GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Information & Communication Technology / Electronics & Communication Engineering / Renewable Energy / Electrical Engineering

Course / Subject Code: DI01000091

Course / Subject Name: Fundamentals of Information and Communication Technology (FICT)

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	ESC

Prerequisite:	Basic knowledge of computer
Rationale:	Nowadays, Information and Communication Technology (ICT) is used in all walks of life. The potential of ICT is widely used in science, business, industry, and education. This course envisages the development of basic skills in the use of information and communication technologies. It will provide students with hands-on experience with different office automation applications to create business documents and to develop programming skills from scratch to improve daily problem-solving skills.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Classify computer systems and their peripherals and create forms using Google applications.	R, U, A
02	Prepare professional documents, analyze data, and create presentations.	U, A
03	Use Scratch to solve simple problems.	R, U, A
04	Understand the use of different blocks in Scratch.	R, U, A
05	Apply decision, loop, and list concepts in Scratch.	U, A

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
0	1	4	3	0	0	20	30	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**COMPUTER SYSTEMS FUNDAMENTALS AND GOOGLE APPLICATIONS** 1.1. Computer system block diagram, Concept of Hardware, and Software 1.2. CPU, Control Unit, Arithmetic logic unit (ALU), Memory Unit, Power Unit, and Interfacing Ports. 1.3. Input-Output unit: Monitor, keyboard, External Hard disk, Mouse, Printers, Scanner, Projectors, etc. 1.4. Operating system concepts, purpose, functions, and characteristics. 1.5. Operations of Windows Linux Installation on PC and Basic Terminal Commands 1.6. Installation of various Application Software. 1.7. Gmail: Create an account; Adding Contacts; Composing an Email; Creating and Managing Labels, Filters, and Signature. 1.8. Drive: Create a folder, Upload and Download Files/folders, and Sharing Files/Folders. 1.9. Forms: Create a Form; Validate a Form; Share a Form, Managing Response.	8	14%
2.	**DOCUMENTATION AND PRESENTATION TOOLS** **MS Word:** 2.1 Basics of text formatting: font type, size, color, effects, typography, Paragraph tool, WordArt, and Drop Cap, Symbol, and Equations. 2.2 Insert Table, Pictures, Shapes Smart Art and Chart options, Inserting rows or columns, merging and splitting cells, Arithmetic Calculations in a Table. 2.3 Page settings and margins including header and footer in the word document. 2.4 Spelling and Grammatical checks (use: Grammarly Software) 2.5 Use of Mail merge tool 2.6 Google Docs sheet: creating and sharing	18	32%

	MS Excel: 2.7 Introduction to data, Cell address, Excel Data Types, formatting 2.8 Understanding formulas, Operators, Common spreadsheet functions and Types of 2D charts. 2.9 Concept of print area, margins, header, footer, and other page setup options 2.10 Overview of Google Spreadsheets and how to create Spreadsheets **MS PowerPoint:** 2.11 Creating new Slides, Working with text boxes, fonts, tables, Layouts, themes, effects, background, and Colors 2.12 Selecting, deleting, moving, copying, resizing and arranging objects. 2.13 Working with drawing tools, Applying shape or picture styles, Applying object borders, object fill, object effects, clip art collection, and modifying clip art 2.14 Configuring a sound playback, Assigning sound to an object, Adding a digital music soundtrack, Transition effects and timings		
3.	**INTRODUCTION TO SCRATCH** 3.1 Scratch: A graphical programing language 3.2 Scratch Programming Environment: The stage, Sprite, Backdrop, Sprite list, Blocks tab, Scripts area, Costumes tab, Sounds tab, Sprite info, Scratch toolbar 3.3 Paint Editor: Create/edit costumes and backdrop, Setting center of a costume. 3.4 Arithmetic Operators and Functions: Arithmetic operators, Mathematical Functions, Random Numbers. 3.5 Data types in Scratch: Boolean, Number, String. 3.6 Variables: What is a variable? Creating a variable, scope of a variable, and use of a variable.	8	14%
4.	**DIFFERENT BLOCKS IN SCRATCH** 4.1 Scratch blocks: Command blocks, Function blocks, Trigger blocks, and Control blocks. 4.2 Motion blocks: go to, glide to, set x to, set y to, point in the direction, point towards, move, turn, change x by, change y by, set rotation style.	12	22%

	4.3 Pen blocks: stamp, pen down, set pen color to, set pen size to, and erase all. 4.4 Looks blocks: say, think, switch costume to, next costume, switch backdrop to, next backdrop, change the size by, set size to, change different effects, set different effects, clear graphic effects, show, hide. 4.5 Sound blocks: play sound until done, start sound, stop sound, change pitch effect by, set pitch effect to, clear sound effect, change volume by, set volume to.		
5.	**PROCEDURES, DECISION MAKING, LOOPING AND CONCEPT OF LISTS IN SCRATCH** 5.1 Concept of structured programming: Procedures, Custom blocks, passing parameters to custom blocks, recursive procedure. 5.2 Event Blocks: when the key is pressed, when this sprite is clicked, broadcast, broadcast, and wait when I receive. 5.3 Comparison operators: less than, greater than, equal to. 5.4 Logical operators: and, or, not 5.5 Control blocks: wait, repeat, forever, if, if-else, wait until, repeat until stop. 5.6 Lists: Creating lists, List commands (Add, Delete, Insert, and Replace), Accessing list elements, and the Contains block.	10	18%
	Total		**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
NA					

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Fundamentals of Computers by Rajaraman V, Adabala N (Sixth Edition)
2. MS-Office for Dummies by Wallace Wang
3. Learn to program with Scratch: A Visual Introduction to Programming with Games, Art, Science and Math by Majed Marji
4. Scratch Programming for Teens by Jerry Lee Ford, Jr.

