Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Program	**Computer Science and Engineering**	**Semester**	1/2
Course Name	**IT Skills**	**Type of Course**	Integrated
Course Code	**25CS01I**	**Contact Hours**	7 per week
Teaching Scheme	3: 0:4	**Credits**	5
CIE Marks	50	**SEE Marks**	50 (Practice)

1. Rationale:

In today's fast-changing digital world, foundational IT skills are crucial for technical professionals. This course equips students with hands-on experience in key areas, including computer fundamentals, cybersecurity, problem-solving, **Cloud Computing**, IoT, Artificial Intelligence (AI), and prompt engineering. Additionally, it covers IT certifications to help students build industry-relevant expertise and enhance their job readiness.

2. Course Outcomes: At the end of the Course, the student will be able to:

CO-01	Demonstrate knowledge of computer hardware, software, networking, and internet services.
CO-02	Identify common cyber threats and implement security measures.
CO-03	Apply algorithmic thinking and block-based coding to create simple programs.
CO-04	Explain applications of digital technologies such as Cloud, IoT and AI.
CO-05	Apply AI tools and prompt engineering techniques to generate meaningful outputs.

3. Course Content

Week	**CO**	**PO**	**Lecture(3HRS) (Knowledge Criteria)**	**Practice(4HRS) (Performance Criteria)**
1	**1**	**1, 4**	**Introduction to Computers** ▪ Definition and basic understanding of a computer.	1. Identify the parts of a computer system.

			▪ Generations of Computers ▪ Classification of computer based on their size, purpose, functionality, and technology. ▪ Functional Block Diagram of a Digital Computer. **Memory Systems:** Types of Memory and Their Usage: Primary Memory, Secondary Memory: Input/output Systems **Software:** System software vs. application software	2. Identify the operating system and hardware specifications of a computer.. 3. Basic folder/ file operations (GUI based) 4. Install application software such as web browser, scratch. 5. Hardware scavenger hunt (students identify components in disassembled PC images). Case Study: Prepare a report on important factors to be considered while buying a computer (based on purpose and budget).
2	**1**	**1, 4**	**Internet skills:** ▪ What is Computer Networks? ▪ Types of Networks. Physical and Logical address, Protocols, Key Devices in a Network (Router, Switch, Modem, Access Point) ▪ What is Internet? Common Applications of the Internet; ▪ Browsers, Web Server, Client–Server Model, URL, Search Engine, Domain name and domain name system, websites. ▪ Personal website, website hosting.	1. Explore and list 3 real-world examples for each type of network (LAN, MAN, WAN). 2. Find your Physical (MAC) and Logical (IP) Address 3. Create an email account (e.g., Gmail, Outlook) and explore its security settings 4. Using a Search Engine Effectively : Search for "How does a Search Engine work?" 5. Design, develop and host a personal website using any free platform such as wix.com or worldpress.com 6. Test Internet speed
3	**2**	**1, 4, 7**	**Cybersecurity** ▪ Introduction to Cybersecurity ▪ What is Cybersecurity? ▪ CIA -triad ▪ Importance and Risks ▪ Common Threats: Malware, Phishing, Ransomware, Social Engineering ▪ Cybersecurity Best Practices	1. Identify different cyber threats using real-world examples 2. Install and run an antivirus scan 3. Create strong passwords using password managers 4. Enable and test multi-factor authentication (MFA) 5. Implement User Access Control (UAC) settings on a system 6. Identify safe vs. unsafe websites using browser security indicators

			Secure Authentication and Access Control ▪ Importance of Strong Passwords and ▪ Multi-Factor Authentication (MFA) ▪ Role of User Access Control and Privileged Accounts ▪ Password Management Tools **Safe Browsing and Data Protection** ▪ Secure Websites (HTTPS, SSL Certificates) ▪ Identifying Fake Websites and Links ▪ Basics of Encryption and Secure File Sharing ▪ Importance of Backups	7. Encrypt and decrypt a file using built-in OS tools 8. Set up and perform a basic data backup
4	**2**	**1, 4, 5, 7**	**Cyber security best practices** ▪ Awareness on cyber safety ▪ Do's and dont's w.r.t ▪ Password Management ▪ Safe Browsing and Email Habits ▪ Software and System Security ▪ Data Protection and Backup ▪ Social Engineering and Phishing Awareness ▪ Secure Mobile and IoT Devices ▪ Staying Safe from Online Predators, Cyberbullying and Cyber harassment, Using Social Networks Safely**.**	1. Spot Fake Websites and Phishing Emails 2. Analyze real vs. fake websites (check for HTTPS, domain names, security certificates). 3. Identify phishing emails (hover over links, check sender email, grammar errors). 4. Update and Patch Management a. Check if your OS and software are up to date (Windows Update, Linux apt upgrade). b. Test an antivirus scan and remove unnecessary apps. 5. Implement a Backup Strategy 6. Encrypt and Secure Sensitive Files 7. Recognizing Scam Calls and Messages
5	**3**	**1, 2, 3, 4, 7**	**Introduction to Problem Solving** ▪ What is problem-solving? ▪ Problem-solving cycle. ▪ Introduction to block-based coding (Scratch, Blockly, MIT App Inventor / Klaritree or similar tool).	1. Explore the interface of the block coding tool 2. Develop algorithms and draw flowchart ▪ for basic arithmetic operations. ▪ Metric conversions.

