SANKALCHAND PATEL UNIVERSITY, VISNAGAR

Faculty of Engineering and Technology

Structure, Teaching Scheme and Syllabus of

B.Sc. in Data Science

Program Code: ET111

With effect from: 2024-25

Program Outcomes:

Program Outcomes POs

PO	Details
1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specification Out Comes:

Program Specific Outcomes PSOs

PSO1	Develop Information Technology-based solutions into the competitive environment.
PSO2	Possess professional skills of software design using cutting-edge technologies.
PSO3	Apply concepts of core areas of Information Technology– Data Structures, Database Management Systems, Operating Systems, Computer Network and Software Engineering to for innovative solutions.
PSO4	Develop effective oral and written communication skills and to introduce them to write ethical codes and guidelines, show leadership, can work as a team leader/team member and communicate efficiently with a team in developing software of multidisciplinary nature.

Semester- I

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Computer and Information Technology
Course Code:	11-ITM201-1C
Pre-requisite Course:	--

Course Objectives:

1. The objective is to provide the basic knowledge of a computer system, its history, architecture and components of a computer system.
2. Students will gain knowledge of number systems and their conversions.
3. This course is intended to develop skills to programming concepts like flowchart, algorithms and pseudo code.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		Total (Marks)
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	50	25	-	25	100

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	**Basic Building Blocks of Computer -** Introduction to computers, History and Evolution, Generation of Computer, Applications of Computers, Capabilities and Limitations, Components of a computer system: Control Unit, ALU, I/ O Devices, Memory: RAM, ROM, EPROM, PROM, Flash Memory and other types of memory.	8	20
2	**Computer Codes-** Introduction to Computer Codes, Decimal System, Binary System, Hexadecimal System, Octal System, Conversion between number systems, One's Complement, Two's Complement, Boolean Algebra and Laws.	4	10
3	**Introduction to IT -** Introduction to IT, Need of IT, Basics of information storage and processing, Role and Applications of IT, Different Types of software, Information systems, Business data processing. **Software Packages:** Database applications, Office suits, Graphics Tools.	8	20
4	**Computer Networks -** Introduction, Data Communication, Types of Network (LAN, MAN, WAN), Mode of transmission, Network Topologies, Network devices (routers, hubs, bridges, switches, proxy servers etc), Internet, Intranet, Extranet.	8	20
5	**Operating Systems -** Operating System: Definition and use, History & Evolution, Functions of an Operating System, Types of OS: Batch Processing, Multiprogramming, Multi-Tasking, Multiprocessing.	7	15
6	**Introduction to Programming Concepts -** Introduction to Programming Concepts: Define program, Process of programming, Algorithms, Introduction to flowcharts, Basic symbols and drawing of flow charts, Advantages and limitations of flow charts, Pseudo codes: Sequence logic, Selection logic, Iteration logic, Advantage and disadvantages.	7	15

Text Books:

1. Fundamentals of Computer, PHI Learning Pvt. Ltd., V. Rajaraman.
2. Computer Fundamentals, Wheeler Publisher, Nagpal, D. P.

Reference Books:

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan
2. Pearson India by M. Morris R. Mano.
3. Computer Fundamentals (First Edition-2010) Publisher: Pearson by Anita Goel.
4. Fundamentals of Computer (First Edition- 2009) Publisher: McGraw-Hill by Balaguruswamy.

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand the basic knowledge of computer systems and its history.	2. Understanding
CLO2	To understand the architecture and components of a computer system.	1. Remembering
CLO3	To understand the number systems and their conversions.	2. Understanding
CLO4	To develop skills to programming concepts like flowchart, algorithms and pseudo code.	3. Applying, 2. Understanding
CLO5	Relate the features of flowchart and algorithm	2. Understanding
CLO6	Interpret the architecture and components of a computer system	6. Creating

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	M	L	L													
CLO2	M	L	L						H				M			
CLO3 -	M	L	L						M		H		H			
CLO4	M	L	L						M		H					