(b) Open source software and website:

1. https://support.microsoft.com/en-us/training
2. https://www.coursera.org/search?query=MS%20office&
3. https://www.udemy.com/courses/search/?src=ukw&q=MS+office
4. https://scratch.mit.edu
5. https://en.scratch-wiki.info
6. https://nptel.ac.in/courses/106106182 (contents of Week 1)

Suggested Course Practical List:

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required.
1	Identify parts of computer systems and peripherals.	I	02
2	Learn about various operating systems (OS) and install Windows/Linux operating systems.	I	04
3	Use the various tools/utilities provided in the Windows/Linux operating system accessories.	I	04
4	Install printer, scanner, and projector with the computer system	I	02
5	Create, share and Manage Files and Folders in Google Drive	I	02
6	Create and design admissions/inquiries google form for students	I	02
7	Create text documents with different formatting features, insert shapes, SmartArt, images, tables, set page layout and background according to the given examples.	II	04
8	Use the mail merge feature for sending invitation letters for an expert lecture to 10 industries.	II	02
9	Create spreadsheets, analyze data using formulas and functions, and present them in charts.	II	04
10	Create Pay bills/ Pay slips/ Electricity bills/student mark sheets using a spreadsheet and take a printout.	II	04
11	Create professional presentations with various formatting features, insert tables and charts, use drawing tools, apply shape and picture styles, apply object borders, the object fills, and object effects.	ii	04
12	Explore Scratch's project editor interface.	III	02

13	Write a script to perform basic arithmetic operations.	III	02
14	Write a script to simulate dice.	III	02
15	According to Ohm's law, When a current I flows through a resistance R, voltage across R is given by V=IR. Write a script that reads I and R and calculates V.	III	02
16	Write a script to find the value of V using the expression $V = A \sin\theta$ for a given value of A, Θ (take the value of Θ in degree).	III	02
17	Write a script that asks the user to enter a temperature in degrees Celsius. The script will convert the temperature to degrees Fahrenheit and display the result to the user with an appropriate message. (Hint: F° = (1.8 × C°) + 32.)	III	02
18	Write a script to draw a rectangle of given width and height.	IV	02
19	Write a script to connect each of the following sets of points in order to reveal the final shape: (20,-40), (-160,-40), (20,160), (140,-40), (20,-40), (20,-60), (-120,-60),(-80,-100), (80,-100), (120,-60), (20,-60).	IV	02
20	Write a script for pattern draw application with the following instruction. a) Move the sprite 10 step forward when 'Up Arrow Key' is pressed b) Move the sprite 10 step backward when 'Down Arrow Key' is pressed c) Turn the sprite clockwise when 'Right Arrow Key' is pressed d) Turn the sprite anticlockwise when 'Left Arrow Key' is pressed	IV, V	02
21	Write a script to draw a polygon for a given number of sides and side length.	IV, V	02
22	Write a script that asks the user to enter three numbers. The script will then determine and print the largest of the three numbers.	V	02
23	Write a script that calculates and displays the sum of all odd integers between 1 and 20.	V	02
24	Write a script to check whether the given number is prime or not and display an appropriate message.	V	02
25	Write a script to display the Fibonacci Series of 0 to N numbers.	V	02

26	Write a script to find the factorial of a given number.	V	02
27	Write a script to count the number of vowels in a given string.	V	02
28	Write a script to check whether the given number/string is palindrome or not and display an appropriate message.	V	02
29	Write a script to display days of a week using a list.	V	02
30	Write a script to check whether a given string/number is in a list or not and display an appropriate message.	V	02
31	Write a script to find the maximum number in a list of numbers.	V	02
32	Write a script to find the average value of a list of numbers.	V	03
33	Write a script to perform a linear search in a list of strings.	V	03
34	Write a script to count how many times an item appears in a list.	V	03
35	Write a script to perform bubble sort in a list.	V	03
	Total	**60 Hours**	

List of Laboratory/Learning Resources Required:

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1	Computer with basic configuration and Internet Facility	All
2	Window/ Linux as operating system	All
3	Word, Excel, and PowerPoint Software	7-11
4	Scratch Software (open source)	12-35

Suggested Project List:

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

1. Use the Google app to prepare any feedback form on any topic given by the subject teacher, covering all the main features of Google Forms.
2. Prepare an MS word document on any subject given by the subject teacher, covering all the main features of MS word.
3. Use spreadsheets to prepare salary statements, tax statements, student assessment records, student expense systems, company income, and expense statements to determine profit and loss, covering all major features of MS Excel.
4. Prepare 15-20 slide presentations with department and institute information covering key features of MS PowerPoint.
5. Develop a small story and animation in scratch.

6. Develop a small game, simulation in scratch.

Suggested Activities for Students: If any

Other than the classroom and laboratory learning, the following are the suggested student-related ***co-curricular*** activities that can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform the following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidence for their (student's) portfolio which may be useful for their placement interviews:

a) Undertake micro-projects in team/individually.
b) Encourage Students for creating and designing forms related to Departmental work.
c) Encourage students to participate in the Microsoft Office Specialist World Championship.
d) Students are encouraged to register themselves in various MOOCs such as Swayam, edx, Coursera, Udemy, etc. to further enhance their learning.
e) Undertake a survey of different graphical programming languages used to develop animations, mobile apps, games etc.

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