			▪ Understanding algorithms, flowcharts, and sequencing.	
6	**3**	**1, 2, 3, 4, 7**	What are variables? Storing and updating values. Using variables for score counters and timers. Basic Elements of Block-Based Coding: ▪ Motion Blocks ▪ Looks Blocks ▪ Events Blocks ▪ Control Blocks ▪ Operators Blocks ▪ Variables Blocks	1. Create a simple animated sequence (e.g., making a sprite move in Scratch). 2. Design a flowchart for a real-world task 3. Create a score counter for a simple game. 4. Develop an interactive greeting app that responds to user input.
7	**3**	**1, 2, 3, 4, 7**	**Decision Making** ▪ What are conditions? (if, if-else, nested if). ▪ Boolean logic (AND, OR, NOT). ▪ Applying conditional logic in games and applications.	1. Develop algorithms and draw flowchart to demonstrate comparison and logical operations (eg. Comparison of two number) 2. Create an interactive story with decision-making (yes/no choices). **3.** Build a traffic light simulator using conditional statements.
8	**3**	**1, 2, 3, 4, 7**	**Understanding Loops and Repetition** ▪ Importance of loops in coding. ▪ Types of loops (repeat, repeat until, forever). ▪ Practical use of loops in problem-solving.	1. Create a bouncing ball animation using loops. **2.** - Design a counting program that prints numbers from 1 to 20 using loops.
9	**4**	**1, 4, 7**	**Cloud Computing** ▪ What is **Cloud Computing**? ▪ **Cloud Computing** benefits and use cases ▪ Cloud service models (IaaS, PaaS, SaaS)	1. Create a free cloud account (AWS, Azure, or GCP) 2. Explore the cloud console and key services 3. Set up cloud storage and upload/download files 4. Create Online Forms and Surveys to capture data using cloud services
10	**4**	**1, 4, 7**	**Internet of Things (IoT)** ▪ What is IoT? ▪ Characteristics	1. Create a simple visual block code to blink LED in Arduino board using visual block code, upload code to Arduino board and demonstrate.

			▪ Components of IoT (Sensors, Actuators, Communication, Cloud, Analytics) ▪ Use Cases of IoT across various industries. ▪ Examples of IoT in everyday life	2. Create a Traffic signal controller with 3 LED (RED, YELLOW and GREEN), upload code to Arduino board and demonstrate. Note : Students and Teachers to use visual block code platform such as a. https://www.tinkercad.com/ b. https://mblock.cc for building IoT application and demonstration.
11	**4, 5**	**1, 4, 7**	**Artificial Intelligence** ▪ What is AI? ▪ Types of AI (Weak AI, Strong AI, General AI) ▪ AI in Everyday Life: Real-world applications ▪ AI Systems like prediction, recommendation ,etc. ▪ - AI Applications (Healthcare, Finance, Robotics, etc.)	Explore AI tools such as : ChatGPT, Deepseek, Gemini,Grok, Copilot, NapkinAI, Sora,etc
12	**5**	**1, 4, 7**	**Prompt Engineering** ▪ What is Prompt Engineering? ▪ Role of AI language models ▪ Types of AI prompts: Direct, Instructional, Conversational ▪ Understanding AI capabilities and limitations **Structuring Effective Prompts** ▪ Key principles of writing effective prompts ▪ Clarity, specificity, and context in prompts ▪ Role of tone, format, and constraints **Domain-Specific Prompting** ▪ Using AI for content creation (writing, marketing, coding) ▪ AI in education and research ▪ Customizing prompts for business applications	1. Exploring different AI models (ChatGPT, Claude, Bard) 2. Testing basic prompts and analyzing responses 3. Improving weak prompts 4. Experimenting with structured vs. unstructured prompts
13	**1, 2,**	**1, 7**	**IT Certifications and Career Paths**	**1.** Research and present a report on popular IT certifications.