CLO5	**M**	**L**	**M**				**H**					**H**				
CLO6	**M**	**L**	**L**						**M**			**L**				

H:High, M:Medium, L:Low

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Learn and identify the fundamentals of components in a typical computer system.
2. Learn and identify various memory modules and IO devices including secondary storage devices.
3. Getting familiar with Windows operating system.
4. Getting familiar with Linux operating systems.
5. Learn and identify the institute's computing networking structure.
6. Study various networking components involved in institute networks
7. Getting acquainted with personal emails, blogs and social accounts.
8. Search various e-Learning sites available and prepare a comparison chart for common features.
9. Search various e-Commerce (shopping) sites available and prepare a comparison chart for common features.
10. Search various online matrimonial sites available and prepare a comparison chart for common features.
11. Prepare a short report on guidelines for novice Internet users mentioning Dos and Don’ts.
12. Google Classroom Exercise.

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Programming in C
Course Code:	11-ITM202-1C
Pre-requisite Course:	--

Course Objectives:

1. This course is intended to demonstrate the importance and develop problem solving skills in students with basics of C Language programming constructs.
2. Students are expected to learn problem solving using algorithm & flowchart techniques, analyze the problem and implement the most appropriate method to solve the problem using 'C' programming.
3. Through this students learn the Concepts of Basic Programming languages like loop, array, structure and will be able to learn other advanced programming languages like Java, C++ etc.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		Total (Marks)
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	50	25	-	25	100

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	**Problem Solving Techniques:** What is Problem Solving? Always have a pen, restate the Problem, Divide the Problem, Start with what you know, reduce the Problem, Look for Analogies, Experimental Approach. **Algorithm:** Introduction, Syntax/Semantics. Writing Techniques. Algorithm writing with simple problems. Importance of Algorithms. **Flowchart:** Definition and Importance of Flowchart, Flowchart Symbols, Guidelines for preparing flowchart, Flowchart Structures – Sequence, Selection, Repetition.	7	18
2	**Basic Introduction of Programming in C:** Basic History of C, Features of C, Introduction to Programming in C, General Structure of "C" Program. Standard Header files. C Tokens, Keywords and Identifiers, Constant and variables in C. Variables (Declaration, Initialization, Dynamic, Basic IO Operation in C Initialization), Data Types, Conversions (Explicit-Implicit Conversions), Debugging C Program. Write your first C program.	5	10
3	**Operators in C:** Types of operators and their symbolic representation, Arithmetic operators, Comma and conditional/turnery operator, Increment/Decrement operator, Relational operators, Assignment operators and expressions, Logical operators, Bitwise operators, Properties of operator, Priority of operator and their clubbing.	4	08
4	**Manage & Formatting Input /Output:** Reading and Writing Characters and Strings, Formatted Input and Formatted Output.	3	06

5	**Decision Making/Branching Statements:** Conditional Statements: if statement, if-else statement, Nested if-else statement, if-else-if ladder statement, switch statements, Conditional Operator. Unconditional branching: goto statement.	6	16
6	**Looping in C:** Introduction to Looping Structures, Types of Loops, for loop, while loop, do while loop, for loop, nesting of loops, use of break and continue statement.	6	16
7	**Fundamentals of Arrays:** Introduction to Arrays, Types of Arrays, Characteristics of Array, Array declaration, Array initialization, Accessing array elements, Sorting / Searching operations on array elements, Two dimensional declaration and initialization, String operation using built in String functions.	6	14
8	**Functions in C:** Introduction to User defined function (UDF), Function declaration, Function definition, Function call, Categories of function, Nesting of function, Recursion, functions with arrays, the scope, visibility and lifetime of variables in functions.	5	12

Text Books:

1. Programming in ANSI C – E Balagurusamy, TMH publication.

Reference Books:

