relative location, and detecting outliers z-scores, empirical rule detecting outliers box plot. Simple and Multiple linear regression model, least squares method	15	1

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Reference Books:

1. “Meru Prastaar”,
By Halai C.M., Garuda Prakashan
2. “Statistics for Business & Economics”,
By Anderson, David R., etal, Cengage learning
3. “Data analytics: models and algorithms for intelligent
By Thomasa. Runkler. –Wiesbaden,
4. “Data analysis”, Springer(cop.2012),
By Verlag
5. Meta S. Brown, “Big data analytics”
By Parag Kulkarni, Sarang Joshi,
6. “Data analytics and big-data”,
7. By Soraya Sedkaoui, Wiley
8. “Data science and big data analytics”,
By Emc Education Services, Wiley
9. Heroor V., “Sridhara’s Trisatika or Patiganitasara”,
By Old Chinmaya International Foundation

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Explore the achievements and methodologies of ancient Indian mathematicians, understanding their profound contributions to mathematical concepts that laid the foundation for computation in Indian Knowledge Systems.
- Delve into the strategic aspects of the game of dice in the Mahabharata, analyzing its connections to game theory. This topic provides insights into ancient decision-making strategies and their cultural significance.
- Investigate the historical roots of data analytics in ancient Indian mathematical practices, connecting traditional wisdom to contemporary applications. This topic highlights the enduring relevance of historical knowledge in the modern context.
- Master essential statistical concepts such as measures of variability, association, and distribution. Understand the practical application of numerical methods, including regression modeling, for effective data analysis and interpretation.
- Apply ancient Indian methods of factorization, triangular numbers, and geometric progression to solve mathematical problems. This hands-on exploration bridges historical knowledge with practical problem-solving skills, showcasing the applicability of ancient techniques in a contemporary setting.

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[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Computer Oriented Statistical Methods-Practical

Course Code: MDC-IMSCIT-124P

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Understand the fundamental concepts of data, its types, and the distinctions between categorical and numerical data.
- Analyze univariate, bivariate, and multivariate data, summarizing information effectively.
- Create and interpret various types of charts, including bar charts, scatter plots, line charts, area charts, and pie charts.
- Utilize advanced visualization techniques such as stem-and-leaf display, dot plot, histogram, cumulative distributions, and Ogive. And Apply data pre-processing techniques, including handling missing values and normalizing data for consistent scaling.
- Conduct statistical analysis in Excel, including the use of charts, rank values, and the Data Analysis Tool Pack.
- Use Tableau Public for creating advanced visualizations and integrate them with Excel data.

Contents:

Unit No.	Course Content	Hours	Credits
1	<p>Data Pre-processing & Data Visualization Introduction to data, Data Analytics/Mining/Science, data sets, features, data scales, categorical and numerical data, cross-sectional and time series data. Univariate, bivariate and Multivariate data. Summarizing data. Frequency Distribution Relative Frequency and Percent Frequency, distributions, cross-tabulations</p> <p>Data Visualization: Bar Charts, Scatter plots, line chart, area chart and Pie Charts, stem and leaf display. Dot Plot, Histogram Cumulative Distributions, Ogive.</p> <p>Data Pre-processing: Handling missing values, normalization of data</p>	30	1
2	<p>Introduction to statistical analysis in excel Charts for univariate and bivariate data, Rank values to establish percentages and percentiles, Data Analysis Tool pack, Descriptive Statistics, measures of central tendency, dispersion and association, Straight Line Analysis, Graphically estimate the relationship between two variables, Simple Linear Regression, Implementation of statistical functions in Spreadsheet Packages, Visualization using Tableau Public</p>	30	1

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Reference Books:

1. “C Programming: Including Numerical and Statistical Methods”,
By Pal, Madhumangal, Alpha Science International
2. “Excel statistics: A quick guide”,
By Salkind, Neil J., Sage Publications
3. “Microsoft Excel Data Analytics& Business Modeling”,
By Wayne Winston, Pearson
4. “Meru Prastar”,
By Halai C.M., Garuda Prakashan

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Students will excel in conveying complex insights through compelling data visualizations.
- Their proficiency in creating diverse visual representations, from basic charts to advanced displays, will enable effective communication of data-driven narratives.
- Graduates will be accomplished in data pre-processing, ensuring the integrity and reliability of datasets.
- Students will showcase mastery in statistical analysis using Excel, employing a range of tools for univariate and bivariate data.
- Graduates will emerge as holistic decision-makers, combining their data visualization, statistical analysis, and data pre-processing skills.



