



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Artificial Intelligence (AI) and Machine Learning

Subject Code : DI01071021

Subject Name : Computing Systems and IT Skills Practice

w. e. f. Academic Year:	2026-27
Semester:	1 st
Category of the Course:	ESC

Prerequisite:	---
Rationale:	This course introduces students to the fundamental concepts of computing systems and essential IT skills required for the Artificial Intelligence and Machine Learning domain. It helps students develop basic knowledge of computer hardware, internet technologies, and cyber security practices. The course also focuses on building logical thinking through algorithms, flowcharts, and block-based programming. Students gain hands-on experience with digital tools, multimedia applications, and introductory AI tools. This foundation prepares students for advanced subjects such as programming, data science, and machine learning in later semesters.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Use computer systems and operating systems effectively.	Apply
02	Apply logical thinking and problem-solving techniques using algorithms and flowcharts.	Apply
03	Develop basic programs using block-based coding tools.	Apply
04	Use internet tools, multimedia tools and digital resources effectively.	Apply
05	Create and format documents, spreadsheets, and presentations using digital productivity tools.	Apply

**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
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
0	1	4	3	00	00	20	30	50



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Fundamentals of Computing Systems: • Introduction to computers and characteristics : Definition of computer, Characteristics of computer, Applications of computers in various fields • Generations and types of computers: First generation, Second generation, Third generation, Fourth generation, Fifth generation, Desktop computer, laptop computers, super computer, workstations, mobile devices • Components of computer system : Input devices, Output devices, Storage devices, Processing devices • CPU components: ALU, Control Unit, Registers • Memory systems: RAM, ROM, Cache, Secondary storage devices • System software and application software	6	16
2.	Internet Technologies and Cyber security: • Introduction to Computer Networks: Definition of computer network, Types of networks (LAN, MAN, WAN) • Internet Fundamentals: What is Internet, Web browser, Web server, Client-server model • World Wide Web: URL, Domain name, Search engines, Websites • Email Communication: Creating email account, Sending and receiving email, Attachments, CC and BCC • Cyber security Fundamentals: Confidentiality, Integrity, Availability • Cyber Threats: Malware, Phishing, Social engineering, Identity theft • Digital Safety Practices: Password security, Two factor authentication, Safe internet usage	12	20
3.	Problem Solving Techniques: • Introduction to Problem Solving: Concept of problem solving, Importance in computing • Steps in Problem Solving: Problem identification, Solution design, Implementation, Testing • Algorithms: Definition of algorithm, Characteristics of algorithms, Writing simple algorithms, Algorithm Design Concepts, Sequential execution, Selection (decision making), Iteration (repetition) • Flowcharts: Definition of flowchart, Standard flowchart symbols, Flowchart design	12	20



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4.	Block Based Programming: • Introduction to Programming: Concept of programming, Programming languages • Block Coding: Concept of block programming, Advantages of block coding, Scratch, Edublocks • Types of Blocks: Motion blocks, Looks blocks, Events blocks, Control blocks, Variables • Programming Logic: Conditions, Loops, Events	14	24
5	Digital Productivity Tools and Introduction to AI: • Digital Productivity Tools : Introduction to productivity tools, Document creation and editing, Spreadsheet basics, Presentation tools • Document Processing : Creating and formatting documents, Inserting tables, images and hyperlinks, Page layout and formatting • Spreadsheet Basics: Spreadsheet interface, Data entry and formatting, Basic formulas and functions, Charts and data visualization • Presentation Tools : Creating presentation slides, Slide layouts and themes, Adding images, charts and multimedia, Slide transitions and animations • Introduction to Artificial Intelligence: Definition of Artificial Intelligence, Difference between AI and traditional programming, Applications of AI in daily life	16	20
	AI Tools for Learning and Productivity: • ChatGPT – AI tool for generating text, explanations, summaries, and coding help • Google Gemini – AI assistant for answering questions, research support, and content generation • Canva AI (Magic Design / AI Image Generator) – tool for creating posters, presentations, and images • Google Teachable Machine – simple tool to demonstrate basic AI model training and classification		
	Total	60	100

References/Suggested Learning Resources:

(a) Books:

1. **Peter Norton**, Introduction to Computers, McGraw Hill Education.
2. **V. Rajaraman**, Fundamentals of Computers, PHI Learning Pvt. Ltd.
3. **Alex Nordeen**, Scratch Programming for Beginners, Independently Published.
4. **Michael Miller**, Absolute Beginner's Guide to Computer Basics, Pearson Education.