1. Let us "C" – KanetkarYashwant, BPB Publication.
2. Think Like a Programmer- V. Anton Spraul ,No starch Press

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand the methods of problem solving and have fundamental knowledge on flowcharts and algorithms to formulate the problem.	2. Understanding
CLO2	To write, compile and debug programs in C language	4. Analyze 5. Evaluate
CLO3	To study, analyze and understand logical structure of a computer program, and different programming construct to develop a program in 'C' language	2.Understanding
CLO4	To design simple and complex programs involving decision structures, loops and functions	3. Applying, 2. Understanding
CLO5	To design simple and complex program with using array and structure	2. Understanding
CLO6	To design program using function of various types	6. Creating

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	L	L						M		L		H			L
CLO2	M	L	L						H				M			M
CLO3	M	L	L						M		H		H			H
CLO4	M	L	L						M		H				H	
CLO5	M	L	M				H					H			L	
CLO6	M	L	L						M			L				M

H:High, M:Medium, L:Low

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

Sr. No.	Practical Exercise
1	1 FOX, Goose and Cone Puzzle 2 Sliding Puzzle
2	**Draw a Flowchart and write an Algorithm for Following Problems**. 1 Write an algorithm and draw a flowchart for converting centimeters to meters. 2 Write an algorithm and draw a flowchart for finding maximum from 3 numbers. 3 Write an algorithm and draw a flowchart for finding sum of N Numbers. 4 Write an algorithm and draw a flowchart to find the factorial of given number.

3	**Usage of Operators (Part-I)** 1 Write a C program to print “Hello C!” 2 Write a C program to demonstrate Simple calculations. 3 Write a C program for demonstrating constant. 4 Write a C program to use symbolic constant. 5 Write a C Program that demonstrates implicit and explicit conversion. 6 Write a C Program to swap two numbers.
4	**Usage of Operators (Part-II)** 1 Write a C Program to make Simple Calculator. 2 Write a C Program to Solve Quadric equation. 3 Write a C Program to convert days in to month and year. 4 Write a C program to make simple grade sheet which makes total of given subjects marks and find percentage. 5 Write a C Program to find simple interest. 6 Write a C Program to Calculate Area of ● Circle , Rectangle , Square
5	**Decision Making/Branching Statements** 1 Write a C Program to check given number is even or odd. 2 Write a C Program to find maximum and minimum of three numbers. 3 Write a C Program to check weather year is leap year or not. 4 Write a C Program to find given number is negative, positive or zero. 5 Write a C Program to make choice based Simple Calculator. 6 Write a C Program to demonstrate forward and backward jump using goto statement. 7 Write a C Program to demonstrate ATM transaction (money withdrawal). 8 The distance between two cities (In KM) is input through key board. Write a program to convert and print this distance in meters, feet, inches & centimetres.

6	**Looping Structures** 1 Write a program to display multiplication table. 2Write a program to find sum of all integers greater than 100 & less than 200 and are Divisible by 5. 3 Write a program to evaluate following series. ● 1+2+3+4+5+…..+N ● 1+3+5+7+……..+N ● 1-2+3-4+5-6+……+N ● 1 + 1/2 + 1/3 + 1/4 +……+ 1/N ● 1^2+ 2^2+ 3^2+ ……+ N^2 4 Write a C Program to find factorial numbers using Loop. 5 Write a C Program to reverse given numbers. 6 Write a C program to (a) count digits (b) find sum of digits of a given number. 7 Write a C program to convert each digits of a number in words 8Write a C program to print Fibonacci series of given range 9 Write a C program to prepare a currency converter. 10 Write a c program to check given number is perfect number or not 11 Write a c program to check given number is Armstrong number or not 12 Write a c program to check given number is Prime number or not 13 Write a c program to check given number is Palindrome number or not 14 Write a C program for following pattern. * 12345 1 1 AAAAA ** 1234 22 12 BBBB *** 123 333 123 CCC **** 12 4444 1234 DD ***** 1 55555 12345 E
7	**Arrays** 1 Write a C Program to make sum of 10 numbers using an Array. 2 Write a C Program to find maximum of given array elements. 3 Write a C Program to make addition of two arrays' elements. 4 Write a C Program to scan and print two dimensional array elements. 5 Write a C Program to search an element from an array. 6 Write a C Program to sort array elements in ascending and descending order. 7 Write a C Program to delete specific element from array elements. 8 Write a C Program to make matrix multiplication of two 3*3 matrixes.