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MAJOR

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[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Data Structure & Algorithm -Theory

Course Code: DSC-C-IMSCIT-121T

Course Credit: 4

Course Outcomes:

After learning the course, the students should be able:

- Data Structure is a subject of primary importance in information and communication Technology
- Students should be able to comprehend the fundamental data structures such as arrays, linked lists, stacks, queues, and trees.
- Develop problem-solving skills using algorithms and data structures. And Analyze and solve algorithmic problems using concepts learned in the course.
- Understand advanced data structures such as binary trees, AVL trees, heaps, and graphs.
- Implement and analyze algorithms related to tree and graph traversal, shortest path, and minimum spanning trees.
- Apply sorting and searching algorithms to the small and large data sets

Contents:

Unit No.	Course Content	Hours	Credits
1	INTRODUCTION TO DATASTRUCTURE USING INDIAN KNOWLEDGE SYSTEM:- Meru Prastaar's Algebra, Narayana Pandit Problem and Sutra to Solve Time, Speed and Distance, Aryabhata's sum of sums, Data Management Concept, Data Types (Primitive and Non-Primitive), Concept of array (Mapping of array elements (1, 2 and 3 dimensional), Triangular and Sparse arrays), Concept of Dynamic Memory allocation (Malloc, Calloc, Realloc, Free), Types of Data Structures-Linear and Non Linear Data Structure.	15	1
2	LINEAR DATA STRUCTURE Stack: Concept of stack, Operations on stack, Application of Stack (Conversion of infix-postfix forms, evaluation of postfix expression, recursion), Queue: Introduction, Representation of queue, Operations on Queue, Circular Queue, Priority Queue (Only Theory), Applications of queue. Linked List: Singly Linked List (Insert, Delete, Copy, Concatenate), Doubly Linked List (Insert, Delete), Circular Linked List (Insert, Delete)	15	1
3	NONLINEAR DATA STRUCTURE Tree: Concepts of tree, Binary Tree (Only Theory) : Definition, Traversal in Binary tree (Recursive + Iterative), Creation of Binary tree from pre order and in	15	1

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	<p>order, post order and in order</p> <p>Threaded Binary tree(Only Theory): Definition and concept, finding in order successor, in order predecessor)</p> <p>Binary Search Tree: Insertion and deletion in a BST</p> <p>Height Balanced tree/AVL tree (Only Theory): Definition, Insertion and deletion in AVL trees</p> <p>Graph: Matrix Representation of graphs, Graph traversal DFS and BFS, Spanning trees, Kruskals algorithm, Prims algorithm.</p>		
4	<p>Sorting Algorithms: Bubble Sort, Selection sort, Insertion sort, Quick sort, Merge sort , Radix sort</p> <p>Searching algorithms: Linear search, Binary search</p>	15	1

Reference Books:

1. An Introduction to Data Structures with Applications.
By Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.
2. Data Structures
By Seymour Lipschutz
3. Data Structures and algorithm analysis in C
By Mark Allen weiss, Second Edition
4. An introduction to data structures and applications
By Trembley and Sorenson Tata McGraw hill publication
5. Classic Data Structures
By Samantha PHI Publication
6. Data Structures and Program Design in C
By Robert Kruse, Prentice- Hall India
7. Data Structures using C and C++,
By Tenebaum, Prentice-Hall India, IInd Edition, 1997.

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Students should have a solid understanding of fundamental data structures such as arrays, linked lists, stacks, queues, trees, graphs, and hash tables
- Students should be proficient in solving algorithmic problems using appropriate data structures and algorithms. And the ability to break down complex problems, design efficient algorithms, and implement solutions.
- Proficiency in understanding and working with advanced data structures such as trees, graphs, and hash tables.
- Students should be proficient in applying dynamic programming techniques to solve optimization problems efficiently.
- Knowledge of the properties, applications, and implementations of these structures.

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Course Name: Data Structure & Algorithm-Practical

Course Code: DSC-C- IMSCIT-122P

Course Credit: 4

Course Outcomes:

After learning the course, the students should be able:

- Demonstrate proficiency in implementing fundamental data structures, including arrays, stacks, queues, linked lists, binary trees, and graphs. Students should be able to design, manipulate, and analyze these structures for efficient data management.
- Develop strong algorithmic thinking and problem-solving skills, especially in the context of sorting and searching algorithms.
- Apply data structures in solving real-world problems, such as the conversion of infix-postfix expressions, evaluation of postfix expressions, recursive problem-solving, and manipulation of linked lists
- Gain a deep understanding of graph representation and algorithms, including DFS, BFS, and minimum spanning tree algorithms (Kruskal's and Prim's).
- Acquire competence in various sorting algorithms, including Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, and Radix Sort