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5. **Stuart Russell and Peter Norvig**, Artificial Intelligence: A Modern Approach, Pearson Education.
6. **David M. Kroenke**, Using MIS / Digital Literacy, Pearson Education.

(b) Open source software and website:

1. Scratch Programming Platform – <https://scratch.mit.edu>
2. Edublocks Visual Programming Tool – <https://edublocks.org>
3. Google Teachable Machine – <https://teachablemachine.withgoogle.com>
4. Canva Design Tool – <https://www.canva.com>
5. ChatGPT AI Assistant – <https://chat.openai.com>
6. Google Gemini AI Assistant – <https://gemini.google.com>
7. Basic Computer Skills Learning – <https://edu.gcfglobal.org>
8. Computer Science Tutorials – <https://www.geeksforgeeks.org>
9. Cybersecurity Learning Resources – <https://www.w3schools.com/cybersecurity>
10. Programming Learning Resources – <https://www.programiz.com>
11. Online Python Compiler – <https://www.onlinegdb.com>

Suggested Course Practical List:

1. Identify the basic hardware components of a computer system and observe their functions.
2. Check the system configuration (CPU, RAM, storage, operating system) of the computer.
3. Create folders and perform file management operations such as copy, move, rename, and delete files.
4. Install and uninstall application software in the operating system.
5. Create an email account and send/receive emails with attachments.
6. Perform effective web searching using different search engines.
7. Configure browser settings and manage privacy options.
8. Demonstrate the use of strong passwords and two-factor authentication.
9. Write an algorithm to perform basic arithmetic operations.
10. Write an algorithm to find the largest of three numbers.
11. Draw flowcharts for simple problems such as odd/even number checking.
12. Explore the Scratch programming interface and identify different blocks.
13. Create a simple animation using Scratch motion and event blocks.
14. Develop a Scratch program using loops and conditional blocks.
15. Design a simple interactive game using Scratch programming.
16. Create a formatted document using a word processing tool.
17. Create a spreadsheet with basic formulas and functions.
18. Generate charts and graphs using spreadsheet data.
19. Prepare presentation slides using presentation software.
20. Design a poster or banner using Canva or any graphic design tool.
21. Demonstrate the use of **ChatGPT** for generating text or explanations.
22. Demonstrate the use of **Google Gemini** for searching and summarizing information.
23. Use **Canva AI tools** to generate images or presentation designs.
24. Train and test a simple image classification model using **Google Teachable Machine**.



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25. Mini practical project demonstrating the use of digital tools or AI tools for solving a simple problem.

List of Laboratory/Learning Resources Required:

1. **Computer Systems** – Desktop/Laptop computers with minimum configuration (Intel i3/i5 processor, 4 GB RAM, 500 GB storage or higher).
2. **Operating System** – Windows / Linux based operating system.
3. **Internet Connectivity** – Broadband internet connection for accessing online learning resources.
4. **Web Browsers** – Google Chrome / Mozilla Firefox / Microsoft Edge.
5. **Visual Programming Software** – Scratch / Edublocks or similar block-based programming tools.
6. **Office Productivity Tools** – Word processor, spreadsheet and presentation software (MS Office / LibreOffice / Google Docs).
7. **Graphic Design Tools** – Canva or similar online design tools.
8. **AI Learning Tools** – ChatGPT, Google Gemini, Google Teachable Machine or similar AI platforms.

Suggested Project List:

1. **Personal Digital Portfolio**
Create a personal digital portfolio containing student details, achievements, and interests using document, presentation, and design tools.
2. **Scratch Animation Project**
Develop a simple animation using Scratch that demonstrates motion, events, and control blocks.
3. **Scratch Interactive Game**
Design a simple interactive game using Scratch programming with conditions, loops, and scoring logic.
4. **Cyber Safety Awareness Poster**
Design a digital poster using Canva or any graphic design tool explaining cyber safety and safe internet practices.
5. **Student Data Management Spreadsheet**
Create a spreadsheet to store student marks, calculate totals and averages, and display results using charts.
6. **AI Tools Demonstration Project**
Prepare a presentation demonstrating the use of AI tools such as ChatGPT, Google Gemini, and Canva AI for learning and productivity.
7. **Image Classification using Teachable Machine**
Train a simple image classification model using Google Teachable Machine and demonstrate its prediction results.