8	**Functions** 1 Write a C Program and make Function to Convert Fahrenheit to Celsius. 2 Write a C Program and make Function to Find Sum and Average of three Numbers. 3 Write a C Program and Make Function for each operation of Simple Calculator. 4 Write a C Program and make recursive function for Factorial. 5 Write a C Program and that demonstrate use of nesting of Function.

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Human Computer Interaction
Course Code:	11-ITE201-1C
Pre-requisite Course:	--

Course Objectives:

1. Students will be able to define 'direct manipulation' and list some of its strengths and weaknesses as an interaction style.
2. Students will be able to redesign part of an interface to exhibit direct manipulation style and predict the likely effects of the change.
3. Students will be able to design an interface for real tasks and users which incorporates direct manipulation in appropriate ways.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
3	0	2	4	50	25	-	25	100

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Introduction to HMI. Natural communication, multimodality, types of human machine interfaces	8	20
2	Human perception and recognition. Psychology of users, attention, thinking, perception of visual, sound and haptic incitements.	7	15
3	Concept of combined reality, virtual reality, technologies, existing scientific and commercial projects. Sensing and tracking. Sensors for sensing of fingers, hands and touching. Interactive digital surfaces, manipulation of digital objects, displays with rear projection.	7	15
4	Multimodal speech interface. Basics of multimodal dialog systems. Speech synthesis. Speech recognition. Talking head.	4	10
5	Interface based on gestures. Sensing of movement, controlling by movement, examples of the interfaces. Sound interaction. Basics of acoustics	8	20
6	Design -Case Studies Case Study 1- Multikey press Hindi Text Input Method on a Mobile Phone. Case Study 2 – GUI design for a mobile phone based Matrimonial application. Case Study 3 –Employment Information System for unorganized construction workers on a Mobile Phone.	8	20

Text Books:

1. Dix A., Finlay J.,Abowd G. D. and Beale R. Human Computer Interaction, 3rd edition, Pearson Education, 2005.

Reference Books:

1. Preece J., Rogers Y.,Sharp H.,Baniyon D., Holland S. and Carey T. Human Computer Interaction,Addison-Wesley.

2. B.Shneiderman; Designing the User Interface,Addison Wesley 2000 (Indian Reprint).

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the basics of human and computational abilities and limitations.	2. Understanding
CLO2	Understand basic theories, tools and techniques in HMI	1 Remembering
CLO3	Understand the fundamental aspects of designing and evaluating interfaces.	1.Remembering 2. Understanding
CLO4	Practice a variety of simple methods for evaluating the quality of a user interface.	3 Applying, 2 Understanding
CLO5	Practice a variety of simple methods for evaluating the quality of a user interface.	5,3, 4 Evaluate , , Applying, Analyze
CLO6	Interpret the methods for evaluating the quality of a user interface	6 Creating

Mapping of CLO with PO and PSO

Course Learning Outcomes	**Program Outcomes (POs)**												**Program Specific Outcomes(PSOs)**			
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CLO1	**M**	**L**	**L**						**M**				**H**			**L**
CLO2	**M**	**L**	**L**						**H**				**M**			
CLO3	**M**	**L**	**L**						**M**		**H**		**H**			
CLO4	**M**	**L**	**L**						**M**		**H**		**L**		**H**	
CLO5	**M**	**L**	**M**				**H**					**H**			**M**	
CLO6	**M**	**L**	**L**						**M**			**L**		**H**		