Contents:

Unit No.	Course Content	Hours	Credits
1	INTRODUCTION TO DATASTRUCTURE Various Operations of array <ul style="list-style-type: none"> • Representation of arrays, • Applications of arrays, • sparse matrix and its representation • One Dimensional Array and Multidimensional Arrays Dynamic Memory allocation:- Malloc() , Calloc() ,realloc() , free(). Stack using array that performs following operations <ul style="list-style-type: none"> • push: Adds an element to the top of the stack. • pop: Removes the topmost element from the stack. • isEmpty: Checks whether the stack is empty. • isFull: Checks whether the stack is full. • top: Displays the topmost element of the stack. 	15	1
2	QUEUE using array that performs following operations:- <ul style="list-style-type: none"> • Enqueue: Adds an element to the rear of the queue. • Dequeue: Removes the element from the front of queue. • isEmpty: Checks whether the queue is empty or not. • isFull: Checks whether the queue is full or not. 	15	1

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	<ul style="list-style-type: none"> • Peek: Displays peek element of the queue. <p>Circular QUEUE using array that performs following operations:-</p> <ul style="list-style-type: none"> • Enqueue: Add an element to the rear of the circular queue. • Dequeue: Removes the element from the front of the circular queue. • isEmpty: Checks whether the queue is empty or not. • isFull: Checks whether the queue is full or not. <p>Singly link list : Create, INSERT(At the front , At the end , Specific position), DELETE (At the front , At the end , Specific position)</p> <p>Doubly link list : Create, INSERT(At the front , At the end , Specific position), DELETE (At the front , At the end , Specific position)</p> <p>Circular link list : Create, INSERT(At the front , At the end , Specific position), DELETE (At the front , At the end , Specific position)</p>		
3	<p>Various operations on Binary search tree:</p> <ul style="list-style-type: none"> • Insertion: Insert a node in BST. • Deletion: Delete a node from the BST. • Perform In-order, preorder and post-order traversal. <p>Implementation of Graphs.</p>	15	1
4	<p>Implementation of Linear Search.</p> <p>Implementation of Binary Search.</p> <p>Implementation of various sorting techniques: Quick Sort, Merge Sort, Bubble Sort, Selection Sort, Insertion Sort.</p>	15	1

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Reference Books:

1. An Introduction to Data Structures with Applications.
by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.
2. Data Structures
By Seymour Lipschutz
3. Data Structures and algorithm analysis in C
By Mark Allen weiss, Second Edition
4. An introduction to data structures and applications
By Tremblay and Sorenson Tata McGraw hill publication
5. Classic Data Structures
By Samantha PHI Publication
6. Data Structures and Program Design in C
By Robert Kruse, Prentice- Hall India
7. Data Structures using C and C++,
By Tenebaum, Prentice-Hall India, IInd Edition, 1997

Accomplishments of the student after completing the Course:

Upon completing the course, Students will able to:

- Understanding the concept of arrays and dynamic memory allocation is fundamental. This topic covers mapping array elements in multiple dimensions (1D, 2D, and 3D), as well as concepts like triangular and sparse arrays
- Stacks and queues are crucial linear data structures. Students learn the concept of a stack, its operations, and practical applications such as converting infix-postfix expressions, evaluating postfix expressions, and solving recursive problems
- Linked lists are dynamic data structures that play a key role in data manipulation. Topics include operations on singly linked lists (insertion, deletion, copy, concatenate), doubly linked lists, and circular linked lists.
- Understanding the concepts of trees, especially binary trees, is essential. Traversal methods (recursive and iterative), creating binary trees from different representations (pre-order and in-order, post-order and in-order), and concepts like threaded binary trees are covered
- Matrix representation of graphs, graph traversal using Depth-First Search (DFS) and Breadth-First Search (BFS), spanning trees, and algorithms like Kruskal's and Prim's.