	3, 4		▪ Overview of IT certifications (Entry-level to Expert) ▪ Importance of certifications in IT careers ▪ Choosing the right certification based on career goals (Networking, Security, Cloud, Development, etc.)	2. Identify career interests and match them with relevant certifications. 3. Develop a career roadmap with certification milestones.

4. References

Sl No	Description
1	*Computer Fundamentals* by P.K. Sinha (11th Ed.)
2	*Data Communications and Networking* by Behrouz Forouzan (5th Ed.)
3	*Cybersecurity for Beginners* by Raef Meeuwisse – Covers threats
4	*Coding for Kids: Scratch* by Jon Woodcock
5	***Cloud Computing** Basics* by Anders Lisdorf
6	*IoT for Beginners* by Adeel Javed
7	*Artificial Intelligence: A Guide for Thinking Humans* by Melanie Mitchell
8	*The Tech Career Guide* by Aki Ito
9	Learn Prompting
10	AI Playground
11	Tinkercad Circuits
12	Blockly Games
13	https://onlinecourses.swayam2.ac.in
14	https://www.geeksforgeeks.org
15	Essentials of Prompt Engineering | Coursera
16	https://www.ncerc.ac.in

5. Suggestive Online courses

Sl no	Topic Name	Reference Courses	Self Assessment Link	Source
1	**Cybersecurity**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014222737382490112870/overview		Coursera
2	**Security Attacks**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013842495231705088165 31_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/html/lex_auth_0138424974193704961598 2_shared?collectionId=lex_auth_0138424952317050881653 1_sharedandcollectionType=Course	IIHT
3	**Introduction to Problem Solving**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013114932072439808168 5_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_auth_013234465974222848743 2_shared?collectionId=lex_auth_013114932072439808168 5_sharedandcollectionType=Course	Infosys Wingspan
4	**Flowcharts**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013501555913695232790 9/overview		Skillsoft

5	**Block coding**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013177717283605708885_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/html/lex_auth_013165205899452416510_shared?collectionId=lex_auth_013177717283605708885_sharedandcollectionType=Course	IIHT
6	Block coding	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013094404668416000169 3_shared/overview		IIHT
7	**Cloud Computing**	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_2924501508992264000 0_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_auth_01268242367501107260_shared?collectionId=lex_29245015089922640000_sharedandcollectionType=Course	Infosys Wingspan
8	Internet of Things	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_215536228825219970 00_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_12361814852557394000_shared?collectionId=lex_21553622882521997000_sharedandcollectionType=Course	Infosys Wingspan
9	Artificial Intelligence	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_8840337130015322000_shared/overview	https://infyspringboard.onwingspan.com/web/en/viewer/iap/lex_261056189367467100002000_shared?collectionId=lex_8840337130015322000_sharedandcollectionType=Course	Infosys Wingspan

6. CIE Assessment Methodologies

Sl.No	CIE Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1Theory Test	4	90	50	Average of all CIE=50 Marks
2.	CIE-2Practice Test	7	180	50	
3	CIE-3Theory Test	10	90	50	
4.	CIE-4Practice Test	13	180	50	
5	CIE-5 ▪ Portfolio evaluation (20) ▪ Online Course/s of minimum 10 Hrs. in Infosys Spring Board/ Swayam/NPTEL/AWS /any other (30)	1-13		50	
				Total	**50 Marks**

Note:

Portfolio evaluation

Each laboratory exercise will be evaluated for a total of 20 marks. The evaluation will include the following components:

- Written description of the experiment in the observation book.
- The results obtained from the experiment.
- Corrections and evaluations of the experiment completed in the previous class, documented in the record book.

The average of all exercises shall be considered for the final assessment at the end of course.

Rubrics for the Mini Project (if included) should be defined by the course coordinator.