H:High, M:Medium, L:Low

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

Sr. No.	Practical Exercise
1.	Design Screen and Mockup for The Student Information System for SPU.
2.	The Client Needs to Design the Web for the Matrimony Application. Design wireframes and get the approval.
3.	The State Bank of India needs to develop the Recharge Portal for the DTH Operators. Get the Mockup ready for them with all the required flow.
4.	The Client from the well-known automobile industry, developing AI based dashboard for the new Upcoming car. Design the Mockup for all Car functions with all required features.
5.	Prepare the Concept Design for new Self Checking Kiosk for the Indian Railway.
6.	The German Government wants to develop automatic Ticket vending machines for the Metro Railway.
7.	Well-known music company wants to develop touch based Music Kioske with Headphones to listen to the upcoming tracks and place them at various Malls. Design the Music Application Interface for the user to listen to new tracks for free and also give feedback.
8.	Conceptualize Design for the Smart Glasses Wearable device.
9.	Conceptualize the Design for the Interface for Smart Watch.
10.	Design the Machine Interface to Monitor Voltage, Current and Flow meter with alarm status and required buttons to control Gates of SardarSarovar DAM.
11.	Design a Wireframe for E-Commerce Portal.

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Basic Mathematics- I
Course Code:	11-MDC201-1C
Pre-requisite Course:	--

Course Objectives:

1. Aimed to solve standard topical textbook-level problems by analytical means.
2. Apply multiple concepts in the solution of a more sophisticated problem, which may be derived from a scientific application or from basic application.
3. Model a topical problem from math, solve the problem, and report the results in the original problem context.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		Total (Marks)
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	1	-	4	50	50	-	-	100

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	**Set theory:** Introduction, Representation of sets, Universal set, Empty set, Finite set, Infinite set, Subset, Disjoint set, Equality of two sets, Equivalent sets, power set, Venn diagram, Set operations: Union, Intersection, Difference, Symmetric difference, Complements, Cartesian product of two sets, the algebraic laws of set theory. Examples related to cardinality of sets.	8	20
2	**Matrices:** Introduction, Unit matrix, Square matrix, Transpose of a matrix, Invertible matrices, Diagonal and Anti diagonal elements of matrices, zero matrix, row and column matrix, Symmetric matrix, Skew symmetric matrix, Upper and Lower triangular matrix. Arithmetic Operations on matrices: Addition, Subtraction, Additive Inverse and Multiplication of matrices.	8	20
3	**Graph theory:** Introduction, Graph and multi graphs, Finite graphs, Trivial graph, Sub graph, isomorphic graphs, Homeomorphic graphs, Paths, Hamiltonian graphs, Eulerian Graph, Complete, Regular and Bipartite graphs.	7	15
4	**Function:** Introduction, Definition , Domain, Co-Domain and Range of Function, Types of Function: In to Function, On to Function, One to One Function, Many to One Function, One to One Correspondence and its Examples.	8	20
5	**Group and Subgroup**: Binary Operations, Properties of Binary Operations, Semi group, Monoid, Group, Subgroups and other Groups	7	15
6	**Data Analysis:** Data and Statistical Data, Frequency Distribution, Graphical Representation, Measure of the Central Tendency, Measure of Dispersion	5	10

Text Books:

1. Discrete Mathematics by Seymour Lipschutz and Marc Lipson.-McGraw Hill, Third Edition.
2. Business Mathematics by Sancheti& Kapoor, S.Chand& Sons.

Reference Books:

3. Discrete Mathematical Structure by Kolman, Busby and Ross, PHI
4. Advance Engineering Mathematics, Vol-1 by Dr. V.P. Misra, Dr. Jyoti Sinha, Pratibha Mishra
5. Linear Algebra & Vector Calculus by Dr. K. R. Kachot& Dr. Atul Patel

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Discuss the knowledge on the fundamentals of Mathematics	2 Understanding
CLO2	Know the set theory and able to perform the operations	2 Understanding 3 Applying
CLO3	Know the Matrix and able to perform the algebraic operations on matrices.	2 Understanding 3 Applying
CLO4	Understood the different types of Graphs and able to define it.	2 Understanding
CLO5	Understood the different types of functions and its relations	2 Understanding
CLO6	Understood the different types of functions and its relations	2 Understanding

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	L												L			
CLO2		L			L									M		
CLO3		M			L								L			
CLO4					M									M		
CLO5	M	L	M										L			
CLO6		M			L											