**Syllabus for First Year M.Sc. (CA&IT)
Semester-II**

[Five Years' (Full-time) M.Sc. (CA&IT) Integrated Degree Course]

Offered in

**K. S. School of Business Management and
Information Technology**

Gujarat University

2023–2024

**As per NEP2020 CURRICULUM AND CREDIT FRAMEWORK
FOR UNDERGRADUATE PROGRAMMES, UGC**

&

Resolution No. KCG/admin/2023-24/0607/kh.1

of

Education Department, Govt. of Gujarat

Semester-II

(B.Sc.(CA&IT)Programme)

MINOR

Gujarat University
K. S. School of Business Management and Information Technology
[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Enterprise Resource Planning -Theory

Course Code: DSC-M- IMSCIT-123T

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Establish the role of information systems in organizations and how they relate to organizational objectives and organization structure
- Provide knowledge of basic techniques and elementary skills in representing system structure
- Introduce various types of applications which are part of an information system

Contents:

Unit No.	Course Content	Hours	Credits
1	<p>Introduction to Systems The Organizational Structure, Business Process, Business Considerations – Accuracy, Queues, Security, Priorities, Audit-Trails, Report Frequency, Exception Reporting, Documentation, User Acceptance, EOD/EOM/EOY Procedures, ERP Systems, Components of an ERP System, Data in ERP Systems, Reporting in ERP, Case Study of an ERP</p>	15	1
2	<p>Modules of ERP System Accounting Systems, Procurement Process & Systems, Fulfilment Process, Production Process, Inventory & Warehouse Management Process, Material Planning Process, Process Integration, Systems Design: Study of Customer Order Processing & Invoicing System, Inventory Management Systems – Stock Replenishment & Inventory Management, Accounts Payable System, Accounts Receivable System, Financial Accounting System, Payroll System, System Maintenance</p>	15	1

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Reference Books:

1. “Integrated Business Processes with ERP Systems”, \
By Magal S., Word J., John Wiley & Sons Inc.
2. “Business Systems for Microcomputers – Concept, Design & Implementation”,
By Haueisen W., Camp J., Prentice Hall India Pvt. Ltd.
3. “Information Systems for Modern Management”,
By Murdick R., Prentice Hall India Pvt. Ltd.
4. “Management Information Systems – Text & Cases”,
Jawadekar W., McGraw Hill

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Gain awareness about various components of ERP Systems
- Build solutions for Management Information Systems, Decision Support Systems

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Course Name: Enterprise Resource Planning -Practical

Course Code: DSC-M- IMSCIT-123P

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Establish the role of information systems in organizations and how they relate to organizational objectives and organization structure
- Provide knowledge of basic techniques and elementary skills in representing system structure
- Introduce various types of applications which are part of an information system

Contents:

Unit No.	Course Content	Hours	Credits
1	Basics of ERP System Overview of Open Source ERP, Installation, Interface, Creating a database, Various functionalities of ERP, Overview of workflows, Use cases of workflow, Basic Administration, Customizing ERP Systems for Businesses	30	1
2	Modules of ERP System Human Resource Management, Customer Relationship Management, Sales & Invoicing, Accounting & Finance Management, Purchase Management, Inventory Management, Project Management	30	1

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Reference Books:

1. “Learn Odoo”,
By Moss Greg, Packt Publication
2. “Odoo ERP”, Cybrosys Technologies
3. (Online: <https://www.cybrosys.com/odoo/odoo-books/odoo-book-v16/>)
4. “Integrated Business Processes with ERP Systems”,
By Magal S., Word J., John Wiley & Sons Inc.
5. “Business Systems for Microcomputers – Concept, Design & Implementation”,
By Haueisen W., Camp J., Prentice Hall India Pvt. Ltd.

Accomplishments of the student after completing the Course:

Upon completing the course, Students will able to:

- Gain awareness about various components of ERP Systems
- Build solutions for Management Information Systems, Decision Support Systems
- Implement Odoo ERP software for any organization



**Syllabus for First Year M.Sc. (CA&IT)
Semester-II**

[Five Years' (Full-time) M.Sc. (CA&IT) Integrated Degree Course]

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Semester-II

(B.Sc.(CA&IT)Programme)

MINOR

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[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
First Year M.Sc. (CA&IT) (Semester - II)

Course Name: Fundamental of Database Management System-Theory

Course Code: DSC-M- IMSCIT-123T

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Evaluate business information problem and find the requirements of a problem in terms of data.
- Understand the uses the database schema and need for normalization.
- Design the database schema with the use of appropriate data types for storage of data in database.
- Use different types of physical implementation of database
- Use database for concurrent use.
- Backup data from database.