7. SEE – Practice Assessment Methodologies

Sl.No	SEE – Practice Assessment	Duration (minutes)	Max marks	Min marks to pass
1.	Semester End Examination-Practice	180	50	20

8. Theory Test model question paper

Program	**Computer Science and Engineering**			**Semester -1**	
Course Name	**IT Skills**			**Test**	**III**
Course Code	**25CS01I**	**Duration**	**90 min**	**Marks**	**50**
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					

Q.No	Questions	Cognitive Level	Course Outcome	Marks
	Section - 1			
1	a. Explain the significance of the functional block diagram of a digital computer with a neat diagram. (5) b. Explain the evolution of computers through different generations, highlighting key technological advancements in each generation. (10) c. Explain the different types of networks (LAN, MAN, WAN) with suitable real-world examples. How do they differ in terms of scale and application?(10)	L2	1	25
2	a. Classify computers based on size and purpose. Provide one real-world use case for each type. (5) b. **Explain** how advancements in computer generations (from	L2	1	

	vacuum tubes to AI) have impacted business productivity. (10) c. Describe the client-server model using the example of an online banking website. (10)			
Section – 2				
3	a. *A friend unknowingly clicks a phishing link and shares their bank credentials. Using the CIA triad, explain the potential risks. Then, outline steps they should take immediately to mitigate damage. (10)* b. What is Multi-Factor Authentication (MFA)? How does it improve authentication security? Provide an example (8) c. Define Cybersecurity and explain the CIA Triad model. Why is it essential in today's digital world? (7)	L2	2	25
4	a. Describe the importance of password management tools. How do they contribute to secure authentication? Illustrate with examples of popular tools. (10) b. Explain how HTTPS and SSL certificates ensure secure browsing. How can users verify a website's security? (8) c. Compare phishing and ransomware attacks in terms of intent, delivery method, and impact. (7)	L2	2	
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.				

Signature of the Course Coordinator **Signature of the HOD** **Signature of the IQAC Chairman**

9. CIE Practice Test model question paper

Program	**Computer Science and Engineering**			**Semester**	**1**
Course Name	**IT Skills**			**Test**	**II**
Course Code	**25CS01I**	**Duration**	**180 min**	**Marks**	**50**
Name of the Course Coordinator:					

Questions	**CO**	**Marks**
You have been hired as an IT Support Specialist in a company. Your first assignment is to set up a secure computer system, connect it to a network, and develop a simple automated task using block-based coding. You are required to: a. Set up a computer system by identifying its hardware and software specifications. ▪ Find and document system details like CPU, RAM, storage, and operating system. ▪ Identify whether the installed software is system software or application software. b. Configure network settings and verify the internet connection. ▪ Retrieve and document the IP address, MAC address, and default gateway. c. Ensure cybersecurity best practices to protect the system and online accounts. d. Develop a simple program using block-based coding (Scratch, Blockly, or MIT App Inventor) to automate a basic task. ▪ Create an interactive quiz that asks a user three questions and gives feedback on their answers. OR ▪ Develop a program where a sprite moves when arrow keys are pressed.	**2**	**50**
Scheme of assessment Computer System Setup - 10 Network Configuration and Internet Connectivity - 10 Cybersecurity Best Practices – 10 Block-Based Coding - 20		
	Total Marks	**50**

Sign of the Course Coordinator **Signature of the HOD**

10. SEE- Model Practice Question Paper

Program	Computer Science and Engineering		Semester	1
Course Name	IT Skills	Course Code : 25CS01I	Duration	180 min
Questions			**CO**	**Marks**
As an IT specialist, you are tasked with setting up a secure digital environment for a small business. You must: a. Configure and document the computer hardware and software specifications of a system. b. identify the IP and MAC addresses and enable basic security settings. c. identify phishing threats and implement Multi-Factor Authentication (MFA). d. Develop a simple interactive program using block-based coding that automates a basic business task of greeting customers e. Use AI tools to generate a business report and refine the output using effective prompt engineering techniques. i.			**1,2,3,5**	**50**
Scheme of assessment a. System setup - 10 b. Cybersecurity Measures - 10 c. Block-Based Coding and Algorithmic Thinking - 10 d. Report Submission and Presentation - 20				
			Total Marks	**50**

1.Signature of the Examiner **2. Signature of the Examiner**

11. Equipment/software list with Specification for a batch of 30 students

Sl.No.	Particulars	Specification	Quantity
01	Desktop/Laptop PC with Windows/Linux	Intel i3, 500GB Hard Disk/SSD, 8GB RAM, Monitor, Mouse, Keyboard or higher configuration	30
02	Internet Connection	100 Mbps speed or higher subscription	1
03	LAN connectivity/ High speed Wireless AP	32 Port Switch with LAN cabling/ Wifi Adapters (32 No.)	1
04	Online UPS	5KV with 3 -6 hours backup	1
05	Projector	Multimedia Projector	1

06	White Board	Plane white board / Smart Board/Smart TV	1
07	Audio Speakers	Multimedia, Two-way hybrid speaker system	2