H:High, M:Medium, L:Low

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Business Communication
Course Code:	11-AEC202-1C
Pre-requisite Course:	--

Course Objectives:

To introduce business vocabulary; to introduce business style in writing and speaking; to expose students to the cross-cultural aspects in a globalized world; to introduce the students to the art of persuasion and negotiation in business contexts

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		Total (Marks)
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
1	1	-	2	25	25	-	-	50

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	• Process of communication and importance of communication in technical field. • Verbal and non-verbal Communication • Barriers to Communication • Does language register matter? • Pronunciation and colloquialisms • Culture and communication	6	20
2	**Vocabulary building** • Grammar basics - parts of speech • Grammar basics - verbs • Grammar basics - agreement • Grammar basics - modifiers • Grammar basics - articles, conjunctions, interjectionsand prepositions • Grammar basics - sentence types • Grammar basics - punctuation: types and uses	5	20
3	**Listening and Speaking** • Listening and speaking • Listening and speaking: formal versus informal communication • Speaking: one-to-one communication • Speaking: group communication • Listening and speaking: use of technology	3	15
4	• Presentation skill and its Strategies • How to prepare presentation • Prerequisites for effective presentation delivery • Use of audio-visual aids in Presentation • Use of visuals in presentations and reports	5	20

	• Group work: building on each other's ideas • Research work: formulating questions		
5	**Technical Writing** • Essentials of writing Layout of technical and business documents • Job Application • Business letters: Inquiry, Quotation, placing of an order, Complain • Email etiquettes	3	15
6	**English language through literature** • Engine Trouble by R. K. Narayan • The Road Not taken by Robert Frost • Where the mind is without fear by Rabindranath Tagore	3	10

Text Books:

1. Technical Communication –principles and practice by Meenakshi Raman &Sangeeta Sharma, Oxford university press
2. Business Correspondence and Report writing by R. C. Sharma & Krishna Mohan, TMH publication

Reference Books:

1. Effective Technical Communication by M Ashraf Rizvi (TMH publication)
2. A Communicative Grammar of English by Geoffrey Leech and Jan Svartvik (Pearson Longman)
3. An Intermediate English Grammar by Raymond Murphy, Cambridge University
4. Everyday Dialogues in English by Robert J. Dixson, Prentice Hall of India Pvt. Ltd., New Delhi,

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	**Description**	**Bloom's Taxonomy Level**
CLO1	Define and discuss dynamics of Verbal and Non-Verbal aspects of Communication	1 Remembering 2 Understanding
CLO2	Define the Role and responsibility of listener and audience	2 Understanding
CLO3	Develop accurate pronunciation and understand the meaning	2 Understanding
CLO4	Prepare participants to speak with greater control and charisma in front of others	3 Applying 2 Understanding
CLO5	Write various formal documents of technical and professional communication	3 Applying 4 Analyze 5 Evaluate
CLO6	Communicate in diverse formal situations taking place in organizations	2 Understanding 3 Applying 4 Analyze 5 Evaluate

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H			H	M		L	H	M			H				M
CLO2				M		L	M		H	L	M	L				M
CLO3		L	H		L		M	H		H	H	L				H
CLO4			M	H		L	H		M	H	H					H
CLO5		M	M	H		H	L		M	L	L					H
CLO6		H			M	M		M	L		L	M				H

H:High, M:Medium, L:Low

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	IT Workshop
Course Code:	11-SEC206-1C
Pre-requisite Course:	--

Course Objectives:

1. The aim to develop and enhance relevant technical hand skills required by under graduate IT students.
2. Workshop curricula build the hands on experiences regarding fundamentals of Information Technology.
3. Students will be able to troubleshoot computer, configure network setting and develop basic IT skills.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
-	-	4	2	-	-	25	25	50