Contents:

Unit No.	Course Content	Hours	Credits
1	<p>Concept of DBMS: Database approach- Characteristics, & Application, Advantages of DBMS, Database Architecture - Data Models, Schemas, and Instances, Data Independence, Data Modeling, Levels of abstraction, file organization, index structures for files.</p> <p>Entity Relationship Model: Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, Aggregation.</p> <p>The Relational Database Model: Functional Dependency – definition, Trivial and non-trivial FD, closure of FD set closure of attributes, irreducible set of FD.</p>	15	1
2	<p>Normalization – 1Normal Form, 2 Normal Form , 3 Normal Form , Boyce Codd Normal Form .</p> <p>Transaction Management: - Transaction Concepts, properties, states, implementations of Atomicity and Durability, Concurrent Executions, Serializability, and Recoverability</p> <p>SQL Concepts: Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All, view and its types. Transaction control commands – Commit, Rollback, Savepoint.</p>	15	1

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Reference Books:

1. Database System Concept
By Silberschatz, Korth, Sudarshan, McGraw Hill, Fifth Edition
2. Database Management System
By G. K. Gupta Tata McGraw Hill publication
3. SQL, PL/SQL The programming language of Oracle
By Ivan Bayross BPB Publication 3rd Revised Edition.
4. Understanding SQL
By Martin Gruber, BPB

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- Understand the fundamental concepts of databases and the advantages of using a Database Management System (DBMS).
- Master the design process and constraints of the Entity-Relationship Model (E-R).
- Grasp the concept of Functional Dependency (FD) and its types.
- Implement normalization techniques, including 1NF, 2NF, 3NF, and BCNF.
- Demonstrate proficiency in SQL including DDL, DML, DCL. Utilize SQL for table creation, alteration, and defining constraints (e.g., primary key, foreign key).
- Apply SQL functions, aggregate functions, and handle set operations, sub-queries.
- Understand and work with GROUP BY, HAVING, ORDER BY, JOINS operations, as well as Exist, Any, All, views, and their types.

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Course Name: Fundamental of Database Management System-Practical

Course Code: DSC-M- IMSCIT-123P

Course Credit: 2

Course Outcomes:

After learning the course, the students should be able:

- Database creation, querying, and data manipulation.
- Importing, exporting, viewing, and sorting data.
- Removing duplicates and performing delete/update operations.
- Advanced SQL topics: sub queries, joins, triggers.
- Proficiency in cursor management and error handling.
- Creating procedures, functions, and packages.
- Comprehensive understanding of SQL-based database management.

Contents:

Unit No.	Course Content	Hours	Credits
1	<p>Concepts of SQL: SQL: concepts and tools, the generic SQL Sentence Construct, DDL command (create, alter, drop, rename, truncate) Data Constraints</p> <ol style="list-style-type: none"> 1. Defining integrity constraints in the alter table command 2. Dropping integrity constraints in the alter table command 3. Default Value Concept <p>Insertion of Data into tables</p> <ol style="list-style-type: none"> 1. Inserting of data into a table 2. Inserting of data into a table from another table <p>Viewing data in the tables</p> <ol style="list-style-type: none"> 1. View all rows and columns 2. Selected columns and all rows 3. Select rows and all columns <p>Selected columns and selected rows</p> <p>Elimination of duplicates from the select statement</p> <p>Sorting of data in a table</p> <p>Delete Operations</p> <ol style="list-style-type: none"> 1. Removing all rows 2. Removal of a specified row(s) <p>Update Operations</p> <ol style="list-style-type: none"> 1. Updating of all rows 2. Updating records conditionally 	30	1

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2	Tables and Joins: Modifying the structure of tables 1. Adding new columns 2. Modifying existing columns Renaming Tables Destroying Tables Operators (Arithmetic & Logical Operators) Range Searching Pattern Matching Column Alias Built-In Functions (Aggregate, Scalar, Date and Date Conversion) Grouping Data from tables 1. Using the WHERE clause with grouped data 2. Using the HAVING clause with grouped data Comparison of WHERE and HAVING Sub queries Joins 1. Inner Join, Self-Join, Outer Joins, Full Joins Union, Intersect and Minus Clause View Sequence	30	1
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Reference Books:

1. SQL for Microsoft Access
By Cecelia L. Allison, 2008
2. MS Access 2019
By David murray 2019
3. SQL, PL/SQL The programming language of Oracle
By Ivan Bayross, BPB Publication 3rd Revised Edition.
4. SQL/PLSQL for Oracle 9i
By P.S. Deshpande, Dreamtech Press

Accomplishments of the student after completing the Course:

After completion of this course Student would be able to

- The course covers SQL essentials, including DDL commands, data constraints, insertion, viewing, and manipulation operations. Students learn integrity constraints, default values, and deletion and update techniques.
- They gain proficiency in sorting, eliminating duplicates, and utilizing arithmetic and logical operators. Advanced topics like sub queries, joins, and specialized clauses such as Union are explored.
- By course end, students adeptly manage databases using SQL, handling tasks like table modification, column manipulation, and data grouping.