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Understanding computer components and peripherals along with their installations.	6	10
2	Install operating system like Linux or MS windows on the computer. The system should be configured as dual boot with both windows and Linux.	6	10
3	Hardware Troubleshooting	6	10
4	Software Troubleshooting	4	8
5	Local area network, Internet and configure TCP/IP setting.	4	8
6	Customize web browsers with LAN proxy setting, bookmarks, toolbars and pop up blockers.	4	8
7	What search engines are and how to use the search engines.	4	8
8	Learn about viruses on the internet and install antivirus software.	4	8
9	Study of Word and LaTeX for documentation.	6	10
10	Study of advanced formulas and functions in Excel.	6	10
11	Introduction to Microsoft Power Point.	6	10

Text Books:

Basic Concepts of Information Technology Workshop by G Praveen Bapu and M V Narayana BS Publications

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To assemble computer peripheral and install OS.	2. Understanding, 3. Applying
CLO2	To do hardware and software troubleshooting.	3. Applying 4. Analyze 5. Evaluate
CLO3	To learn about LAN proxy setting, configure TCP/IP.	2. Understanding, 3. Applying
CLO4	To learn about search engine and antivirus software.	2. Understanding, 3. Applying
CLO5	To study various documentation tools.	2. Understanding, 3. Applying

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	H	M	H	H	H						M	M	H	H	H
CLO2	M	M	M	M	H	M						L	M	H	M	H
CLO3	M	H	M	M	H	H						L	H	M	M	M
CLO4	H	H	H	H	H	M						L	M	M	H	H
CLO5	M	M	M	M	M	M						L	M	M	M	M

H:High, M:Medium, L:Low

Faculty of Engineering and Technology
B.Sc. in Data Science (Semester-I)
In Effect from Academic Year 2024-25

Branch Name:	B.Sc.(IT/DS/CS)
Program Code:	ET110/ ET111/ ET112
Course Title:	Indian Constitution
Course Code:	11-IKS201-1C
Pre-requisite Course:	--

Course Objectives:
Understand the meaning and importance of Constitution, Fundamental rights and duties, union government, state and local governments, other statutory bodies

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
1	1	-	2	25	25	-	-	50

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Meaning of the constitution law and constitutionalism	01	04
2	History of Indian Constitution	02	08
3	Salient features and characteristics of the Constitution of India	01	04
4	Fundamental rights	01	04
5	Right to Equality under Article – 14	02	08
6	Right to certain Freedom under Article 19	01	04
7	Scope of the Right to Life and Personal Liberty under article 21	02	08
8	Fundamental Duties and its legal status	02	08
9	The Directive Principles of State Policy – Its importance and implementation	02	08
10	Federal structure and distribution of legislative and financial powers between the Union and the States	02	08
11	Parliamentary Form of Government in India – The constitution powers and status of the President of India	02	08
12	Powers and Procedure for Amendments in Indian Constitution	02	08
13	History of amendments in Indian Constitutional	02	04
14	Emergency Provisions : National Emergency, President Rule, Financial Emergency	02	08
15	Local Self Government – Constitutional Scheme in India	02	08

Text Book:

1. Constitutional Law of India, Dr. J.N. Pandey, Central Law Agency

Reference Books:

1. Introduction to the Consitution of India, Durga Das Basu, LexisNexis

2. Indian Constitutional Law, M.P. Jain, LexisNexis

3. V.N.Shukla's Constitution of India, Mahndra Pal Singh, Eastern Book Company

4. Constitutional Law – I Structure, Udai Raj Rai, Eastern Book Company

Course Learning Outcomes (CLO):

On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Enhance human values , create awareness about law enactment and importance of Constitution	3. Applying
CLO2	To Understand the Fundamental Rights and Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsbilities.	2. Understanding
CLO3	Create Awareness of their Surroundings, Society, Social problems and their sutaible solutions while keeping rights and duties of the citizen keeping in mind.	3. Applying
CLO4	Understand distribution of powers and functions of Local Self Government.	2. Understanding
CLO5	Understand the National Emergency, Financial Emergency and their impact on Economy of the country.	2. Understanding, 4. Analyzing

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1						L		H								M
CLO2								H								
CLO3								M								L
CLO4		L						M							L	
CLO5				L				H								M
CLO6								M								

H:High, M:Medium, L:Low